Chapter 6

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Air Quality and Global Climate Change Impact Analysis

BADLANDS LANDFILL INTEGRATED PROJECT (BLIP) AIR QUALITY AND GLOBAL CLIMATE CHANGE IMPACT ANALYSIS

County of Riverside

January 9, 2019

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Traffic Engineering ● Transportation Planning ● Parking ● Noise & Vibration
Air Quality ● Global Climate Change ● Health Risk Assessment

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County of Riverside

January 9, 2019

prepared by

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EXECUTIVE SUMMARY

The purpose of this air quality and global climate change impact analysis is to provide an assessment of the impacts resulting from development of the proposed Badlands Landfill Integrated Project (BLIP) and to identify measures that may be necessary to reduce potentially significant impacts.

CONSTRUCTION-SOURCE EMISSIONS

Project construction-source emissions would not exceed applicable regional thresholds of significance established by the SCAQMD. For localized emissions, the project will not exceed applicable Localized Significance Thresholds (LSTs) established by the SCAQMD.

Project construction-source emissions would not conflict with the Basin Air Quality Management Plan (AQMP). As discussed herein, the project will comply with all applicable SCAQMD construction-source emission reduction rules and guidelines. Project construction source emissions would not cause or substantively contribute to violation of the California Ambient Air Quality Standards (CAAQS) or National Ambient Air Quality Standards (NAAQS).

Established requirements addressing construction equipment operations, and construction material use, storage, and disposal requirements act to minimize odor impacts that may result from construction activities. Moreover, construction-source odor emissions would be temporary, short-term, and intermittent in nature and would not result in persistent impacts that would affect substantial numbers of people. Potential construction-source odor impacts are therefore considered less than significant.

OPERATIONAL-SOURCE EMISSIONS

The project operational sourced emissions would not exceed applicable regional thresholds of significance established by the SCAQMD. Project operational-source emissions would not result in or cause a significant localized air quality impact as discussed in the Operations-Related Local Air Quality Impacts section of this report. Additionally, project-related trips will not cause or result in CO concentrations exceeding applicable state and/or federal standards (CO “hotspots). Project operational-source emissions would therefore not adversely affect sensitive receptors within the vicinity of the project.

Project operational-source emissions would not conflict with the Basin Air Quality Management Plan (AQMP). The projects emissions meet SCAQMD regional thresholds and will not result in a significant cumulative impact. The project is expected to comply with the site's existing Odor Impact Minimization Plan. Mitigation measure 1 is incorporated to ensure that the project meets an 80 percent control efficiency in VOC emissions over the unmitigated emission rates provided in SCAQMD Rule 1133.3 (d)(5). Potential operational-source odor impacts are therefore considered less than significant.

GREENHOUSE GASES

Project-related GHG emissions do not exceed the SCAQMD draft threshold of 3,000 MTCO2e per year for all land uses, and GHG emissions are considered to be less than significant.

Furthermore, as the projects GHG emissions do not exceed the SCAQMD draft threshold (based on EO S-3-05), the project would not conflict with the goals of SB-32 and the County of Riverside Climate Action Plan; therefore, the project would not conflict with an applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases and impacts are considered to be less than significant.

1. INTRODUCTION

This section describes the purpose of this air quality and global climate change impact analysis, project location, proposed development, and study area. Figure 1 shows the project location map and Figure 2 illustrates the project site plan.

PURPOSE AND OBJECTIVES

This study was performed to address the possibility of regional/local air quality impacts and global climate change impacts, from project related air emissions. The objectives of the study include:

- documentation of the atmospheric setting
- discussion of criteria pollutants and greenhouse gases
- discussion of the air quality and global climate change regulatory framework
- discussion of the air quality and greenhouse gases thresholds of significance
- analysis of the construction related air quality and greenhouse gas emissions
- analysis of the operations related air quality and greenhouse gas emissions
- analysis of the conformity of the proposed project with the SCAQMD AQMP
- recommendations for mitigation measures

The Riverside County Department of Waste Resources (RCDWR), on behalf of the County of Riverside, is the lead agency for this air quality and greenhouse gas analysis, in accordance with the California Environmental Quality Act authorizing legislation. Although this is a technical report, every effort has been made to write the report clearly and concisely. To assist the reader with terms unique to air quality and global climate change, a definition of terms has been provided in Appendix A.

PROJECT LOCATION

The project site is located at 31125 Ironwood Avenue, northeast of the City of Moreno Valley, north of the SR-60 Freeway, and westerly of the City of Beaumont, in unincorporated Riverside County. A vicinity map showing the project location is provided on Figure 1.

PROJECT DESCRIPTION

The project proposes to excavate/grade approximately 300 acres to the south and east of the existing 150 acre disposal area. The excavation is proposed to occur in approximately seventeen stages (ranging from 11 to 26 acres in each stage), which will be followed by the installation of a liner system to be used for the expanded refuse disposal area. Ultimately, the lined refuse disposal area will be increased by 250 acres. The project also includes relocation of the fee booth, Waste Recycling Park area, and other ancillary uses and activities within the site as necessary. Two areas to the north and east of the expansion area will be used to stockpile excavated dirt and sedimentation basins will be constructed where appropriate.

The project site is proposed to be expanded as follows:

- Increase the maximum daily disposal capacity for municipal solid waste (MSW) from 4,500 tons per day to 5,000 tons per day;
- Add a windrow (up to 300 tons per day) or aerated static pile (ASP) compost operation (up to 150 tons per day);
- Expand the refuse footprint from 150 acres to 400 acres in multiple stages;
- Add sedimentation basins;
- Add two (2) stockpile areas;
- There will be no change to daily permitted vehicles – will remain 612.

The equipment and machinery utilized by the Badlands Landfill is shown in the table below. The baseline/existing equipment column lists the quantity of equipment typically used at the landfill for daily operation, soil management, site maintenance, improvement projects, etc. Implementation of the proposed project will require additional equipment during both construction and operation of the compost facility. During construction, current soil management and site maintenance activities, as well as improvement projects, will cease, and baseline/existing equipment, where appropriate, shall be redirected to the construction of the proposed project. The redirected equipment is identified in each work item below under off-set credits:

Equipment List		
Equipment Type	Baseline/Existing Equipment	Additional Equipment Needed for the Project
Compactor	2	0
Scraper	7	3
Dump Truck	2	0
Dozer	6	0
Loader	1	1
Excavator	2	0
Motor Grader	3	0
Water Truck	3	1
Backhoe	2	0
Water Pump	-	2
Rock Crusher	-	1
Forklift	1	1
Grinder	-	1
Trommel/Screener	-	1
Compost Turner	-	1
Landfill Tipper	-	1

Project Construction

Work items listed for project construction are developed sequentially and will not overlap. Project construction work Items represent the worst case construction stage - 26 acre liner development and compost facility construction.

Work Item 1: Mobilization

- 10 days
- 2 Flatbed trucks to haul equipment to the site (4 hours per day)

Work Item 2: Develop Water/Install BMPs

- Includes initial clearance and pump setup to get water to the project.
- 10 days - eight workers
- Equipment:
  - ☐ 1- Wheeled Backhoe (8 hours per day)
  - ☐ 2- 900GPM Water Pumps (8 hours per day)
  - ☐ 1- Wheeled Loader (8 hours per day)
  - ☐ 1- Tracked Bulldozer (4 hours per day)

  - 1- Water Truck (4 hours per day)
- Off-set Credits:
  - 5 Wheeled Scrapers, 3 Tracked Bulldozers, 2 Water Trucks, 2 Wheeled Motor Graders, 2 Dump Trucks, 1 Tracked Excavator, and 1 Wheeled Backhoe

Work Item 3: Demolition and Crushing

- Demolition of drainage channels, riprap, asphalt roads, concrete materials, and site preparation.
- 20 days for removal and 5 days for crushing - seven workers
- Equipment:
  - Removal
    - 1- Tracked Excavator (8 hours per day for 20 days)
    - 2- Dump Trucks (8 hours per day for 20 days)
    - 1- Water Truck (4 hours per day for 5 days)
  - Crush
    - 1- Wheeled Loader (8 hours per day for 5 days)
    - 1- Rock Crusher (8 hours per day for 5 days)
  - Off-set Credits:
    - 5 Wheeled Scrapers, 3 Tracked Bulldozers, 2 Water Trucks, 2 Wheeled Motor Graders, 2 Dump Trucks, 1 Tracked Excavator, and 1 Wheeled Backhoe

Work Item 4: Earthwork: Liner Subgrade, Stockpile Construction

- Excavation, dirt hauling, PCS installation, and engineered fill.
- 410 days – 20 workers
- Equipment:
  - 8- Wheeled Scrapers (8 hours per day for 410 days)
  - 3- Tracked Bulldozers (8 hours per day for 410 days)
  - 3- Water Trucks (8 hours per day for 410 days)
  - 1- Wheeled Motor Grader (8 hours per day for 410 days)
- Off-set Credits:
  - 5 Wheeled Scrapers, 3 Tracked Bulldozers, 2 Water Trucks, 2 Wheeled Motor Graders, 2 Dump Trucks, 1 Tracked Excavator, and 1 Wheeled Backhoe

Work Item 5: Liner System Installation

- Prepare subgrade and install geo-synthetic liner.
- 135 days – 10 workers
- Equipment:
  - 1- Wheeled Loader (8 hours per day for 135 days)
  - 1- Wheeled Forklift (8 hours per day for 135 days)
  - 1- Dump Truck (4 hours per day for 135 days)
  - 1- Water Truck (4 hours per day for 135 days)
- Off-set Credits:
  - 5 Wheeled Scrapers, 3 Tracked Bulldozers, 2 Water Trucks, 2 Wheeled Motor Graders, 2 Dump Trucks, 1 Tracked Excavator, and 1 Wheeled Backhoe

Work Item 6: Compost Facility Installation

- Development of compost area including grading and site development (pad development and equipment assembly).
- 25 days – 8 workers
- ASP Composting
  - Equipment:
    - Grading
      - 1- Wheeled Scraper (8 hours per day for 15 days)

      - 1- Tracked Bulldozer (8 hours per day for 15 days)
      - 1- Wheeled Motor Grader (8 hours per day for 15 days)
      - 1- Water Truck (4 hour per day)
    - Site Development
      - 1- Wheeled Concrete Truck (8 hours per day for 10 days)
      - 1- Concrete Pump (8 hours per day for 10 days)
      - 1- Water Truck (4 hour per day)
- Windrow Composting
  - Equipment:
    - Grading
      - 1- Wheeled Scraper (8 hours per day for 15 days)
      - 1- Tracked Bulldozer (8 hours per day for 15 days)
      - 1- Wheeled Motor Grader (8 hours per day for 15 days)
      - 1- Water Truck (4 hour per day)
    - Site Development
      - 1- Wheeled Concrete Truck (8 hours per day for 10 days)
      - 1- Concrete Pump (8 hours per day for 10 days)
      - 1- Water Truck (4 hour per day)
  - Off-set Credits:
      - 5 Wheeled Scrapers, 3 Tracked Bulldozers, 2 Water Trucks, 2 Wheeled Motor Graders, 2 Dump Trucks, 1 Tracked Excavator, and 1 Wheeled Backhoe

Work Item 7: Demobilization

- 10 days
- 2- Flatbed Trucks to haul equipment off the project site (4 hours per day for 10 days)

Project Operation

Operations are expected to be up to 7 days per week and a maximum of 12 hours per day. All work items under project operation will overlap and be on-going.

Work Item 1: Waste Delivery Vehicles

- 23 Transfer Trucks with an average of 17.5 miles round trip (additional waste delivery trucks are based on a 500 ton per day increase)

Work Item 2: Landfill Processing Equipment

- 1- Tracked Landfill Tipper (2 hours per day)

Work Item 3: Compost Operation

- Feedstock Processing
  - Equipment:
    - 1- Grinder (4 hours per day)
    - 1- Trommel Screen (4 hours per day)
    - 1- Compost Turner (4 hours per day)
    - 1- Wheeled Loader (4 hours per day)
- Compost Pile Emissions
  - The project would include the addition of one of the following compost operations:
    - ASP Compost Emissions
    - Windrow Compost Emissions
      - 300 tons per day of feedstock (approximately 200 green waste/100 food waste)

Figure 2 illustrates the project site plan.

SENSITIVE RECEPTORS IN PROJECT VICINITY

Those who are sensitive to air pollution include children, the elderly, and persons with preexisting respiratory or cardiovascular illness. For purposes of CEQA, the SCAQMD considers a sensitive receptor to be a location where a sensitive individual could remain for 24 hours, such as residences, hospitals, or convalescent facilities (South Coast Air Quality Management District 2008). Commercial and industrial facilities are not included in the definition because employees do not typically remain on-site for 24 hours.

The nearest sensitive receptors to the project site are the RV Park (Fisherman's Retreat) located approximately 0.73 miles northeast and the single-family detached residential dwelling units located approximately 0.8 miles west, 1.05 miles north, and 1.02 miles southwest of the Badlands Sanitary Landfill property line.

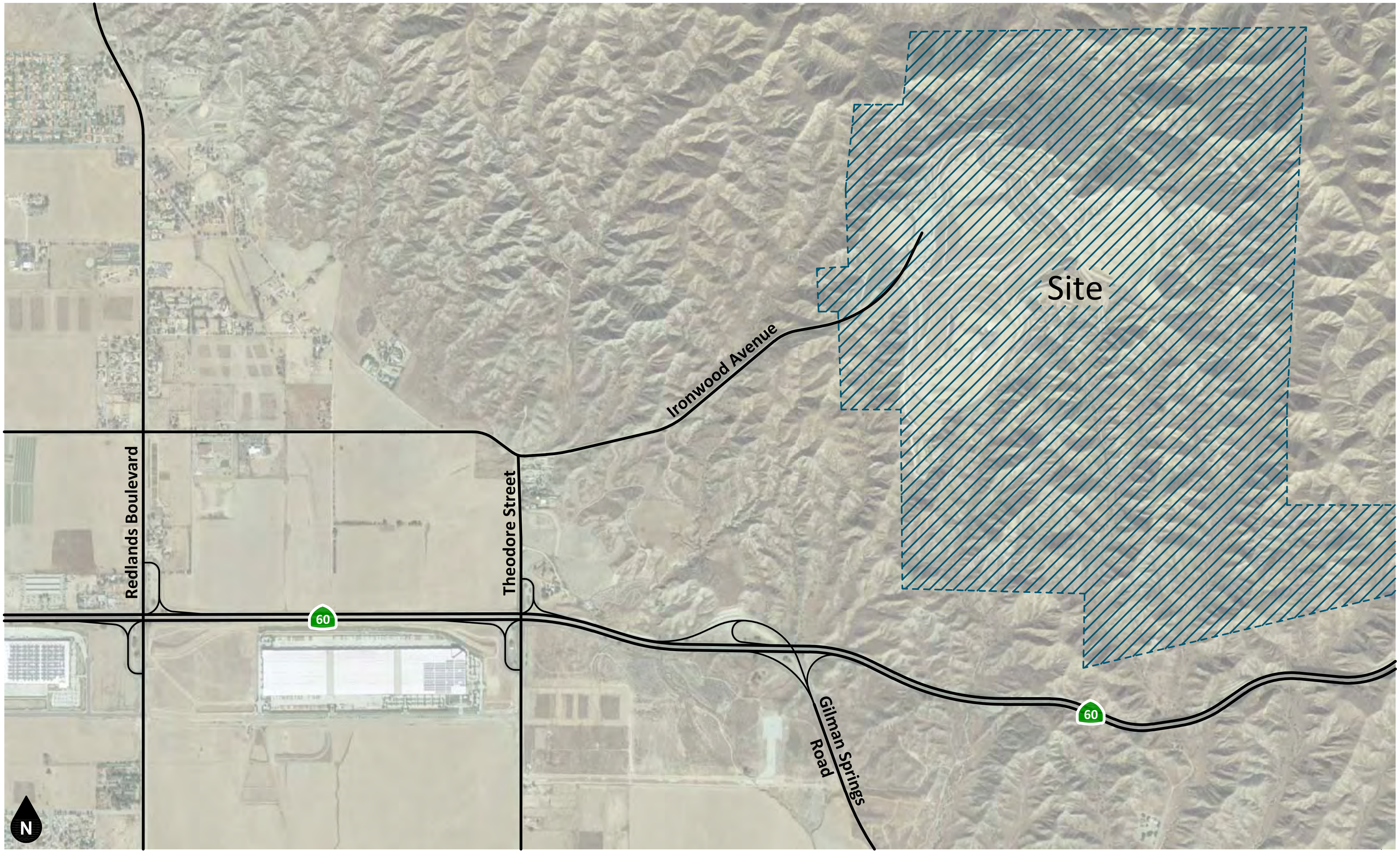

Figure 1
Project Location Map

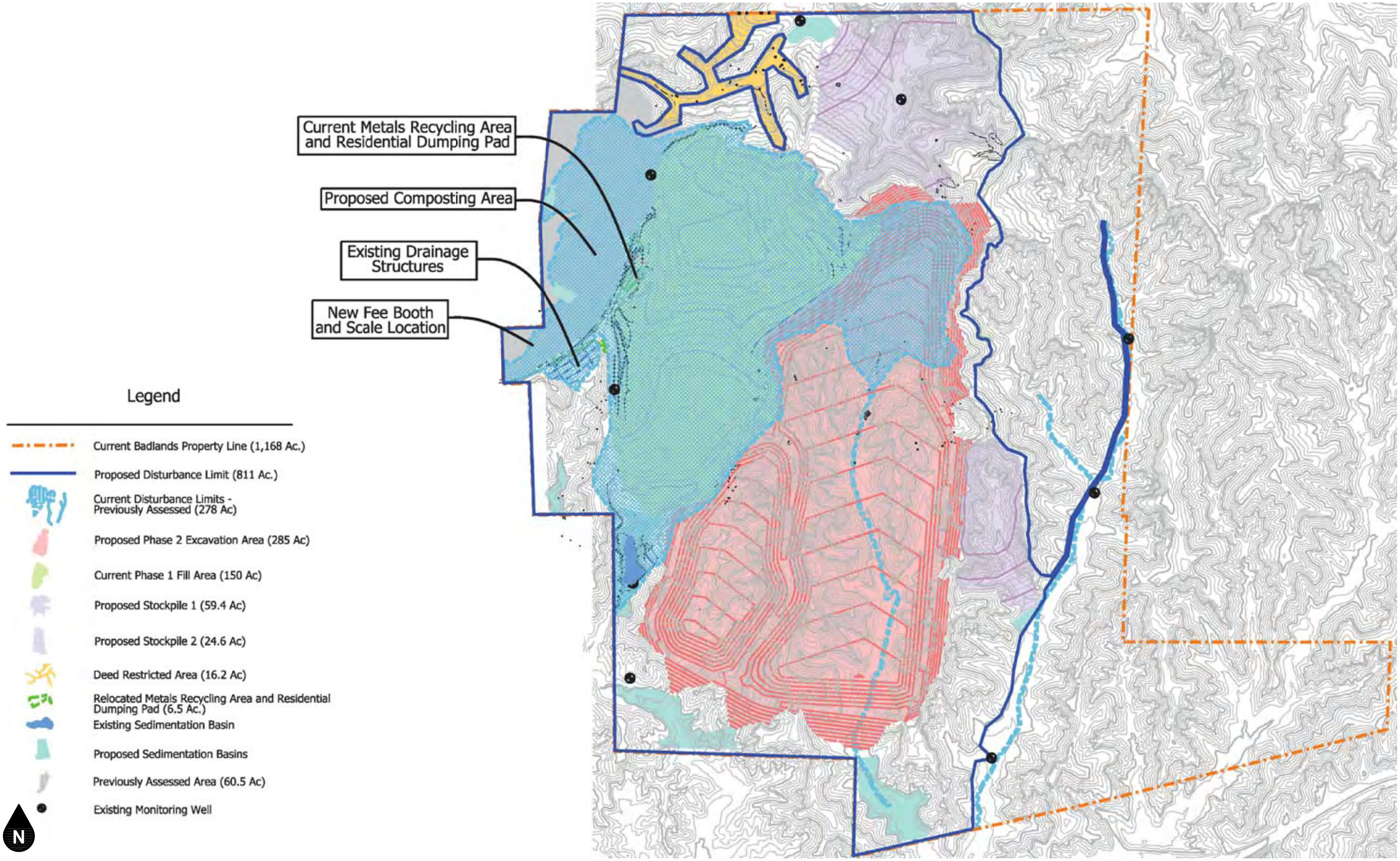

Figure 2
Site Plan

2. ATMOSPHERIC SETTING

LOCAL AIR QUALITY

The project site is located within the northwestern portion of Riverside County, which is part of the South Coast Air Basin (Basin) that includes all of Orange County as well as the non-desert portions of Los Angeles, Riverside, and San Bernardino Counties. The South Coast Air Basin is located on a coastal plain with connecting broad valleys and low hills to the east. Regionally, the South Coast Air Basin is bounded by the Pacific Ocean to the southwest and high mountains to the east forming the inland perimeter. The project site is located toward the northeast portion of the South Coast Air Basin near the foot of the San Bernardino Mountains, which define the eastern boundary of the South Coast Air Basin.

The climate of western Riverside County, technically called an interior valley subclimate of the Southern California's Mediterranean-type climate, is characterized by hot dry summers, mild moist winters with infrequent rainfall, moderate afternoon breezes, and generally fair weather. Occasional periods of strong Santa Ana winds and winter storms interrupt the otherwise mild weather pattern. The clouds and fog that form along the area's coastline rarely extend as far inland as western Riverside County. When morning clouds and fog form, they typically burn off quickly after sunrise. The most important weather pattern from an air quality perspective is associated with the warm season airflow across the populated areas of the Los Angeles Basin. This airflow brings polluted air into western Riverside County late in the afternoon. This transport pattern creates unhealthful air quality that may extend to the project site particularly during the summer months.

Winds are an important parameter in characterizing the air quality environment of a project site because they both determine the regional pattern of air pollution transport and control the rate of dispersion near a source. Daytime winds in western Riverside County are usually light breezes from off the coast as air moves regionally onshore from the cool Pacific Ocean to the warm Mojave Desert interior of Southern California. These winds allow for good local mixing, but as discussed above, these coastal winds carry significant amounts of industrial and automobile air pollutants from the densely urbanized western portion of the South Coast Air Basin into the interior valleys which become trapped by the mountains that border the eastern edge of the South Coast Air Basin.

In the summer, strong temperature inversions may occur that limit the vertical depth through which air pollution can be dispersed. Air pollutants concentrate because they cannot rise through the inversion layer and disperse. These inversions are more common and persistent during the summer months. Over time, sunlight produces photochemical reactions within this inversion layer that creates ozone, a particularly harmful air pollutant. Occasionally, strong thermal convections occur which allows the air pollutants to rise high enough to pass over the mountains and ultimately dilute the smog cloud.

In the winter, light nocturnal winds result mainly from the drainage of cool air off of the mountains toward the valley floor while the air aloft over the valley remains warm. This forms a type of inversion known as a radiation inversion. Such winds are characterized by stagnation and poor local mixing and trap pollutants such as automobile exhaust near their source. While these inversions may lead to air pollution "hot spots" in heavily developed coastal areas of the basin, there is not enough vehicle volumes in inland valleys to cause any winter air pollution problems. Despite light wind conditions, especially at night and in the early morning, winter is generally a period of good air quality in the project vicinity.

The temperature and precipitation levels for the Riverside area (in proximity to the site) are shown below in Table 1. Table 1 shows that August is typically the warmest month and December is typically the coolest month. Rainfall in the project area varies considerably in both time and space. Almost all the annual rainfall comes from the fringes of mid-latitude storms from late November to early April, with summers being almost completely dry.

Table 1
Local Monthly Climate Data[1]

Descriptor	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Avg. Max. Temperature	67.2	68.0	71.1	75.7	80.6	86.9	93.5	94.6	90.7	82.6	71.4	67.4
Avg. Min. Temperature	42.6	44.2	46.2	49.3	53.9	57.4	61.6	62.3	59.3	53.4	45.1	42.1
Avg. Total Precipitation (in.)	2.03	2.32	1.78	0.68	0.23	0.08	0.04	0.09	0.15	0.42	0.79	1.43

Notes:
(1) Source: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca7473

Data taken from the Riverside Citrus Exp, CA (047473) Monitoring Station.

3. POLLUTANTS

Pollutants are generally classified as either criteria pollutants or non-criteria pollutants. Federal ambient air quality standards have been established for criteria pollutants, whereas no ambient standards have been established for non-criteria pollutants. For some criteria pollutants, separate standards have been set for different periods. Most standards have been set to protect public health. For some pollutants, standards have been based on other values (such as protection of crops, protection of materials, or avoidance of nuisance conditions). A summary of federal and state ambient air quality standards is provided in the Regulatory Framework section.

CRITERIA POLLUTANTS

The criteria pollutants consist of: ozone, nitrogen dioxide, carbon monoxide, sulfur dioxide, lead, and particulate matter. These pollutants can harm your health and the environment, and cause property damage. The Environmental Protection Agency (EPA) calls these pollutants "criteria" air pollutants because it regulates them by developing human health-based and/or environmentally-based criteria for setting permissible levels. The following provides descriptions of each of the criteria pollutants.

Nitrogen Dioxides

Nitrogen Oxides (NOx) is the generic term for a group of highly reactive gases which contain nitrogen and oxygen. While most NOx are colorless and odorless, concentrations of nitrogen dioxide (NO_2) can often be seen as a reddish-brown layer over many urban areas. NOx form when fuel is burned at high temperatures, as in a combustion process. The primary manmade sources of NOx are motor vehicles, electric utilities, and other industrial, commercial, and residential sources that burn fuel. NOx reacts with other pollutants to form, ground-level ozone, nitrate particles, acid aerosols, as well as NO_2, which cause respiratory problems. NOx and the pollutants formed from NOx can be transported over long distances, following the patterns of prevailing winds. Therefore controlling NOx is often most effective if done from a regional perspective, rather than focusing on the nearest sources.

Ozone

Ozone (O_3) is not usually emitted directly into the air but at ground-level is created by a chemical reaction between NOx and volatile organic compounds (VOC) in the presence of sunlight. Motor vehicle exhaust, industrial emissions, gasoline vapors, chemical solvents as well as natural sources emit NOx and VOC that help form ozone. Ground-level ozone is the primary constituent of smog. Sunlight and hot weather cause ground-level ozone to form with the greatest concentrations usually occurring downwind from urban areas. Ozone is subsequently considered a regional pollutant. Ground-level ozone is a respiratory irritant and an oxidant that increases susceptibility to respiratory infections and can cause substantial damage to vegetation and other materials. Because NOx and VOC are ozone precursors, the health effects associated with ozone are also indirect health effects associated with significant levels of NOx and VOC emissions.

Carbon Monoxide

Carbon monoxide (CO) is a colorless, odorless gas that is formed when carbon in fuel is not burned completely. It is a component of motor vehicle exhaust, which contributes about 56 percent of all CO emissions nationwide. In cities, 85 to 95 percent of all CO emissions may come from motor vehicle exhaust. Other sources of CO emissions include industrial processes (such as metals processing and chemical manufacturing), residential wood burning, and natural sources such as forest fires. Woodstoves, gas stoves, cigarette smoke, and unvented gas and kerosene space heaters are indoor sources of CO. The highest levels of CO in the outside air typically occur during the colder months of the year when inversion conditions are more frequent. The air pollution becomes trapped near the ground beneath a layer of warm air. CO is described as having only a local influence because it dissipates quickly. Since CO concentrations are strongly associated with motor vehicle emissions, high CO concentrations generally occur in the immediate vicinity of roadways with high traffic volumes and traffic congestion, active parking lots, and in automobile tunnels. Areas adjacent to heavily traveled and congested intersections are particularly susceptible to high CO concentrations.

CO is a public health concern because it combines readily with hemoglobin and thus reduces the amount of oxygen transported in the bloodstream. The health threat from lower levels of CO is most serious for those who suffer from heart disease such as angina, clogged arteries, or congestive heart failure. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person's ability to exercise; repeated exposures may contribute to other cardiovascular effects. High levels of CO can affect even healthy people. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

Sulfur Dioxide

Sulfur Oxide (SOx) gases (including sulfur dioxide [SO2]) are formed when fuel containing sulfur, such as coal and oil is burned, and from the refining of gasoline. SOx dissolves easily in water vapor to form acid and interacts with other gases and particles in the air to form sulfates and other products that can be harmful to people and the environment.

Lead

Lead (Pb) is a metal found naturally in the environment as well as manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, metal processing is now the primary source of lead emissions to the air. High levels of lead in the air are typically only found near lead smelters, waste incinerators, utilities, and lead-acid battery manufacturers. Exposure of fetuses, infants and children to low levels of lead can adversely affect the development and function of the central nervous system, leading to learning disorders, distractibility, inability to follow simple commands, and lower intelligence quotient. In adults, increased lead levels are associated with increased blood pressure.

Particulate Matter

Particulate matter (PM) is the term for a mixture of solid particles and liquid droplets found in the air. Particulate matter is made up of a number of components including acids (such as nitrates and sulfates), organic chemicals, metals, and soil or dust particles. The size of particles is directly linked to their potential for causing health problems. Particles that are less than 10 micrometers in diameter (PM10) are the particles that generally pass through the throat and nose and enter the lungs. Once inhaled, these particles can affect the heart and lungs and cause serious health effects. Particles that are less than 2.5 micrometers in diameter (PM2.5) have been designated as a subset of PM10 due to their increased negative health impacts and its ability to remain suspended in the air longer and travel further.

Reactive Organic Gases (ROG)

Although not a criteria pollutant, reactive organic gases (ROGs), or VOCs, are defined as any compound of carbon—excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate—that participates in atmospheric photochemical reactions. Although there are slight differences in the definition of ROGs and VOCs, the two terms are often used interchangeably. Indoor sources of VOCs include paints, solvents, aerosol sprays, cleansers, tobacco smoke, etc. Outdoor sources of VOCs are from combustion and fuel evaporation. A reduction in VOC emissions reduces certain chemical reactions that contribute to the formulation of ozone. VOCs are transformed into organic aerosols in the atmosphere, which contribute to higher PM10 and lower visibility.

OTHER POLLUTANTS OF CONCERN

Toxic Air Contaminants

In addition to the above-listed criteria pollutants, toxic air contaminants (TACs) are another group of pollutants of concern. Sources of toxic air contaminants include industrial processes such as petroleum refining and chrome plating operations, commercial operations such as gasoline stations and dry cleaners, and motor vehicle exhaust. Cars and trucks release at least forty different toxic air contaminants. The most important of these toxic air contaminants, in terms of health risk, are diesel particulates, benzene, formaldehyde, 1,3-butadiene, and acetaldehyde. Public exposure to toxic air contaminants can result from emissions from normal operations as well as from accidental releases. Health effects of toxic air contaminants include cancer, birth defects, neurological damage, and death.

Toxic air contaminants are less pervasive in the urban atmosphere than criteria air pollutants, however they are linked to short-term (acute) or long-term (chronic or carcinogenic) adverse human health effects. There are hundreds of different types of toxic air contaminants with varying degrees of toxicity. Sources of toxic air contaminants include industrial processes, commercial operations (e.g., gasoline stations and dry cleaners), and motor vehicle exhaust.

According to the 2013 California Almanac of Emissions and Air Quality, the majority of the estimated health risk from toxic air contaminants can be attributed to relatively few compounds, the most important of which is diesel particulate matter (DPM). Diesel particulate matter is a subset of PM2.5 because the size of diesel particles are typically 2.5 microns and smaller. The identification of diesel particulate matter as a toxic air contaminant in 1998 led the California Air Resources Board (CARB) to adopt the Risk Reduction Plan to Reduce Particulate Matter Emissions from Diesel-fueled Engines and Vehicles in September 2000. The plan's goals are a 75-percent reduction in diesel particulate matter by 2010 and an 85-percent reduction by 2020 from the 2000 baseline. Diesel engines emit a complex mixture of air pollutants, composed of gaseous and solid material. The visible emissions in diesel exhaust are known as particulate matter or PM, which includes carbon particles or "soot". Diesel exhaust also contains a variety of harmful gases and over 40 other cancer-causing substances. California's identification of diesel particulate matter as a toxic air contaminant was based on its potential to cause cancer, premature deaths, and other health problems. Exposure to diesel particulate matter is a health hazard, particularly to children whose lungs are still developing and the elderly who may have other serious health problems. Overall, diesel engine emissions are responsible for the majority of California's potential airborne cancer risk from combustion sources.

Asbestos

Asbestos is listed as a TAC by the ARB and as a Hazardous Air Pollutant by the EPA. Asbestos occurs naturally in mineral formations and crushing or breaking these rocks, through construction or other means, can release asbestiform fibers into the air. Asbestos emissions can result from the sale or use of asbestos-containing materials, road surfacing with such materials, grading activities, and surface mining. The risk of disease is dependent upon the intensity and duration of exposure. When inhaled, asbestos fibers may remain in the lungs and with time may be linked to such diseases as asbestosis, lung cancer, and mesothelioma. Naturally occurring asbestos is not present in Riverside County. The nearest likely locations of naturally occurring asbestos, as identified in the General Location Guide for Ultramafic Rocks in California prepared by the California Division of Mines and Geology, is located in Santa Barbara County. Due to the distance to the nearest natural occurrences of asbestos, the project site is not likely to contain asbestos.

GREENHOUSE GASES

Constituent gases of the Earth's atmosphere, called atmospheric greenhouse gases (GHG), play a critical role in the Earth's radiation amount by trapping infrared radiation emitted from the Earth's surface, which otherwise would have escaped to space. Prominent greenhouse gases contributing to this process include carbon dioxide (CO_2), methane (CH_4), ozone, water vapor, nitrous oxide (N_2O), and chlorofluorocarbons

(CFCs). This phenomenon, known as the Greenhouse Effect, is responsible for maintaining a habitable climate. Anthropogenic (caused or produced by humans) emissions of these greenhouse gases in excess of natural ambient concentrations are responsible for the enhancement of the Greenhouse Effect and have led to a trend of unnatural warming of the Earth's natural climate, known as global warming or climate change. Emissions of gases that induce global warming are attributable to human activities associated with industrial/manufacturing, agriculture, utilities, transportation, and residential land uses. Transportation is responsible for 41 percent of the State's greenhouse gas emissions, followed by electricity generation. Emissions of CO_2 and nitrous oxide (NOx) are byproducts of fossil fuel combustion. Methane, a potent greenhouse gas, results from off-gassing associated with agricultural practices and landfills. Sinks of CO_2, where CO_2 is stored outside of the atmosphere, include uptake by vegetation and dissolution into the ocean. The following provides a description of each of the greenhouse gases and their global warming potential.

Water Vapor

Water vapor is the most abundant, important, and variable GHG in the atmosphere. Water vapor is not considered a pollutant; in the atmosphere it maintains a climate necessary for life. Changes in its concentration are primarily considered a result of climate feedbacks related to the warming of the atmosphere rather than a direct result of industrialization. The feedback loop in which water is involved is critically important to projecting future climate change. As the temperature of the atmosphere rises, more water is evaporated from ground storage (rivers, oceans, reservoirs, soil). Because the air is warmer, the relative humidity can be higher (in essence, the air is able to "hold" more water when it is warmer), leading to more water vapor in the atmosphere. As a GHG, the higher concentration of water vapor is then able to absorb more thermal indirect energy radiated from the Earth, thus further warming the atmosphere. The warmer atmosphere can then hold more water vapor and so on and so on. This is referred to as a "positive feedback loop". The extent to which this positive feedback loop will continue is unknown as there is also dynamics that put the positive feedback loop in check. As an example, when water vapor increases in the atmosphere, more of it will eventually also condense into clouds, which are more able to reflect incoming solar radiation (thus allowing less energy to reach the Earth's surface and heat it up).

Carbon Dioxide (CO_2)

The natural production and absorption of CO_2 is achieved through the terrestrial biosphere and the ocean. However, humankind has altered the natural carbon cycle by burning coal, oil, natural gas, and wood. Since the industrial revolution began in the mid-1700s. Each of these activities has increased in scale and distribution. CO_2 was the first GHG demonstrated to be increasing in atmospheric concentration with the first conclusive measurements being made in the last half of the 20th century. Prior to the industrial revolution, concentrations were fairly stable at 280 parts per million (ppm). The International Panel on Climate Change (IPCC Fifth Assessment Report, 2014) Emissions of CO_2 from fossil fuel combustion and industrial processes contributed about 78% of the total GHG emissions increase from 1970 to 2010, with a similar percentage contribution for the increase during the period 2000 to 2010. Globally, economic and population growth continued to be the most important drivers of increases in CO_2 emissions from fossil fuel combustion. The contribution of population growth between 2000 and 2010 remained roughly identical to the previous three decades, while the contribution of economic growth has risen sharply.

Methane (CH_4)

CH_4 is an extremely effective absorber of radiation, although its atmospheric concentration is less than that of CO_2. Its lifetime in the atmosphere is brief (10 to 12 years), compared to some other GHGs (such as CO_2, N_2O, and Chlorofluorocarbons (CFCs). CH_4 has both natural and anthropogenic sources. It is released as part of the biological processes in low oxygen environments, such as in swamplands or in rice production (at the roots of the plants). Over the last 50 years, human activities such as growing rice, raising cattle, using natural gas, and mining coal have added to the atmospheric concentration of methane. Other anthropocentric sources include fossil-fuel combustion and biomass burning.

Nitrous Oxide (N_2O)

Concentrations of N_2O also began to rise at the beginning of the industrial revolution. In 1998, the global concentration of this GHG was documented at 314 parts per billion (ppb). N_2O is produced by microbial processes in soil and water, including those reactions which occur in fertilizer containing nitrogen. In addition to agricultural sources, some industrial processes (fossil fuel-fired power plants, nylon production, nitric acid production, and vehicle emissions) also contribute to its atmospheric load. It is also commonly used as an aerosol spray propellant, (i.e., in whipped cream bottles, in potato chip bags to keep chips fresh, and in rocket engines and in race cars).

Chlorofluorocarbons (CFC)

CFCs are gases formed synthetically by replacing all hydrogen atoms in methane or ethane (C_2H_6) with chlorine and/or fluorine atoms. CFCs are nontoxic, nonflammable, insoluble, and chemically unreactive in the troposphere (the level of air at the Earth's surface). CFCs have no natural source, but were first synthesized in 1928. It was used for refrigerants, aerosol propellants, and cleaning solvents. Due to the discovery that they are able to destroy stratospheric ozone, a global effort to halt their production was undertaken and in 1989 the European Community agreed to ban CFCs by 2000 and subsequent treaties banned CFCs worldwide by 2010. This effort was extremely successful, and the levels of the major CFCs are now remaining level or declining. However, their long atmospheric lifetimes mean that some of the CFCs will remain in the atmosphere for over 100 years.

Hydrofluorocarbons (HFC)

HFCs are synthetic man-made chemicals that are used as a substitute for CFCs. Out of all the GHGs, they are one of three groups with the highest global warming potential. The HFCs with the largest measured atmospheric abundances are (in order), HFC-23 (CHF_3), HFC-134a (CF_3CH_2F), and HFC-152a (CH_3CHF_2). Prior to 1990, the only significant emissions were HFC-23. HFC-134a use is increasing due to its use as a refrigerant. Concentrations of HFC-23 and HFC-134a in the atmosphere are now about 10 parts per trillion (ppt) each. Concentrations of HFC-152a are about 1 ppt. HFCs are manmade for applications such as automobile air conditioners and refrigerants.

Perfluorocarbons (PFC)

PFCs have stable molecular structures and do not break down through the chemical processes in the lower atmosphere. High-energy ultraviolet rays about 60 kilometers above Earth's surface are able to destroy the compounds. Because of this, PFCs have very long lifetimes, between 10,000 and 50,000 years. Two common PFCs are tetrafluoromethane (CF_4) and hexafluoroethane (C_2F_6). Concentrations of CF_4 in the atmosphere are over 70 ppt. The two main sources of PFCs are primary aluminum production and semiconductor manufacturing.

Sulfur Hexafluoride (SF_6)

SF_6 is an inorganic, odorless, colorless, nontoxic, nonflammable gas. SF_6 has the highest global warming potential of any gas evaluated; 23,900 times that of CO_2. Concentrations in the 1990s were about 4 ppt. Sulfur hexafluoride is used for insulation in electric power transmission and distribution equipment, in the magnesium industry, in semiconductor manufacturing, and as a tracer gas for leak detection.

Aerosols

Aerosols are particles emitted into the air through burning biomass (plant material) and fossil fuels. Aerosols can warm the atmosphere by absorbing and emitting heat and can cool the atmosphere by reflecting light. Cloud formation can also be affected by aerosols. Sulfate aerosols are emitted when fuel containing sulfur is burned. Black carbon (or soot) is emitted during biomass burning due to the incomplete combustion of fossil fuels. Particulate matter regulation has been lowering aerosol concentrations in the United States; however, global concentrations are likely increasing.

Global Warming Potential

The Global Warming Potential (GWP) was developed to allow comparisons of the global warming impacts of different gases. Specifically, it is a measure of how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to the emissions of 1 ton of carbon dioxide (CO_2). The larger the GWP, the more that a given gas warms the Earth compared to CO_2 over that time period. The time period usually used for GWPs is 100 years. GWPs provide a common unit of measure, which allows analysts to add up emissions estimates of different gases (e.g., to compile a national GHG inventory), and allows policymakers to compare emissions reduction opportunities across sectors and gases. A summary of the atmospheric lifetime and the global warming potential of selected gases are summarized in Table 2. As shown in Table 2, the global warming potential of GHGs ranges from 1 to 22,800.

Table 2
Global Warming Potentials and Atmospheric Lifetimes[1]

Gas	Atmospheric Lifetime	Global Warming Potential[2] (100 Year Horizon)
Carbon Dioxide (CO_2)	--[3]	1
Methane (CH_4)	12	28-36
Nitrous Oxide (NO)	114	298
Hydrofluorocarbons (HFCs)	1-270	12-14,800
Perfluorocarbons (PFCs)	2,600-50,000	7,390-12,200
Nitrogen trifluoride (NF_3)	740	17,200
Sulfur Hexafluoride (SF_6)	3,200	22,800

Notes:

(1) Source: http://www3.epa.gov/climatechange/ghgemissions/gases.html

(2) Compared to the same quantity of CO_2 emissions.

(3) Carbon dioxide's lifetime is poorly defined because the gas is not destroyed over time, but instead moves among different parts of the ocean–atmosphere–land system. Some of the excess carbon dioxide will be absorbed quickly (for example, by the ocean surface), but some will remain in the atmosphere for thousands of years, due in part to the very slow process by which carbon is transferred to ocean sediments.

4. AIR QUALITY MANAGEMENT

REGULATORY SETTING

The proposed project is addressed through the efforts of various international, federal, state, regional, and local government agencies. These agencies work jointly, as well as individually, to improve air quality through legislation, regulations, planning, policy-making, education, and a variety of programs. The agencies responsible for improving the air quality are discussed below.

International

Montreal Protocol

In 1988, the United Nations established the Intergovernmental Panel on Climate Change (IPCC) to evaluate the impacts of global climate change and to develop strategies that nations could implement to curtail global climate change. In 1992, the United States joined other countries around the world in signing the United Nations' Framework Convention on Climate Change (UNFCCC) agreement with the goal of controlling GHG emissions. As a result, the Climate Change Action Plan was developed to address the reduction of GHGs in the United States. The plan consists of more than 50 voluntary programs.

Additionally, the Montreal Protocol was originally signed in 1987 and substantially amended in 1990 and 1992. The Montreal Protocol stipulates that the production and consumption of compounds that deplete ozone in the stratosphere—CFCs, halons, carbon tetrachloride, and methyl chloroform—were to be phased out, with the first three by the year 2000 and methyl chloroform by 2005.

The Paris Agreement

The Paris Agreement entered into force on 4 November 2016, thirty days after the date on which at least 55 Parties to the Convention accounting in total for at least an estimated 55 % of the total global greenhouse gas emissions have deposited their instruments of ratification, acceptance, approval or accession with the Depositary.

The Paris Agreement builds upon the Convention and – for the first time – brings all nations into a common cause to undertake take ambitious efforts to combat climate change and adapt to its effects, with enhanced support to assist developing countries to do so. As such, it charts a new course in the global climate effort.

The Paris Agreement's central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius. Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives. The Agreement also provides for enhanced transparency of action and support through a more robust transparency framework. The Trump administration has recently indicated the United States federal government will no longer participate in the Paris agreement. However, the U.S. cannot technically withdraw from the Agreement until 2020.

Federal – United States Environmental Protection Agency

The United States Environmental Protection Agency (EPA) is responsible for setting and enforcing the National Ambient Air Quality Standards (NAAQS) for atmospheric pollutants. It regulates emission sources that are under the exclusive authority of the federal government, such as aircraft, ships, and certain locomotives. The

National Ambient Air Quality Standards (NAAQS) pollutants were identified using medical evidence and are shown below in Table 3.

The EPA and the California Air Resource Board (CARB) designate air basins where ambient air quality standards are exceeded as "nonattainment" areas. If standards are met, the area is designated as an "attainment" area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered "unclassified." National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or 'form' of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the Federal annual PM2.5 standard is met if the three-year average of the annual average PM2.5 concentration is less than or equal to the standard. Attainment status is shown in Table 4.

As part of its enforcement responsibilities, the EPA requires each state with federal nonattainment areas to prepare and submit a State Implementation Plan (SIP) that demonstrates the means to attain the national standards. The State Implementation Plan (SIP) must integrate federal, state, and local components and regulations to identify specific measures to reduce pollution, using a combination of performance standards and market-based programs within the timeframe identified in the State Implementation Plan (SIP).

As indicated below in Table 4, the Basin has been designated by the EPA as a non-attainment area for ozone (O_3) and suspended particulates (PM10 and PM2.5). Currently, the Basin is in attainment with the ambient air quality standards for carbon monoxide (CO), lead, sulfur dioxide (SO_2), suspended particulate matter (PM-2.5), and nitrogen dioxide (NO_2).

In Massachusetts v. Environmental Protection Agency (Docket No. 05–1120), argued November 29, 2006 and decided April 2, 2007, the U.S. Supreme Court held that not only did the EPA have authority to regulate greenhouse gases, but the EPA's reasons for not regulating this area did not fit the statutory requirements. As such, the U.S. Supreme Court ruled that the EPA should be required to regulate CO_2 and other greenhouse gases as pollutants under the federal Clean Air Act (CAA).

In response to the FY2008 Consolidations Appropriations Act (H.R. 2764; Public Law 110-161), EPA proposed a rule on March 10, 2009 that requires mandatory reporting of GHG emissions from large sources in the United States. On September 22, 2009, the Final Mandatory Reporting of GHG Rule was signed and published in the Federal Register on October 30, 2009. The rule became effective on December 29, 2009. This rule requires suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities that emit 25,000 metric tons or more per year of GHG emissions to submit annual reports to EPA.

On December 7, 2009, the EPA Administrator signed two distinct findings under section 202(a) of the Clean Air Act. One is an endangerment finding that finds concentrations of the six GHGs in the atmosphere threaten the public health and welfare of current and future generations. The other is a cause or contribute finding, that finds emissions from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare. These actions will not themselves impose any requirements on industry or other entities. However, it is a prerequisite to finalizing the EPA's proposed GHG emission standards for light-duty vehicles, which were jointly proposed by the EPA and Department of Transportation on September 15, 2009.

On March 19, 2015, the Whitehouse announced that President Obama will issue an Executive Order that will cut the Federal Government's greenhouse gas (GHG) emissions 40 percent over the next decade from 2008 levels -- saving taxpayers up to $18 billion in avoided energy costs -- and increase the share of electricity the Federal Government consumes from renewable sources to 30 percent. Complementing this effort, several major Federal suppliers are announcing commitments to cut their own GHG emissions. The Administration hosted a roundtable that brought some of these large Federal suppliers together to discuss the benefits of their GHG reduction targets or to make their first-ever corporate commitments to disclose emissions and set new reduction goals.

Together, the combined results of the Federal Government actions and new supplier commitments will reduce GHG emissions by 26 million metric tons by 2025 from 2008 levels, the equivalent of taking nearly 5.5 million cars off the road for a year. And to encourage continued progress across the Federal supply chain, the Administration is releasing a new scorecard to publicly track self-reported emissions disclosure and progress for all major Federal suppliers, who together represent more than $187 billion in Federal spending and account for more than 40 percent of all Federal contract dollars.

Since the Federal Government is the single largest consumer of energy in the Nation, Federal emissions reductions and progress across the supply chain will have broad impacts. The new commitments announced today support the United States' international commitment to cut net GHG emissions 26-28 percent below 2005 levels by 2025, which President Obama first announced in November 2014 as part of an historic agreement with China. Additionally, the goals build on the strong progress made by Federal agencies during the first six years of the Administration under President Obama's 2009 Executive Order on Federal Leadership on Environmental, Energy and Economic Performance, including reducing Federal GHG emissions by 17 percent — which helped Federal agencies avoid $1.8 billion in cumulative energy costs — and increasing the share of renewable energy consumption to 9 percent.[1]

State – California Air Resources Board

The California Air Resources Board (CARB), which is a part of the California Environmental Protection Agency, is responsible for the coordination and administration of both federal and state air pollution control programs within California. In this capacity, the CARB conducts research, sets the California Ambient Air Quality Standards (CAAQS), compiles emission inventories, develops suggested control measures, provides oversight of local programs, and prepares the State Implementation Plan (SIP). The California Ambient Air Quality Standards (CAAQS) for criteria pollutants are shown in Table 3. In addition, the CARB establishes emission standards for motor vehicles sold in California, consumer products (e.g., hairspray, aerosol paints, and barbeque lighter fluid), and various types of commercial equipment. It also sets fuel specifications to further reduce vehicular emissions.

The South Coast Air Basin has been designated by the CARB as a nonattainment area for ozone, PM10 and PM2.5. Currently, the South Coast Air Basin is in attainment with the ambient air quality standards for CO, lead, SO2, NO2, and sulfates and is unclassified for visibility reducing particles and Hydrogen Sulfide.

On June 20, 2002, the CARB revised the PM10 annual average standard to 20 µg/m3 and established an annual average standard for PM2.5 of 12 µg/m3. These standards were approved by the Office of Administrative Law in June 2003 and are now effective. On September 27, 2007 CARB approved the South Coast Air Basin and the Coachella Valley 2007 Air Quality Management Plan for Attaining the Federal 8-hour Ozone and PM2.5 Standards. The plan projects attainment for the 8-hour Ozone standard by 2024 and the PM2.5 standard by 2015.

On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, Title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in California shall meet model year 2010 (Tier 4) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. This regulation also provides a few exemptions including a onetime per year 3-day pass for trucks registered outside of California.

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[1] Source: https://www.whitehouse.gov/the-press-office/2015/03/19/fact-sheet-reducing-greenhouse-gas-emissions-federal-government-and-acro.

The CARB is also responsible for regulations pertaining to toxic air contaminants. The Air Toxics "Hot Spots" Information and Assessment Act (AB 2588, 1987, Connelly) was enacted in 1987 as a means to establish a formal air toxics emission inventory risk quantification program. AB 2588, as amended, establishes a process that requires stationary sources to report the type and quantities of certain substances their facilities routinely release into the South Coast Air Basin. The data is ranked by high, intermediate, and low categories, which are determined by: the potency, toxicity, quantity, volume, and proximity of the facility to nearby receptors.

The State currently has no regulations that establish ambient air quality standards for GHGs. However, the State has passed laws directing CARB to develop actions to reduce GHG emissions, which are listed below.

Assembly Bill 1493

California Assembly Bill 1493 enacted on July 22, 2002, required CARB to develop and adopt regulations that reduce GHGs emitted by passenger vehicles and light duty trucks. In 2005, the CARB submitted a "waiver" request to the EPA from a portion of the federal Clean Air Act in order to allow the State to set more stringent tailpipe emission standards for CO_2 and other GHG emissions from passenger vehicles and light duty trucks. On December 19, 2007 the EPA announced that it denied the "waiver" request. On January 21, 2009, CARB submitted a letter to the EPA administrator regarding the State's request to reconsider the waiver denial. The EPA approved the waiver on June 30, 2009.

Executive Order S-3-05

The California Governor issued Executive Order S-3-05, GHG Emission, in June 2005, which established the following reduction targets:

- 2010: Reduce greenhouse gas emissions to 2000 levels
- 2020: Reduce greenhouse gas emissions to 1990 levels
- 2050: Reduce greenhouse gas emissions to 80 percent below 1990 levels.

The executive order directed the secretary of the California Environmental Protection Agency (CalEPA) to coordinate a multi-agency effort to reduce GHG emissions to the target levels. To comply with the Executive Order, the secretary of CalEPA created the California Climate Action Team (CAT), made up of members from various state agencies and commissions. The team released its first report in March 2006. The report proposed to achieve the targets by building on the voluntary actions of businesses, local governments, and communities and through State incentive and regulatory programs.

Assembly Bill 32

In 2006, the California State Legislature adopted Assembly Bill 32 (AB 32), the California Global Warming Solutions Act of 2006. AB 32 requires CARB, to adopt rules and regulations that would achieve GHG emissions equivalent to statewide levels in 1990 by 2020 through an enforceable statewide emission cap which will be phased in starting in 2012. Emission reductions shall include carbon sequestration projects that would remove carbon from the atmosphere and best management practices that are technologically feasible and cost effective.

On December 6, 2007 CARB released the calculated Year 1990 GHG emissions of 427 million metric tons of CO_2e ($MMTCO_2e$). The 2020 target of 427 $MMTCO_2e$ requires the reduction of 169 $MMTCO_2e$, or approximately 30 percent from the State's projected 2020 business as usual emissions of 596 $MMTCO_2e$ and the reduction of 42 $MMTCO_2e$, or almost 10 percent from the 2002-2004 average GHG emissions. Under AB 32, CARB was required to adopt regulations by January 1, 2011 to achieve reductions in GHGs to meet the 1990 cap by 2020. Early measures CARB took to lower GHG emissions included requiring operators of the largest industrial facilities that emit 25,000 metric tons of CO_2 in a calendar year to submit verification of GHG emissions by December 1, 2010. The CARB Board also approved nine discrete early action measures that include regulations affecting landfills, motor vehicle fuels, refrigerants in cars, port operations and other sources that became enforceable on or before January 1, 2010.

On December 11, 2008 the CARB Board approved a Scoping Plan, with final adoption May 11, 2009 that proposed a variety of measures including direct regulations, alternative compliance mechanisms, monetary and non-monetary incentives, voluntary actions, a market-based cap-and-trade system, and a fee regulation to fund the program. In current pending litigation, Association of Irritated Residents v. California Air Resources Board, a California State trial court found that the analysis of the alternatives identified in the AB 32 Scoping Plan Functional Equivalent Document (FED) was not sufficient for informed decision-making and public review under CEQA. In response, CARB has appealed the decision. In addition, CARB prepared the *Supplement to the AB 32 Scoping Plan Functional Equivalent Document* (June 13, 2011). On August 24, 2011 CARB recertified the complete AB 32 Scoping Plan Functional Equivalent Environmental Document revised by the Final Supplement. In December, 2011 the Final Supplement was accepted as sufficient to fulfill the trial court's March order.

While local government operations were not accounted for in achieving the 2020 emissions reduction, local land use changes are estimated to result in a reduction of 5 metric tons of CO_2e, which is approximately 3 percent of the 2020 GHG emissions reduction goal. In recognition of the critical role local governments will play in successful implementation of AB 32, CARB is recommending GHG reduction goals of 15 percent of 2010 levels by 2020 to ensure that municipal and community-wide emissions match the state's reduction target. According to the Measure Documentation Supplement to the Scoping Plan, local government actions and targets are anticipated to reduce vehicle miles by approximately 2 percent through land use planning, resulting in a potential GHG reduction of 2 metric tons of CO_2e (or approximately 1.2 percent of the GHG reduction target).

In May 2014, CARB released its *First Update to the Climate Change Scoping Plan* (CARB 2014). This *Update* identifies the next steps for California's leadership on climate change. While California continues on its path to meet the near-term 2020 greenhouse gas limit, it must also set a clear path toward long-term, deep GHG emission reductions. This report highlights California's success to date in reducing its GHG emissions and lays the foundation for establishing a broad framework for continued emission reductions beyond 2020, on the path to 80 percent below 1990 levels by 2050.

On January 20, 2017, CARB announced its release of a proposed plan to reduce greenhouse gas emissions by 40 percent below 1990 levels by 2030 – the most ambitious target in North America. The plan builds on the state's successful efforts to reduce emissions and outlines the most effective ways to reach the 2030 goal, including continuing California's Cap-and-Trade Program. The Final 2017 Scoping Plan Update will be released in late March and be considered for approval by the Board in late April.

SB 32, Pavley. California Global Warming Solutions Act of 2006

(1) The California Global Warming Solutions Act of 2006 designates the State Air Resources Board as the state agency charged with monitoring and regulating sources of emissions of greenhouse gases. The state board is required to approve a statewide greenhouse gas emissions limit equivalent to the statewide greenhouse gas emissions level in 1990 to be achieved by 2020 and to adopt rules and regulations in an open public process to achieve the maximum, technologically feasible, and cost-effective greenhouse gas emissions reductions. This bill would require the state board to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030.

(2) This bill would become operative only if AB 197 of the 2015–16 Regular Session is enacted and becomes effective on or before January 1, 2017. AB 197 requires that the California Air Resources Board, which directs implementation of emission-reduction programs, should target direct reductions at both stationary and mobile sources.

Senate Bill 1368

Senate Bill 1368 (SB 1368) is the companion Bill of AB 32 and was adopted September, 2006. SB 1368 requires the California Public Utilities Commission (CPUC) to establish a performance standard for baseload generation of GHG emissions by investor-owned utilities by February 1, 2007 and for local publicly owned utilities by June 30, 2007. These standards could not exceed the GHG emissions rate from a baseload combined-cycle, natural gas-fired plant. Furthermore, the legislation states that all electricity provided to the State, including imported electricity, must be generated by plants that meet the standards set by California Public Utilities Commission (CPUC) and California Energy Commission (CEC).

Executive Order S-1-07

Executive Order S-1-07 was issued in 2007 and proclaims that the transportation sector is the main source of GHG emissions in the State, since it generates more than 40 percent of the State's GHG emissions. It establishes a goal to reduce the carbon intensity of transportation fuels sold in the State by at least ten percent by 2020. This Order also directs CARB to determine whether this Low Carbon Fuel Standard (LCFS) could be adopted as a discrete early-action measure as part of the effort to meet the mandates in AB 32.

On April 23, 2009 CARB approved the proposed regulation to implement the low carbon fuel standard. The low carbon fuel standard is anticipated to reduce GHG emissions by about 16 MMT per year by 2020. The low carbon fuel standard is designed to provide a framework that uses market mechanisms to spur the steady introduction of lower carbon fuels. The framework establishes performance standards that fuel producers and importers must meet each year beginning in 2011. Separate standards are established for gasoline and diesel fuels and the alternative fuels that can replace each. The standards are "back-loaded", with more reductions required in the last five years, than during the first five years. This schedule allows for the development of advanced fuels that are lower in carbon than today's fuels and the market penetration of plug-in hybrid electric vehicles, battery electric vehicles, fuel cell vehicles, and flexible fuel vehicles. It is anticipated that compliance with the low carbon fuel standard will be based on a combination of both lower carbon fuels and more efficient vehicles.

Reformulated gasoline mixed with corn-derived ethanol at ten percent by volume and low sulfur diesel fuel represent the baseline fuels. Lower carbon fuels may be ethanol, biodiesel, renewable diesel, or blends of these fuels with gasoline or diesel as appropriate. Compressed natural gas and liquefied natural gas also may be low carbon fuels. Hydrogen and electricity, when used in fuel cells or electric vehicles are also considered as low carbon fuels for the low carbon fuel standard.

Senate Bill 97

Senate Bill 97 (SB 97) was adopted August 2007 and acknowledges that climate change is a prominent environmental issue that requires analysis under CEQA. SB 97 directed the Governor's Office of Planning and Research (OPR), which is part of the State Natural Resources Agency, to prepare, develop, and transmit to CARB guidelines for the feasible mitigation of GHG emissions or the effects of GHG emissions, as required by CEQA, by July 1, 2009. The Natural Resources Agency was required to certify and adopt those guidelines by January 1, 2010.

Pursuant to the requirements of SB 97 as stated above, on December 30, 2009 the Natural Resources Agency adopted amendments to the state CEQA guidelines that address GHG emissions. The CEQA Guidelines Amendments changed 14 sections of the CEQA Guidelines and incorporate GHG language throughout the Guidelines. However, no GHG emissions thresholds of significance were provided and no specific mitigation measures were identified. The GHG emission reduction amendments went into effect on March 18, 2010 and are summarized below:

- Climate action plans and other greenhouse gas reduction plans can be used to determine whether a project has significant impacts, based upon its compliance with the plan.
- Local governments are encouraged to quantify the greenhouse gas emissions of proposed projects, noting that they have the freedom to select the models and methodologies that best meet their needs and circumstances. The section also recommends consideration of several qualitative factors that may be used in the determination of significance, such as the extent to which the given project complies with state, regional, or local GHG reduction plans and policies. OPR does not set or dictate specific thresholds of significance. Consistent with existing CEQA Guidelines, OPR encourages local governments to develop and publish their own thresholds of significance for GHG impacts assessment.
- When creating their own thresholds of significance, local governments may consider the thresholds of significance adopted or recommended by other public agencies, or recommended by experts.
- New amendments include guidelines for determining methods to mitigate the effects of greenhouse gas emissions in Appendix F of the CEQA Guidelines.
- OPR is clear to state that "to qualify as mitigation, specific measures from an existing plan must be identified and incorporated into the project; general compliance with a plan, by itself, is not mitigation".
- OPR's emphasizes the advantages of analyzing GHG impacts on an institutional, programmatic level. OPR therefore approves tiering of environmental analyses and highlights some benefits of such an approach.
- Environmental impact reports (EIRs) must specifically consider a projects energy use and energy efficiency potential.

Senate Bills 1078, 107, and X1-2 and Executive Orders S-14-08 and S-21-09

Senate Bill 1078 (SB 1078) requires retail sellers of electricity, including investor-owned utilities and community choice aggregators, to provide at least 20 percent of their supply from renewable sources by 2017. Senate Bill 107 (SB 107) changed the target date to 2010. Executive Order S-14-08 was signed on November 2008 and expands the State's Renewable Energy Standard to 33 percent renewable energy by 2020. Executive Order S-21-09 directed CARB to adopt regulations by July 31, 2010 to enforce S-14-08. Senate Bill X1-2 codifies the 33 percent renewable energy requirement by 2020.

Senate Bill 375

Senate Bill 375 (SB 375) was adopted September 2008 and aligns regional transportation planning efforts, regional GHG emission reduction targets, and land use and housing allocation. SB 375 requires Metropolitan Planning Organizations (MPO) to adopt a sustainable communities strategy (SCS) or alternate planning strategy (APS) that will prescribe land use allocation in that MPOs Regional Transportation Plan (RTP). CARB, in consultation with each MPO, will provide each affected region with reduction targets for GHGs emitted by passenger cars and light trucks in the region for the years 2020 and 2035. These reduction targets will be updated every eight years but can be updated every four years if advancements in emissions technologies affect the reduction strategies to achieve the targets. CARB is also charged with reviewing each MPO's sustainable communities strategy or alternate planning strategy for consistency with its assigned targets.

The proposed project is located within the Southern California Association of Governments (SCAG) jurisdiction, which has authority to develop the SCS or APS. For the SCAG region, the targets set by CARB are at eight percent below 2005 per capita GHG emissions levels by 2020 and 13 percent below 2005 per capita GHG emissions levels by 2035. On April 4, 2012, SCAG adopted the 2012-2035 Regional Transportation Plan / Sustainable Communities Strategy (RTP/SCS), which meets the CARB emission reduction requirements. The Housing Element Update is required by the State to be completed within 18 months after RTP/SCS adoption or by October 2013.

On April 7, 2016, SCAG's Regional Council adopted the 2016-2040 Regional Transportation Plan/ Sustainable Communities Strategy (2016 RTP/SCS or Plan). The Plan is a long-range visioning plan that balances future mobility and housing needs with economic, environmental and public health goals. The Plan charts a course for closely integrating land use and transportation – so that the region can grow smartly and sustainably. It outlines more than $556.5 billion in transportation system investments through 2040. The Plan was prepared through a collaborative, continuous, and comprehensive process with input from local governments, county transportation commissions, tribal governments, non-profit organizations, businesses and local stakeholders within the counties of Imperial, Los Angeles, Orange, Riverside, San Bernardino and Ventura. In June 2016, SCAG received its conformity determination from the Federal Highway Administration (FHWA) and the Federal Transit Administration (FTA) indicating that all air quality conformity requirements for the 2016 RTP/SCS and associated 2015 FTIP Consistency Amendment through Amendment 15-12 have been met.

Senate Bill X7-7

Senate Bill X7-7 (SB X7-7), enacted on November 9, 2009, mandates water conservation targets and efficiency improvements for urban and agricultural water suppliers. SB X7-7 requires the Department of Water Resources (DWR) to develop a task force and technical panel to develop alternative best management practices for the water sector. In addition SB X7-7 required the DWR to develop criteria for baseline uses for residential, commercial, and industrial uses for both indoor and landscaped area uses. The DWR was also required to develop targets and regulations that achieve a statewide 20 percent reduction in water usage.

Assembly Bill 939 and Senate Bill 1374

Assembly Bill 939 (AB 939) requires that each jurisdiction in California to divert at least 50 percent of its waste away from landfills, whether through waste reduction, recycling or other means. Senate Bill 1374 (SB 1374) requires the California Integrated Waste Management Board to adopt a model ordinance by March 1, 2004 suitable for adoption by any local agency to require 50 to 75 percent diversion of construction and demolition of waste materials from landfills.

California Code of Regulations (CCR) Title 24, Part 6

CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. CalEEMod modeling defaults to 2008 standards. 2013 Standards have been approved and are effective July 1, 2014.

California Code of Regulations (CCR) Title 24, Part 11

CCR Title 24, Part 6: California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24) were first established in 1978 in response to a legislative mandate to reduce California's energy consumption. The standards are updated periodically to allow consideration and possible incorporation of new energy efficiency technologies and methods. Although it was not originally intended to reduce GHG emissions, electricity production by fossil fuels results in GHG emissions and energy efficient buildings require less electricity. Therefore, increased energy efficiency results in decreased GHG emissions.

The Energy Commission adopted 2008 Standards on April 23, 2008 and Building Standards Commission approved them for publication on September 11, 2008. These updates became effective on August 1, 2009. 2013 Standards have been approved and were effective July 1, 2014. 2016 Standards were adopted January 1, 2017.

All buildings for which an application for a building permit is submitted on or after January 1, 2017 must follow the 2016 standards. The 2016 standards are estimated to be approximately 28 percent more efficient than the 2013 standards. Energy efficient buildings require less electricity; therefore, increased energy efficiency reduces fossil fuel consumption and decreases greenhouse gas emissions.

California Green Building Standards

On January 12, 2010, the State Building Standards Commission unanimously adopted updates to the California Green Building Standards Code, which went into effect on January 1, 2011.

2016 CALGreen Code: During the 2016-2017 fiscal year, the Department of Housing and Community Development (HCD) updated CALGreen through the 2015 Triennial Code Adoption Cycle. HCD adopted three new definitions related to electric vehicle charging regulations. These definitions provided clarity to the code user as to the differences between an electric vehicle charging space and an electric vehicle charging station. HCD replaced the term “electric vehicle charging stations” with “electric vehicle charging spaces” since the term “electric vehicle charging space” better describes a space available for future installation of electric vehicle supply equipment, but with no electric vehicle charger installed.

HCD also increased the required construction waste reduction from 50 percent to 65 percent of the total building site waste. This increase aids in meeting CalRecycle’s statewide solid waste recycling goal of 75 percent for 2020 as stated in Chapter 476, Statutes of 2011 (AB 341). HCD adopted new regulations requiring recycling areas for multi-family projects of five or more dwelling units. This regulation requires developers to provide readily accessible areas adequate in size to accommodate containers for depositing, storage and collection of non-hazardous materials (including organic waste) for recycling. This requirement assists businesses that were required as of April 1, 2016, to meet the requirements of Chapter 727, Statutes of 2014 (AB 1826).

HCD adopted new regulations to require information on photovoltaic systems and electric vehicle chargers to be included in operation and maintenance manuals. Currently, CALGreen section 4.410.1 Item 2(a) requires operation and maintenance instructions for equipment and appliances. Photovoltaic systems and electric vehicle chargers are systems that play an important role in many households in California, and their importance is increasing every day. HCD incorporated these two terms in the existing language in order to provide clarity to code users as to additional systems requiring operation and maintenance instructions.

HCD updated the reference to Clean Air Standards of the United States Environmental Protection Agency applicable to woodstoves and pellet stoves. HCD also adopted a new requirement for woodstoves and pellet stoves to have a permanent label indicating they are certified to meet the emission limits. This requirement provides clarity to the code user and is consistent with the United States Environmental Protection Agency’s New Source Performance Standards. HCD updated the list of standards which can be used for verification of compliance for exterior grade composite wood products. This list now includes four standards from the Canadian Standards Association (CSA): CSA O121, CSA O151, CSA O153 and CSA O325. HCD updated heating and air-conditioning system design references to the ANSI/ACCA 2 Manual J, ANSI/ACCA 1 Manual D, and ANSI/ACCA 3 Manual S to the most recent versions approved by ANSI. HCD adopted a new elective measure for hot water recirculation systems for water conservation. The United States Department of Energy estimates that 3,600 to 12,000 gallons of water per year can be saved by the typical household (with four points of hot water use) if a hot water recirculation system is installed.

Executive Order B-30-15

Executive Order B-30-15, establishing a new interim statewide greenhouse gas emission reduction target to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030, was signed by Governor Brown in April 2015.

Executive Order B-29-15

Executive Order B-29-15, mandates a statewide 25 percent reduction in potable water usage. EO B-29-15 signed into law on April 1, 2015.

Executive Order B-37-16

Executive Order B-37-16, continuing the State's adopted water reductions, was signed into law on May 9, 2016. The water reductions build off the mandatory 25 percent reduction called for in EO B-29-15.

SBX1 2

Signed into law in April 2011, SBX1 2, requires one-third of the state's electricity to come from renewable sources. The legislation increases California's current 20 percent renewables portfolio standard target in 2010 to a 33 percent renewables portfolio standard by December 31, 2020.

Senate Bill 1383

Signed into law in September 2016, this bill requires the state board to approve and begin implementing that comprehensive strategy to reduce emissions of short-lived climate pollutants to achieve a reduction in methane by 40%, hydrofluorocarbon gases by 40%, and anthropogenic black carbon by 50% below 2013 levels by 2030, as specified. SB 1383 establishes targets to achieve a 50 percent reduction in the level of the statewide disposal of organic waste from the 2014 level by 2020 and a 75 percent reduction by 2025. The law grants CalRecycle the regulatory authority required to achieve the organic waste disposal reduction targets and establishes an additional target that not less than 20 percent of currently disposed edible food is recovered for human consumption by 2025.

Senate Bill 350

Signed into law October 7, 2015, SB 350 increases California's renewable electricity procurement goal from 33 percent by 2020 to 50 percent by 2030. This will increase the use of Renewables Portfolio Standard (RPS) eligible resources, including solar, wind, biomass, geothermal, and others. In addition, SB 350 requires the state to double statewide energy efficiency savings in electricity and natural gas end uses by 2030. To help ensure these goals are met and the greenhouse gas emission reductions are realized, large utilities will be required to develop and submit Integrated Resource Plans (IRPs). These IRPs will detail how each entity will meet their customers resource needs, reduce greenhouse gas emissions and ramp up the deployment of clean energy resources.

Regional

The SCAQMD is the agency principally responsible for comprehensive air pollution control in the South Coast Air Basin. To that end, as a regional agency, the SCAQMD works directly with the Southern California Association of Governments (SCAG), county transportation commissions, and local governments and cooperates actively with all federal and state agencies.

South Coast Air Quality Management District

The SCAQMD develops rules and regulations, establishes permitting requirements for stationary sources, inspects emission sources, and enforces such measures through educational programs or fines, when necessary. The SCAQMD is directly responsible for reducing emissions from stationary, mobile, and indirect sources. It has responded to this requirement by preparing a sequence of AQMPs. On June 30, 2016, the SCAQMD released its Draft 2016 AQMP. The 2016 AQMP is a regional blueprint for achieving the federal air quality standards and healthful air.

The 2016 AQMP includes both stationary and mobile source strategies to ensure that rapidly approaching attainment deadlines are met, that public health is protected to the maximum extent feasible, and that the region is not faced with burdensome sanctions if the Plan is not approved or if the NAAQS are not met on time. As with every AQMP, a comprehensive analysis of emissions, meteorology, atmospheric chemistry, regional growth projections, and the impact of existing control measures is updated with the latest data and methods. The most significant air quality challenge in the Basin is to reduce nitrogen oxide (NOx) emissions sufficiently to meet the upcoming ozone standard deadlines. On March 23, 2017 CARB approved the 2016 AQMP. The primary goal of this Air Quality Management Plan is to meet clean air standards and protect public health, including ensuring benefits to environmental justice and disadvantaged communities. Now that the plan has been approved by CARB, it has been forwarded to the U.S. Environmental Protection Agency for its review. If approved by EPA, the plan becomes federally enforceable.

A revised draft of the 2012 AQMP was released on September, 2012, was adopted by the SCAQMD Board on December 7, 2012, and was adopted by CARB via Resolution 13-3 on January 25, 2013. The 2012 AQMP was prepared in order to meet the federal Clean Air Act requirement that all 24-hour PM2.5 non-attainment areas prepare a SIP, that were required to be submitted to the U.S. EPA by December 14, 2012 and demonstrate attainment with the 24-hour PM2.5 standard by 2014. The 2012 AQMP demonstrates attainment of the federal 24-hour PM2.5 standard by 2014 in the Basin through adoption of all feasible measures, and therefore, no extension of the attainment date is needed.

The 2007 AQMP demonstrated attainment with the 1997 8-hour ozone (80 ppb) standard by 2023, through implementation of future improvements in control techniques and technologies. These “black box” emissions reductions represent 65 percent of the remaining NOx emission reductions by 2023 in order to show attainment with the 1997 8-hour ozone NAAQS. Given the magnitude of these needed emissions reductions, additional NOx control measures have been provided in this AQMP even though the primary purpose of this AQMP is to show compliance with 24-hour PM2.5 emissions standards.

The 2012 AQMP built upon the approaches taken in the 2007 AQMP for the attainment of federal PM and ozone standards, and highlights the significant amount of reductions needed and the need to engage in interagency coordinated planning of mobile sources to meet all of the federal criteria pollutant standards. Compared with the 2007 AQMP, the 2012 AQMP utilizes revised emissions inventory projections that use 2008 as the base year. On-road emissions are calculated using CARB EMFAC2011 emission factors and the transportation activity data provided by SCAG from their 2012 Regional Transportation Plan (2012 RTP). Off-road emissions were updated using CARB’s 2011 In-Use Off-Road Fleet Inventory Model. Since the 2007 AQMP was finalized new area source categories such as liquid propane gas (LPG) transmission losses, storage tank and pipeline cleaning and degassing, and architectural colorants, were created and included in the emissions inventories. The 2012 AQMP also includes analysis of several additional sources of GHG emissions such as landfills and could also assist in reaching the GHG target goals in the AB32 Scoping Plan.

The control measures in the 2012 AQMP consist of three components: (1) Basin-wide and episodic short-term PM2.5 measures; (2) Section 182(e)(5) implementation measures; and (3) Transportation control measures. Many of the control measures are not based on command and control regulations, but instead focus on incentives, outreach, and education to bring about emissions reductions through voluntary participation and behavioral changes. More broadly, a transition to zero- and near-zero emission technologies is necessary to meet 2023 and 2032 air quality standards and 2050 climate goals. Many of the same technologies will address both air quality and climate needs.

During construction and operation, the project must comply with applicable rules and regulations. The following are rules the project may be required to comply with, either directly, or indirectly:

SCAQMD Rule 402. Prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property.

SCAQMD Rule 403. Governs emissions of fugitive dust during construction and operation activities. Compliance with this rule is achieved through application of standard Best Management Practices, such as application of water or chemical stabilizers to disturbed soils, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 miles per hour, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph, and establishing a permanent ground cover on finished sites.

Rule 403 requires that fugitive dust be controlled with best available control measures so that the presence of such dust does not remain visible in the atmosphere beyond the property line of the emission source. In addition, SCAQMD Rule 403 requires implementation of dust suppression techniques to prevent fugitive dust from creating a nuisance off-site. Applicable dust suppression techniques from Rule 403 are summarized below. Implementation of these dust suppression techniques can reduce the fugitive dust generation (and thus the PM_{10} component). Compliance with these rules would reduce impacts on nearby sensitive receptors. Rule 403 measures may include but are not limited to the following:

- Apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive construction areas (previously graded areas inactive for 10 days or more).
- Water active sites at least three times daily. (Locations where grading is to occur will be thoroughly watered prior to earthmoving.)
- Cover all trucks hauling dirt, sand, soil, or other loose materials, or maintain at least 0.6 meters (2 feet) of freeboard (vertical space between the top of the load and top of the trailer) in accordance with the requirements of California Vehicle Code section 23114.
- Reduce traffic speeds on all unpaved roads to 15 miles per hour (mph) or less.
- Suspension of all grading activities when wind speeds (including instantaneous wind gusts) exceed 25 mph.
- Bumper strips or similar best management practices shall be provided where vehicles enter and exit the construction site onto paved roads or wash off trucks and any equipment leaving the site each trip.
- Replanting disturbed areas as soon as practical.
- During all construction activities, construction contractors shall sweep on-site and off-site streets if silt is carried to adjacent public thoroughfares, to reduce the amount of particulate matter on public streets. All sweepers shall be compliant with SCAQMD Rule 1186.1, Less Polluting Sweepers.

SCAQMD Rule 445. Prohibits permanently installed wood burning devices into any new development. A wood burning device means any fireplace, wood burning heater, or pellet-fueled wood heater, or any similarly enclosed, permanently installed, indoor or outdoor device burning any solid fuel for aesthetic or space-heating purposes, which has a heat input of less than one million British thermal units per hour.

SCAQMD Rule 481. Applies to all spray painting and spray coating operations and equipment. The rule states that a person shall not use or operate any spray painting or spray coating equipment unless one of the following conditions is met:

(1) The spray coating equipment is operated inside a control enclosure, which is approved by the Executive Officer. Any control enclosure for which an application for permit for new construction, alteration, or change of ownership or location is submitted after the date of adoption of this rule shall be exhausted only through filters at a design face velocity not less than 100 feet per minute nor greater than 300 feet per minute, or through a water wash system designed to be equally effective for the purpose of air pollution control.
(2) Coatings are applied with high-volume low-pressure, electrostatic and/or airless spray equipment.
(3) An alternative method of coating application or control is used which has effectiveness equal to or greater than the equipment specified in the rule.

SCAQMD Rule 1108. Governs the sale, use, and manufacturing of asphalt and limits the volatile organic compound (VOC) content in asphalt used in the South Coast Air Basin. This rule would regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the project must comply with SCAQMD Rule 1108.

SCAQMD Rule 1113. Governs the sale, use, and manufacturing of architectural coating and limits the VOC content in paints and paint solvents. This rule regulates the VOC content of paints available during construction. Therefore, all paints and solvents used during construction and operation of the project must comply with SCAQMD Rule 1113.

SCAQMD Rule 1133.3. The SCAQMD developed Rule 1133.3 in order to reduce emissions of VOC and ammonia during greenwaste composting operations. For projects that process greater than 5,000 tons per year of foodwaste any active composting that contains more than 10 percent foodwaste is required to be operated with either an emission control system that has an overall control efficiency of at least 80 percent for VOC and ammonia emissions or a control alternative that achieves the same reductions.

SCAQMD Rule 1143. Governs the manufacture, sale, and use of paint thinners and solvents used in thinning of coating materials, cleaning of coating application equipment, and other solvent cleaning operations by limiting their VOC content. This rule regulates the VOC content of solvents used during construction. Solvents used during the construction phase must comply with this rule.

SCAQMD Rule 1186. Limits the presence of fugitive dust on paved and unpaved roads and sets certification protocols and requirements for street sweepers that are under contract to provide sweeping services to any federal, state, county, agency or special district such as water, air, sanitation, transit, or school district.

SCAQMD Rule 1303. Governs the permitting of re-located or new major emission sources, requiring Best Available Control Measures and setting significance limits for PM_{10} among other pollutants.

SCAQMD Rule 1401. New Source Review of Toxic Air Contaminants, specifies limits for maximum individual cancer risk, cancer burden, and non-cancer acute and chronic hazard index from new permit units, relocations, or modifications to existing permit units, which emit toxic air contaminants.

SCAQMD Rule 2202. On-Road Motor Vehicle Mitigation Options, is to provide employers with a menu of options to reduce mobile source emissions generated from employee commutes, to comply with federal and state Clean Air Act requirements, Health & Safety Code Section 40458, and Section 182(d)(1)(B) of the federal Clean Air Act. It applies to any employer who employs 250 or more employees on a full or part-time basis at a worksite for a consecutive six-month period calculated as a monthly average.

In order to assist local agencies with direction on GHG emissions, the SCAQMD organized a working group and adopted Rules 2700, 2701, 2702, and 3002 which are described below.

Rules 2700 and 2701. The SCAQMD adopted Rules 2700 and 2701 on December 5, 2008, which establishes the administrative structure for a voluntary program designed to quantify GHG emission reductions. Rule 2700 establishes definitions for the various terms used in Regulation XXVII – Global Climate Change. Rule 2701 provides specific protocols for private parties to follow to generate certified GHG emission reductions for projects within the district. Approved protocols include forest projects, urban tree planting, and manure management. The SCAQMD is currently developing additional protocols for other reduction measures. For a GHG emission reduction project to qualify, it must be verified and certified by the SCAQMD Executive Officer, who has 60 days to approve or deny the Plan to reduce GHG emissions. Upon approval of the Plan, the Executive Officer issues required to issue a certified receipt of the GHG emission reductions within 90 days.

Rule 2702. The SCAQMD adopted Rule 2702 on February 6, 2009, which establishes a voluntary air quality investment program from which SCAQMD can collect funds from parties that desire certified GHG emission reductions, pool those funds, and use them to purchase or fund GHG emission reduction projects within two years, unless extended by the Governing Board. Priority will be given to projects that result in co-benefit emission reductions of GHG emissions and criteria or toxic air pollutants within environmental justice areas. Further, this voluntary program may compete with the cap-and-trade program identified for implementation in CARB's Scoping Plan, or a Federal cap and trade program.

Rule 3002. The SCAQMD amended Rule 3002 on November 5, 2010 to include facilities that emit greater than 100,000 tons per year of CO_2e are required to apply for a Title V permit by July 1, 2011. A Title V permit is for facilities that are considered major sources of emissions.

Although the SCAQMD is responsible for regional air quality planning efforts, it does not have the authority to directly regulate air quality issues associated with plans and new development projects throughout the South Coast Air Basin. Instead, this is controlled through local jurisdictions in accordance with the California Environmental Quality Act (CEQA). In order to assist local jurisdictions with air quality compliance issues the CEQA Air Quality Handbook (SCAQMD CEQA Handbook) prepared by the SCAQMD (1993) with the most current updates found at http://www.aqmd.gov/ceqa/hdbk.html, was developed in accordance with the projections and programs of the AQMP. The purpose of the SCAQMD CEQA Handbook is to assist Lead Agencies, as well as consultants, project proponents, and other interested parties in evaluating a proposed projects potential air quality impacts. Specifically, the SCAQMD CEQA Handbook explains the procedures that the SCAQMD recommends be followed for the environmental review process required by CEQA. The SCAQMD CEQA Handbook provides direction on how to evaluate potential air quality impacts, how to determine whether these impacts are significant, and how to mitigate these impacts. SCAQMD is in the process of developing an "Air Quality Analysis Guidance Handbook" to replace the CEQA Air Quality Handbook approved by the AQMD Governing Board in 1993. The 1993 CEQA Air Quality Handbook is still available but not online. In addition, there are sections of the 1993 Handbook that are obsolete. In order to assist the CEQA practitioner in conducting an air quality analysis while the new Handbook is being prepared, supplemental information regarding: significance thresholds and analysis, emissions factors, cumulative impacts emissions analysis, and other useful subjects, are available at the SCAQMD website[2].

SCAQMD Working Group

Since neither CARB nor the OPR has developed GHG emissions threshold, the SCAQMD formed a Working Group to develop significance thresholds related to GHG emissions. At the September 28, 2010 Working Group meeting, the SCAQMD released its most current version of the draft GHG emissions thresholds, which recommends a tiered approach that provides a quantitative annual thresholds of 10,000 MTCO2e for industrial uses.

Southern California Association of Governments

The SCAG is the regional planning agency for Los Angeles, Orange, Ventura, Riverside, San Bernardino and Imperial Counties and addresses regional issues relating to transportation, the economy, community development and the environment. SCAG is the Federally designated MPO for the majority of the southern California region and is the largest MPO in the nation. With respect to air quality planning, SCAG has prepared the Regional Transportation Plan and Regional Transportation Improvement Plan (RTIP), which addresses regional development and growth forecasts. These plans form the basis for the land use and transportation components of the AQMP, which are utilized in the preparation of air quality forecasts and in the consistency analysis included in the AQMP. The Regional Transportation Plan, Regional Transportation Improvement Plan, and AQMP are based on projections originating within the City and County General Plans.

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[2] http://www.aqmd.gov/home/regulations/ceqa/air-quality-analysis-handbook.

Local – County of Riverside

Local jurisdictions, such as the County of Riverside, have the authority and responsibility to reduce air pollution through its police power and decision-making authority. Specifically, the County is responsible for the assessment and mitigation of air emissions resulting from its land use decisions. The County is also responsible for the implementation of transportation control measures as outlined in the 2016 AQMP. In accordance with CEQA requirements and the CEQA review process, the County assesses the air quality impacts of new development projects, requires mitigation of potentially significant air quality impacts by conditioning discretionary permits, and monitors and enforces implementation of such mitigation.

In accordance with the CEQA requirements, the County does not, however, have the expertise to develop plans, programs, procedures, and methodologies to ensure that air quality within the County and region will meet federal and state standards. Instead, the County relies on the expertise of the SCAQMD and utilizes the SCAQMD CEQA Handbook as the guidance document for the environmental review of plans and development proposals within its jurisdiction.

Riverside County General Plan

The project is within the Reche Canyon/Badlands Area Plan; however, the Air Quality Element of the County of Riverside General Plan summarizes air quality issues in the Basin, air quality-related plans and programs administered by federal, state, and special purpose agencies, and establishes goals and policies to improve air quality. These goals and policies in the Air Quality Element include:

AQ 1.1 Promote and participate with regional and local agencies, both public and private, to protect and improve air quality. (AI 111)

AQ 1.2 Support the Southern California Association of Government's (SCAG) Regional Growth Management Plan by developing intergovernmental agreements with appropriate governmental entities such as the Western Riverside Council of Governments (WRCOG), the Coachella Valley Association of Governments (CVAG), sanitation districts, water districts, and those subregional entities identified in the Regional Growth Management Plan. (AI 111)

AQ 1.3 Participate in the development and update of those regional air quality management plans required under federal and state law, and meet all standards established for clean air in these plans. (AI 110)

AQ 1.4 Coordinate with the SCAQMD and MDAQMD to ensure that all elements of air quality plans regarding reduction of air pollutant emissions are being enforced. (AI 111)

AQ 1.5 Establish and implement air quality, land use and circulation measures that improve not only the County's environment but the entire regions. (AI 111)

AQ 1.6 Establish a level playing field by working with local jurisdictions to simultaneously adopt policies similar to those in this Air Quality Element.

AQ 1.7 Support legislation which promotes cleaner industry, clean fuel vehicles and more efficient burning engines and fuels. (AI 113)

AQ 1.8 Support the introduction of federal, state or regional enabling legislation to permit the County to promote inventive air quality programs, which otherwise could not be implemented. (AI 113)

AQ 1.9 Encourage, publicly recognize and reward innovative approaches that improve air quality. (AI 113)

AQ 1.10 Work with regional and local agencies to evaluate the feasibility of implementing a system of charges (e.g., pollution charges, user fees, congestion pricing and toll roads) that requires individuals who undertake polluting activities to bear the economic cost of their actions where possible. (AI 111)

AQ 1.11 Involve environmental groups, the business community, special interests, and the general public in the formulation and implementation of programs that effectively reduce airborne pollutants.

AQ 2.2 Require site plan designs to protect people and land uses sensitive to air pollution through the use of barriers and/or distance from emissions sources when possible.

AQ 4.1 Encourage the use of building materials/methods which reduce emissions.

AQ 4.2 Encourage the use of efficient heating equipment and other appliances, such as water heaters, swimming pool heaters, cooking equipment, refrigerators, furnaces and boiler units.

AQ 4.5 Require stationary pollutions sources to minimize the release of toxic pollutants through: design features, operating procedures, preventative maintenance, operator training, and emergency response planning.

AQ 4.6 Require stationary air pollution sources to comply with applicable air district rules and control measures.

AQ 4.7 To the greatest extent possible, require every project to mitigate any of its anticipated emissions which exceed allowable emissions as established by the SCAQMD, MDAQMD, SOCAB, the Environmental Protection Agency and the California Air Resources Board.

AQ 4.8 Expand, as appropriate, measures contained in the County's Fugitive Dust Reduction Program for the Coachella Valley to the entire County.

AQ 4.9 Require compliance with SCAQMD Rules 403 and 403.1, and support appropriate future measures to reduce fugitive dust emanating from construction sites.

AQ 4.10 Coordinate with the SCAQMD and MDAQMD to create a communications plan to alert those conducting grading operations in the County of first, second, and third stage smog alerts, and when wind speeds exceed 25 miles per hour. During these instances all grading operations should be suspended. (AI 111)

AQ 5.4 Encourage the incorporation of energy-efficient design elements, including appropriate site orientation and the use of shade and windbreak trees to reduce fuel consumption for heating and cooling.

AQ 12.5 Encourage business owners to schedule deliveries at off-peak traffic periods.

AQ 15.1 Identify and monitor sources, enforce existing regulations, and promote stronger controls to reduce particulate matter.

AQ 16.1 Cooperate with local, regional, state and federal jurisdictions to better control particulate matter.

AQ 17.1 Reduce particulate matter from agriculture, construction, demolition, debris hauling, street cleaning, utility maintenance, railroad rights-of-way, and off-road vehicles to the extent possible. (AI 123)

AQ 17.3 Identify and create a control plan for areas within the County prone to wind erosion of soil.

AQ 17.4 Adopt incentives, regulations and/or procedures to manage paved and unpaved roads and parking lots so they produce the minimum practicable level of particulates. (AI 111)

AQ 17.5 Adopt incentives and/or procedures to limit dust from agricultural lands and operations, where applicable. (AI 123)

AQ 17.6 Reduce emissions from building materials and methods that generate excessive pollutants, through incentives and/or regulations.

MONITORED AIR QUALITY

The air quality at any site is dependent on the regional air quality and local pollutant sources. Regional air quality is determined by the release of pollutants throughout the air basin. Estimates of the existing emissions in the Basin provided in the Final 2016 Air Quality Management Plan prepared by SCAQMD (March 2017) indicate that collectively, mobile sources account for 60 percent of the VOC, 90 percent of the NOx emissions, 95 percent of the CO emissions and 34 percent of directly emitted PM2.5, with another 13 percent of PM2.5 from road dust.

The EPA and the ARB designate air basins where ambient air quality standards are exceeded as “nonattainment” areas. If standards are met, the area is designated as an “attainment” area. If there is inadequate or inconclusive data to make a definitive attainment designation, they are considered “unclassified”. National nonattainment areas are further designated as marginal, moderate, serious, severe, or extreme as a function of deviation from standards. Each standard has a different definition, or ‘form’ of what constitutes attainment, based on specific air quality statistics. For example, the Federal 8-hour CO standard is not to be exceeded more than once per year; therefore, an area is in attainment of the CO standard if no more than one 8-hour ambient air monitoring values exceeds the threshold per year. In contrast, the Federal annual PM2.5 standard is met if the three-year average of the annual average PM2.5 concentration is less than or equal to the standard. Attainment status is shown in Table 4.

The local air quality can be evaluated by reviewing relevant air pollution concentrations near the project area. For evaluation purposes, the SCAQMD has divided the South Coast Air Basin into 38 air-monitoring areas with a designated ambient air monitoring station representative of each area. The project site is located in Hemet-San Jacinto Valley Air Monitoring Area (Area 28). The nearest air monitoring station to the project site is the Perris Station. The Perris Station is located approximately 12.65 miles southwest of the project site at 237 1/2 N. D Street, Perris. However, not all monitoring statins monitor all pollutants; therefore, the Banning Airport Station (Banning Station) and the Riverside-Magnolia Station (Riverside Station) were also used. The Banning Station is located at 200 S. Hathaway Street, Banning, approximately 13.95 miles southeast of the project site. The Riverside Station is located at 7002 Magnolia Avenue, Riverside, approximately 15.73 miles west of the project site. Table 5 presents the monitored pollutant levels from the monitoring stations. However, it should be noted that due to the air monitoring station distance from the project site, recorded air pollution levels at the air monitoring station reflect with varying degrees of accuracy, local air quality conditions at the project site.

The monitoring data presented in Table 5 shows that ozone and particulate matter (PM10 and PM2.5) are the air pollutants of primary concern in the project area, which are detailed below. Where state and federal emissions are exceeded, the values have been bolded.

Ozone

During the 2015 to 2017 monitoring period, the State 1-hour concentration standard for ozone has been exceeded between 23 and 33 days each year at the Perris Station. The State 8-hour ozone standard has been exceeded between 30 and 52 days each year over the past three years at the Perris Station. The Federal 8-hour ozone standard was exceeded between 49 and 80 days each year over the past three years at the Perris Station.

Ozone is a secondary pollutant as it is not directly emitted. Ozone is the result of chemical reactions between other pollutants, most importantly hydrocarbons and NO_2, which occur only in the presence of bright sunlight. Pollutants emitted from upwind cities react during transport downwind to produce the oxidant concentrations experienced in the area. Many areas of the SCAQMD contribute to the ozone levels experienced at the monitoring station, with the more significant areas being those directly upwind.

Carbon Monoxide

CO is another important pollutant that is due mainly to motor vehicles. The Riverside Station did not record an exceedance of the state or federal 1-hour or 8-hour CO standards for the last three years.

Nitrogen Dioxide

The Banning Station did not record an exceedance of the State or Federal NO_2 standards for the last three years.

Particulate Matter

During the 2015 to 2017 monitoring period, the State 24-hour concentration standards for PM10 have been exceeded for 4 days in 2015 and there was insufficient data for 2016 and 2017 at the Perris Station. Over the past three years the Federal 24-hour standard for PM10 has been exceeded for only one day in 2015 at the Perris Station.

There was insufficient data at the Banning Station for the Federal 24 hour standard for PM2.5 over the past three years.

According to the EPA, some people are much more sensitive than others to breathing fine particles (PM10 and PM2.5). People with influenza, chronic respiratory and cardiovascular diseases, and the elderly may suffer worsening illness and premature death due to breathing these fine particles. People with bronchitis can expect aggravated symptoms from breathing in fine particles. Children may experience decline in lung function due to breathing in PM10 and PM2.5. Other groups considered sensitive are smokers and people who cannot breathe well through their noses. Exercising athletes are also considered sensitive, because many breathe through their mouths during exercise.

Table 3
State and Federal Criteria Pollutant Standards [1]

Air Pollutant	Concentration / Averaging Time		Most Relevant Effects
	California Standards	Federal Primary Standards	
Ozone (O_3)	0.09 ppm/1-hour 0.07 ppm/8-hour	0.070 ppm/8-hour	(a) Decline in pulmonary function and localized lung edema in humans and animals; (b) Risk to public health implied by alterations in pulmonary morphology and host defense in animals; (c) Increased mortality risk; (d) Risk to public health implied by altered connective tissue metabolism and altered pulmonary morphology in animals after long-term exposures and pulmonary function decrements in chronically exposed humans; (e) Vegetation damage; and (f) Property damage.
Carbon Monoxide (CO)	20.0 ppm/1-hour 9.0 ppm/8-hour	35.0 ppm/1-hour 9.0 ppm/8-hour	(a) Aggravation of angina pectoris and other aspects of coronary heart disease; (b) Decreased exercise tolerance in persons with peripheral vascular disease and lung disease; (c) Impairment of central nervous system functions; and (d) Possible increased risk to fetuses.
Nitrogen Dioxide (NO_2)	0.18 ppm/1-hour 0.03 ppm/annual	100 ppb/1-hour 0.053 ppm/annual	(a) Potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups; (b) Risk to public health implied by pulmonary and extra-pulmonary biochemical and cellular changes and pulmonary structural changes; and (c) Contribution to atmospheric discoloration.
Sulfur Dioxide (SO_2)	0.25 ppm/1-hour 0.04 ppm/24-hour	75 ppb/1-hour 0.14 ppm/annual	(a) Bronchoconstriction accompanied by symptoms which may include wheezing, shortness of breath and chest tightness, during exercise or physical activity in persons with asthma.
Suspended Particulate Matter (PM_{10})	50 $\mu g/m^3$/24-hour 20 $\mu g/m^3$/annual	150 $\mu g/m^3$/24-hour	(a) Exacerbation of symptoms in sensitive patients with respiratory or cardiovascular disease; (b) Declines in pulmonary function growth in children; (c) Increased risk of premature death from heart or lung diseases in elderly.
Suspended Particulate Matter ($PM_{2.5}$)	12 $\mu g/m^3$ / annual	35 $\mu g/m^3$/24-hour 12 $\mu g/m^3$/annual	
Sulfates	25 $\mu g/m^3$/24-hour	No Federal Standards	(a) Decrease in ventilatory function; (b) Aggravation of asthmatic symptoms; (c) Aggravation of cardio-pulmonary disease; (d) Vegetation damage; (e) Degradation of visibility; (f) property damage.
Lead	1.5 $\mu g/m^3$/30-day	0.15 $\mu g/m^3$/3-month rolling	(a) Learning disabilities; (b) Impairment of blood formation and nerve conduction.
Visibility Reducing Particles	Extinction coefficient of 0.23 per kilometer-visibility of 10 miles or more due to particles when humidity is less than 70 percent.	No Federal Standards	Visibility impairment on days when relative humidity is less than 70 percent.

Notes:
(1) Source: http://www.arb.ca.gov/research/aaqs/aaqs2pdf.

Table 4
South Coast Air Basin Attainment Status

Pollutant	State Status[1]	National Status[2]
Ozone	Nonattainment	Nonattainment (Extreme)
Carbon monoxide	Attainment	Attainment/Unclassified
Nitrogen dioxide	Attainment	Attainment/Unclassified
Sulfur dioxide	Attainment	Attainment/Unclassified
PM10	Nonattainment	Attainment (Maintenance)
PM2.5	Nonattainment	Nonattainment (Moderate)

Notes:

(1) Source of State status: California Air Resources Board June 2015.

(2) Source of National status: http://www3.epa.gov/airquality/greenbk/index.html and CARB 2015.

Table 5
Air Quality Monitoring Summary[1]

Pollutant (Standard)[2]		Year		
		2015	2016	2017
Ozone:	Maximum 1-Hour Concentration (ppm)	0.124	0.131	0.120
	Days > CAAQS (0.09 ppm)	25	23	33
	Maximum 8-Hour Concentration (ppm)	0.102	0.098	0.105
	Days > NAAQS (0.070 ppm)	49	55	80
	Days > CAAQS (0.070 ppm)	31	30	52
Carbon Monoxide:[4]	Maximum 8-Hour Concentration (ppm)	*	*	*
	Days > CAAQS (9 ppm)	0	0	0
	Days > NAAQS (9 ppm)	0	0	0
Nitrogen Dioxide:[3]	Maximum 1-Hour Concentration (ppm)	0.050	0.047	0.056
	Days > CAAQS (0.18 ppm)	0	0	0
Inhalable Particulates (PM10):	Maximum 24-Hour Concentration ($\mu g/m^3$)	188.0	76.0	75.4
	Days > NAAQS (150 µg/m3)	1	0	0
	Days > CAAQS (50 µg/m3)	4	*	*
	Annual Average (µg/m3)	33.1	32.2	32.6
Ultra-Fine Particulates (PM2.5):[3]	Maximum 24-Hour Concentration (µg/m3)	27.9	110.5	34.9
	Days > NAAQS (35 µg/m3)	*	*	*
	Annual Average (µg/m3)	*	*	11.4

Notes:

(1) Source: http://www.arb.ca.gov/adam/topfour/topfour1.php
Data from the Perris monitoring station unless noted.

(2) CAAQS = California Ambient Air Quality Standard; NAAQS = National Ambient Air Quality Standard; ppm = parts per million

(3) Data from the Banning Airport Monitoring Station.

(4) Data from the Riverside-Magnolia Station.

* = Insufficient data available to determine value.

5. AIR QUALITY STANDARDS

REGIONAL AIR QUALITY

Many air quality impacts that derive from dispersed mobile sources, which are the dominate pollution generators in the basin, often occurs hours later and miles away after photochemical processes have converted primary exhaust pollutants into secondary contaminants such as ozone. The incremental regional air quality impact of an individual project is generally very small and difficult to measure. Therefore, the SCAQMD has developed significance thresholds based on the volume of pollution emitted rather than on actual ambient air quality because the direct air quality impact of a project is not quantifiable on a regional scale. The SCAQMD CEQA Handbook states that any project in the South Coast Air Basin with daily emissions that exceed any of the identified significance thresholds should be considered as having an individually and cumulatively significant air quality impact. For the purposes to this air quality impact analysis, a regional air quality impact would be considered significant if emissions exceed the SCAQMD significance thresholds identified in Table 6.

LOCAL AIR QUALITY

Project-related construction air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. In order to assess local air quality impacts the SCAQMD has developed Localized Significant Thresholds (LSTs) to assess the project-related air emissions in the project vicinity. The SCAQMD has also provided Final Localized Significant Threshold Methodology (LST Methodology), June 2003, which details the methodology to analyze local air emission impacts. The Localized Significant Threshold Methodology found that the primary emissions of concern are NO_2, CO, PM10, and PM2.5.

The significance thresholds for the local emissions of NO_2 and CO are determined by subtracting the highest background concentration from the last three years of these pollutants from Table 5 above, from the most restrictive ambient air quality standards for these pollutants that are outlined in the Localized Significant Thresholds. Table 6 shows the ambient air quality standards for NO_2, CO, and PM10 and PM2.5.

TOXIC AIR CONTAMINANTS

Construction

The construction equipment would emit diesel particulate matter (DPM), which is a carcinogen. However, the DPM emissions are short-term in nature. Determination of risk from DPM is considered over a 30-year exposure period because carcinogenic risk is directly related to sustained exposure. In contrast, construction activities would be intermittent and limited to a period of approximately 10 years. Thus, duration of construction activities would represent a fraction of the 30-year exposure period used as the basis for assessing the significance of carcinogenic risk exposure. The closest sensitive receptor is in excess of 3,000 feet from the proposed project site. Furthermore, construction-based particulate matter (PM) emissions (including diesel exhaust emissions) do not exceed any local or regional thresholds. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project and exposure to DPM is anticipated to be less than significant.

Operation

The project is a proposal to expand an existing landfill facility and add composting operations. The closest sensitive receptor is in excess of 3,000 feet from the proposed project site. Therefore, even though diesel equipment will be in use on site, due to the distance from the site to the closest sensitive receptor, sensitive receptors would not be exposed to project-related toxic sources of air pollution.

ODOR IMPACTS

The California Code of Regulations, Title 14, Chapter 3.1, Compostable Materials Handling Operations and Facilities Regulatory Requirements, provides specific odor management requirements for compost facilities. These requirements supersede the regional odor requirements that are provided in SCAQMD's Rule 402.

In order to determine if the proposed project would result in a significant odor impact, the proposed project would have to be in nonconformance with Title 14, Chapter 3.1, which requires that all composting facilities in the State of California prepare an Odor Impact Minimization Plan. The Odor Impact Minimization Plan is required to detail potential odor impacts, develop a complaint response protocol and provide design considerations and operational procedures to minimize odors.

GREENHOUSE GASES

The CEQA Guidelines recommend that a lead agency consider the following when assessing the significance of impacts from GHG emissions on the environment:

- The extent to which the project may increase (or reduce) GHG emissions as compared to the existing environmental setting;
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project;
- The extent to which the project complies with regulations or requirements adopted to implement an adopted statewide, regional, or local plan for the reduction or mitigation of GHG emissions[3].

Regional – South Coast Air Quality Management District

The project is within the South Coast Air Basin, which is under the jurisdiction of the South Coast Air Quality Management District (SCAQMD).

SCAQMD Regulation XXVII, Climate Change

SCAQMD Regulation XXVII currently includes three rules:

- The purpose of Rule 2700 is to define terms and post global warming potentials.
- The purpose of Rule 2701, SoCal Climate Solutions Exchange, is to establish a voluntary program to encourage, quantify, and certify voluntary, high quality certified greenhouse gas emission reductions in the SCAQMD.
- Rule 2702, Greenhouse Gas Reduction Program, was adopted on February 6, 2009. The purpose of this rule is to create a Greenhouse Gas Reduction Program for greenhouse gas emission reductions in the SCAQMD. The SCAQMD will fund projects through contracts in response to requests for proposals or purchase reductions from other parties.

A variety of agencies have developed greenhouse gas emission thresholds and/or have made recommendations for how to identify a threshold. However, the thresholds for projects in the jurisdiction of the SCAQMD remain in flux. The California Air Pollution Control Officers Association explored a variety of threshold approaches, but did not recommend one approach (2008). The ARB recommended approaches for setting interim significance thresholds (California Air Resources Board 2008b), in which a draft industrial project threshold suggests that non-transportation related emissions under 7,000 MTCO2e per year would

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[3] The Governor's Office of Planning and Research recommendations include a requirement that such a plan must be adopted through a public review process and include specific requirements that reduce or mitigate the projects incremental contribution of GHG emissions. If there is substantial evidence that the possible effects of a particular project are still cumulatively considerable, notwithstanding compliance with the adopted regulations or requirements, an EIR must be prepared for the project.

be less than significant; however, the ARB has not approved those thresholds and has not published anything since then. The SCAQMD is in the process of developing thresholds, as discussed below.

SCAQMD Threshold Development

On December 5, 2008, the SCAQMD Governing Board adopted an interim greenhouse gas significance threshold for stationary sources, rules, and plans where the SCAQMD is lead agency (SCAQMD permit threshold). The SCAQMD permit threshold consists of five tiers. However, the SCAQMD is not the lead agency for this project. Therefore, the five permit threshold tiers do not apply to the proposed project.

The SCAQMD is in the process of preparing recommended significance thresholds for greenhouse gases for local lead agency consideration ("SCAQMD draft local agency threshold"); however, the SCAQMD Board has not approved the thresholds as of the writing of this report. The current draft thresholds consist of the following tiered approach:

- Tier 1 consists of evaluating whether or not the project qualifies for any applicable exemption under CEQA.
- Tier 2 consists of determining whether the project is consistent with a greenhouse gas reduction plan. If a project is consistent with a qualifying local greenhouse gas reduction plan, it does not have significant greenhouse gas emissions.
- Tier 3 consists of screening values, which the lead agency can choose, but must be consistent with all projects within its jurisdiction. A projects construction emissions are averaged over 30 years and are added to a projects operational emissions. If a projects emissions are under one of the following screening thresholds, then the project is less than significant:
  - All land use types: 3,000 MTCO2e per year
  - Based on land use type: residential: 3,500 MTCO2e per year; commercial: 1,400 MTCO2e per year; or mixed use: 3,000 MTCO2e per year.
  - Based on land type: Industrial (where SCAQMD is the lead agency), 10,000 MTCO2e per year.
- Tier 4 has the following options:
  - Option 1: Reduce emissions from business as usual (BAU) by a certain percentage; this percentage is currently undefined.
  - Option 2: Early implementation of applicable AB 32 Scoping Plan measures.
  - Option 3, 2020 target for service populations (SP), which includes residents and employees: 4.8 MTCO2e/SP/year for projects and 6.6 MTCO2e/SP/year for plans;
  - Option 3, 2035 target: 3.0 MTCO2e/SP/year for projects and 4.1 MTCO2e/SP/year for plans.
- Tier 5 involves mitigation offsets to achieve target significance threshold.

The SCAQMD's draft threshold uses the Executive Order S-3-05 goal as the basis for the Tier 3 screening level. Achieving the Executive Order's objective would contribute to worldwide efforts to cap carbon dioxide concentrations at 450 ppm, thus stabilizing global climate. Specifically, the Tier 3 screening level for stationary sources is based on an emission capture rate of 90 percent for all new or modified projects. A 90 percent emission capture rate means that 90 percent of total emissions from all new or modified stationary source projects would be subject to a CEQA analysis, including a negative declaration, a mitigated negative declaration, or an environmental impact report, which includes analyzing feasible alternatives and imposing feasible mitigation measures. A GHG significance threshold based on a 90 percent emission capture rate may be more appropriate to address the long-term adverse impacts associated with global climate change because most projects will be required to implement GHG reduction measures. Further, a 90 percent emission capture rate sets the emission threshold low enough to capture a substantial fraction of future stationary source projects that will be constructed to accommodate future statewide population and economic growth, while setting the emission threshold high enough to exclude small projects that will in aggregate contribute a relatively small fraction of the cumulative statewide GHG emissions. This assertion is based on the fact that staff estimates that these GHG emissions would account for slightly less than one percent of future 2050 statewide GHG emissions target (85 MMTCO2eq/year). In addition, these small projects may be subject to future applicable GHG control regulations that would further reduce their overall future contribution to the statewide GHG inventory. Finally, these small sources are already subject to BACT for criteria pollutants and are more likely to be single-permit facilities, so they are more likely to have few opportunities readily available to reduce GHG emissions from other parts of their facility.

Local – County of Riverside

Riverside County Climate Action Plan

The Climate Action plan for the County of Riverside summarizes greenhouse gas emissions and climate change issues in the Basin, greenhouse gas emissions and climate change plans and programs administered by federal, state, and special purpose agencies, and establishes goals and policies to improve greenhouse gas emissions. These goals and policies in the Climate Action Plan include:

1.2 Goals To fulfill the purposes of the CAP (Climate Action Plan), the County identified the following goals to be achieved:

- Provide a list of specific actions that will reduce Greenhouse Gas (GHG) emissions, giving the highest priority to actions that provide the greatest reduction in GHG emissions and benefit to the community at the least cost.
- Reduce emissions attributable to Riverside County to levels consistent with the target reductions of AB 32.
- Establish a qualified reduction plan for which future development within the County can tier and thereby streamline the environmental analysis necessary under CEQA.

Thresholds of Significance for this Project

To determine whether the projects GHG emissions are significant, this analysis uses the SCAQMD draft threshold of 3,000 MTCO2e per year for all land uses.

Table 6
SCAQMD Air Quality Significance Thresholds[1,2]

Mass Daily Thresholds		
Pollutant	Construction (lbs/day)	Operation (lbs/day)
NOx	100	55
VOC	75	55
PM10	150	150
PM2.5	55	55
SOx	150	150
CO	550	550
Lead	3	3

Toxic Air Contaminants, Odor and GHG Thresholds	
TACs	Maximum Incremental Cancer Risk ≥ 10 in 1 million Cancer Burden > 0.5 excess cancer cases (in areas ≥ 1 in 1 million) Chronic & Acute Hazard Index > 1.0 (project increment)
Odor	Project creates an odor nuisance pursuant to SCAQMD Rule 402
GHG	10,000 MT/yr CO2e for industrial projects

Ambient Air Quality Standards	
Pollutant	SCAQMD Standards
NO2 -1-hour average	0.18 ppm (338 µg/m^3)
PM10 -24-hour average	
Construction	10.4 µg/m^3
Operations	2.5 ug/m^3
PM2.5 -24-hour average	
Construction	10.4 µg/m^3
Operations	2.5 µg/m^3
SO2	
1-hour average	0.25 ppm
24-hour average	0.04 ppm
CO	
1-hour average	20 ppm (23,000 µg/m^3)
8-hour average	9 ppm (10,000 µg/m^3)
Lead	
30-day average	1.5 µg/m^3
Rolling 3-month average	0.15 µg/m^3
Quarterly average	1.5 µg/m^3

Notes:

(1) Source: http://www.aqmd.gov/ceqa/handbook/signthres.pdf

6. SHORT-TERM CONSTRUCTION IMPACTS

Construction activities associated with the proposed project would have the potential to generate air emissions, toxic air contaminant emissions, and odor impacts.

The project proposes to excavate/grade approximately 300 acres to the south and east of the existing 150 acre disposal area (see Figure 2). This excavation is proposed to occur in approximately seventeen (17) stages (ranging from 11 to 26 acres in each stage) which will be followed by the installation of a liner system to be used for the expanded refuse disposal area. Ultimately, the lined refuse disposal area will be increased by 250 acres. Also, two (2) areas to the north and east of the expansion area will be used to stockpile excavated dirt, and sedimentation basins will be constructed where appropriate.

All heavy equipment needed for the BLIP shall meet a minimum of U.S. EPA Tier 3/EU Stage III emission standards, or a more stringent standard if promulgated prior to approval of construction documents/specifications for each phase. A total of approximately 2.4 million cubic yards is to be excavated during liner construction (worst-case) over 17 stages, which results in an maximum export of 208,000 cubic yards for the largest 26-acre phase (the phase analyzed as worst-case below) to the on-site stockpile areas 1 and/or 2. The most-intense phase of construction is anticipated to generate 20,800 hauling trips (using on-road haul trucks with 10 cubic yards capacity) and travel approximately one mile to the on-site stockpile areas.

Implementation of the BLIP will require additional equipment during construction of new landfill phases and operation of the compost facility (shown in the Equipment List in Section 1 of this report). During BLIP construction, soil management and site maintenance activities, as well as improvement projects, will cease, and baseline/existing equipment, where appropriate, shall be redirected to the construction of the BLIP. Therefore, the emissions from heavy equipment avoided as a result of halting the aforementioned landfill activities will be used as off-set credits during this analysis. The engine Tiers of the existing equipment were obtained from the client and factored into the calculations for the existing equipment offset credit analysis.

Assumptions for the phasing, duration, and required equipment for the construction of the proposed project were obtained from the project applicant. The construction activities for the proposed expansion project consist of Work Items (WI) 1 through 7, and are described in detail in Section I, Project Description, of this report. The proposed project is anticipated to start construction no sooner than January 2020.

CONSTRUCTION-RELATED REGIONAL IMPACTS

The construction-related regional air quality impacts have been analyzed for both criteria pollutants and GHGs.

Construction-Related Criteria Pollutants Analysis

The following provides a discussion of the methodology used to calculate regional construction air emissions and an analysis of the proposed projects short-term construction emissions for the criteria pollutants.

Methodology

Typical emission rates from construction activities were obtained from CalEEMod Version 2016.3.2. CalEEMod is a computer model published by the SCAQMD for estimating air pollutant emissions. The CalEEMod program uses the EMFAC2014 computer program to calculate the emission rates specific for the eastern portion of Riverside County for construction-related employee vehicle trips and the OFFROAD2011 computer program to calculate emission rates for heavy construction equipment operations. EMFAC2014 and OFFROAD2011 are computer programs generated by CARB that calculates composite emission rates for vehicles. Emission rates are reported by the program in grams per trip and grams per mile or grams per running hour. Using CalEEMod, the peak daily air pollutant emissions during each phase was calculated and presented below. These emissions represent the highest level of emissions for each of the construction phases in terms of air pollutant emissions. The construction emissions printouts from CalEEMod are provided in Appendix B.

SCAQMD's Rule 403

The project will be required to comply with existing SCAQMD rules for the reduction of fugitive dust emissions. SCAQMD Rule 403 establishes these procedures. Compliance with this rule is achieved through application of standard best management practices in construction and operation activities, such as application of water or chemical stabilizers to disturbed soils, managing haul road dust by application of water, covering haul vehicles, restricting vehicle speeds on unpaved roads to 15 mph, sweeping loose dirt from paved site access roadways, cessation of construction activity when winds exceed 25 mph and establishing a permanent, stabilizing ground cover on finished sites. In addition, projects that disturb 50 acres or more of soil or move 5,000 cubic yards of materials per day are required to submit a Fugitive Dust Control Plan or a Large Operation Notification Form to SCAQMD. Based on the maximum phase size of the project (26 acres) a Fugitive Dust Control Plan or Large Operation Notification would not be required.

SCAQMD's Rule 403 minimum requirements require that the application of the best available dust control measures are used for all grading operations and include the application of water or other soil stabilizers in sufficient quantity to prevent the generation of visible dust plumes. Compliance with Rule 403 would require the use of water trucks during all phases where earth moving operations would occur. Compliance with Rule 403 is required. On-road flatbed trucks, water trucks and dump trucks were included in the analysis as described in Section I, Project Description of this report. Per CalEEMod guidance, the additional trips from these vehicles were added on as vendor trips (or as hauling trips for the dump trucks).

Per SCAQMD Rule 1113 as amended on June 3, 2011, the architectural coatings that would be applied after January 1, 2014 will be limited to an average of 50 grams per liter or less.

The phases of the construction activities which have been analyzed below are: (1) site preparation WI 1 and 2, (2) site preparation WI 3, (3) grading WI 4, (4) building construction WI 5, (5) grading WI 6i, and (6) grading WI 6ii and 7. Emissions for the off-set credits for each WI are also included and subtracted from the subtotals for each WI. Table 7 provides a detailed description of the type of equipment, hours per day each piece of equipment will be operated for each phase of construction. For additional details on construction modeling, please see Appendix B.

Project Impacts

The construction-related criteria pollutant emissions for each WI and the off-set equipment are shown below in Table 8. As the existing equipment had varying levels of engine Tiers, and CalEEMod does not have the capacity to have the same type of equipment listed with different engine Tiers, the average for the engine Tiers was estimated for the off-set equipment analyzed. Furthermore, as the equipment for each WI will be Tier 3 or better, and the existing equipment has better than Tier 0 engines, the mitigated values are reported. Table 8 shows that even before off-set emissions credits were applied, none of the analyzed criteria pollutants would exceed the regional emissions thresholds. Therefore, a less than significant regional air quality impact would occur during construction of the proposed project.

CONSTRUCTION-RELATED LOCAL IMPACTS

Construction-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The proposed project has been analyzed for the potential local air quality impacts created from: construction-related fugitive dust and diesel emissions; from toxic air contaminants; and from construction-related odor impacts.

Local Air Quality Impacts from Construction

The SCAQMD has published a “Fact Sheet for Applying CalEEMod to Localized Significance Thresholds” (South Coast Air Quality Management District 2011b). CalEEMod calculates construction emissions based on the number of equipment hours and the maximum daily disturbance activity possible for each piece of equipment. In order to compare CalEEMod reported emissions against the localized significance threshold lookup tables, the CEQA document should contain in its project design features or its mitigation measures the following parameters:

(1) The off-road equipment list (including type of equipment, horsepower, and hours of operation) assumed for the day of construction activity with maximum emissions.
(2) The maximum number of acres disturbed on the peak day.
(3) Any emission control devices added onto off-road equipment.
(4) Specific dust suppression techniques used on the day of construction activity with maximum emissions.

The CalEEMod output in Appendix B show the equipment used for this analysis.

As shown in Table 9, the maximum number of acres disturbed in a day would be 18.5 acres during WI 4, the most intense phase of construction. The number of off-set vehicles was also included in this estimate as they would also be working in the immediate vicinity. The local air quality emissions from construction were analyzed using the SCAQMD’s Mass Rate Localized Significant Threshold Look-up Tables and the methodology described in Localized Significance Threshold Methodology prepared by SCAQMD (revised July 2008). The Look-up Tables were developed by the SCAQMD in order to readily determine if the daily emissions of CO, NOx, PM10, and PM2.5 from the proposed project could result in a significant impact to the local air quality. The emission thresholds were calculated based on the Hemet-San Jacinto Valley source receptor area (SRA) 28 and a disturbance of five acres[4] per day. According to LST Methodology, any receptor located closer than 25 meters (82 feet) shall be based on the 25 meter thresholds. The nearest sensitive receptors to the proposed construction activities is the RV Park (Fisherman’s Retreat) located approximately 0.73 miles (~1,175 meters) northeast of the proposed projects construction activities; therefore, the SCAQMD Look-up Tables for 500 meters was used. Table 10 shows the on-site emissions from the CalEEMod model for the different Work Item phases and the corresponding local emissions thresholds.

The data provided in Table 10 shows that none of the analyzed criteria pollutants would not exceed the local emissions thresholds at the nearest sensitive receptors. Therefore, a less than significant local air quality impact would occur from construction of the proposed project. No mitigation is required.

Construction-Related Toxic Air Contaminant Impacts

The greatest potential for toxic air contaminant emissions would be related to diesel particulate emissions associated with heavy equipment operations during construction of the proposed project. According to SCAQMD methodology, health effects from carcinogenic air toxics are usually described in terms of “individual cancer risk”. “Individual Cancer Risk” is the likelihood that a person exposed to concentrations of toxic air contaminants over a 30 year lifetime will contract cancer, based on the use of standard risk-assessment methodology. Given the relatively limited number of heavy-duty construction equipment and the short-term construction schedule, the proposed project would not result in a long-term (i.e., 30 years) substantial source of toxic air contaminant emissions and corresponding individual cancer risk. Furthermore, construction-based particulate matter (PM) emissions (including diesel exhaust emissions) do not exceed any local or regional thresholds. Therefore, no significant short-term toxic air contaminant impacts would occur during construction of the proposed project.

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[4] The comparison against the 5-acres thresholds are a much more stringent as the project would be disturbing 18.5 acres, as the more acres you disturb, the larger the thresholds would be, For example the threshold values for disturbing 1 acre are lower than the threshold values for disturbing 2 acres and 5 acres respectively. The threshold values for disturbing 18.5 acres would be higher than the threshold values for disturbing 5 acres.

Construction-Related Odor Impacts

Potential sources that may emit odors during construction activities include the application of materials such as asphalt pavement, paints and solvents and from diesel equipment emissions. The objectionable odors that may be produced during the construction process are of short-term in nature and the odor emissions are expected cease upon the drying or hardening of the odor producing materials. Furthermore, the nearest off-site sensitive receptor to the project site is the RV Park (Fisherman's Retreat) located approximately 0.73 miles (~1,175 meters) northeast of the proposed projects construction activities. Due to the short-term nature, distance to the nearby sensitive receptors, and limited amounts of odor producing materials being utilized, no significant impact related to odors would occur during construction of the proposed project. Diesel exhaust and VOCs would be emitted during construction of the project, which are objectionable to some; however, emissions would disperse rapidly from the project site and therefore should not reach an objectionable level at the nearest sensitive receptors.

Table 7
Off-Road Construction Equipment and Off-Set Equipment Assumptions

Equipment Type	Number	Hours/Day	Horse Power[1]	Load Factor[1]
Work Items 1 and 2				
Tractors/Loaders/Backhoes	2	8	97	0.37
Crawler Tractors	1	4	212	0.43
900 GPM Pumps	2	8	84	0.74
Work Item 3				
Crushing/Proc. Equipment	1	8	85	0.78
Excavators	1	8	158	0.38
Tractors/Loaders/Backhoes	1	8	97	0.37
Work Item 4				
Crawler Tractors	3	8	212	0.43
Graders	1	8	187	0.41
Scrapers	8	8	367	0.48
Work Item 5				
Forklifts	1	8	89	0.20
Tractors/Loaders/Backhoes	1	8	97	0.37
Work Item 6i				
Crawler Tractors	1	8	212	0.43
Pumps	1	8	84	0.74
Graders	1	8	187	0.41
Scrapers	1	8	367	0.48
Work Items 6ii and 7				
Crawler Tractors	1	8	212	0.43
Graders	1	8	187	0.41
Pumps	1	8	84	0.74
Scrapers	1	8	367	0.48
Offset Credit Equipment				
Crawler Tractors	3	8	212	0.43
Graders	2	8	187	0.41
Excavators	1	8	158	0.38
Scrapers	5	8	367	0.48
Tractors/Loaders/Backhoes	1	8	97	0.37

Notes:

(1) On-site emissions from equipment operated on-site that is not operated on public roads. On-site grading and site preparation PM-10 anc PM-2.5

Note: On-road water trucks and dump trucks were added in as additional vendor trips per CalEEMod guidance (see CalEEMod output for details).

Table 8
Construction-Related Criteria Pollutant Emissions [1]

Activity		Pollutant Emissions (pounds/day)					
		ROG	NOx	CO	SO$_2$	PM10	PM2.5
Work Items 1 and 2	On-Site[2]	0.51	11.34	14.89	0.02	1.27	0.79
	Off-Site[3]	0.08	0.35	0.59	0.00	0.17	0.05
	Subtotal	0.59	11.69	15.48	0.03	1.44	0.84
	- Off-Set Equipment	*-7.96*	*-127.57*	*-136.65*	*-0.13*	*-3.71*	*-2.98*
	Total for WI 1 and 2	-7.37	-115.88	-121.17	-0.10	-2.27	-2.14
Work Item 3	On-Site[2]	0.34	7.40	10.59	0.02	0.89	0.51
	Off-Site[3]	0.04	0.14	0.35	0.00	0.10	0.03
	Subtotal	0.39	7.53	10.93	0.02	0.99	0.54
	- Off-Set Equipment	*-7.96*	*-127.57*	*-136.65*	*-0.13*	*-3.71*	*-2.98*
	Total for WI 3	-7.57	-120.04	-125.72	-0.11	-2.72	-2.45
Work Item 4	On-Site[2]	3.72	71.99	80.68	0.15	2.78	2.74
	Off-Site[3]	0.27	6.26	1.79	0.01	0.44	0.12
	Subtotal	4.00	78.25	82.47	0.16	3.23	2.86
	- Off-Set Equipment	*-7.96*	*-127.57*	*-136.65*	*-0.13*	*-3.71*	*-2.98*
	Total for WI 4	-3.96	-49.32	-54.18	0.04	-0.48	-0.12
Work Item 5	On-Site[2]	0.11	2.59	3.50	0.00	0.18	0.18
	Off-Site[3]	2.14	1.27	16.55	0.05	5.47	1.47
	Subtotal	2.26	3.86	20.05	0.05	5.65	1.65
	- Off-Set Equipment	*-7.96*	*-127.57*	*-136.65*	*-0.13*	*-3.71*	*-2.98*
	Total for WI 5	-5.70	-123.71	-116.60	-0.07	1.94	-1.33
Work Item 6i	On-Site[2]	0.86	17.08	19.83	0.04	1.17	0.79
	Off-Site[3]	0.05	0.11	0.36	0.00	0.12	0.03
	Subtotal	0.91	17.19	20.19	0.04	1.30	0.82
	- Off-Set Equipment	*-7.96*	*-127.57*	*-136.65*	*-0.13*	*-3.71*	*-2.98*
	Total for WI 6i	-7.05	-110.38	-116.46	-0.09	-2.41	-2.16
Work Items 6ii and 7	On-Site[2]	0.86	17.08	19.83	0.04	1.17	0.79
	Off-Site[3]	0.05	0.29	0.39	0.00	0.13	0.04
	Subtotal	0.91	17.37	20.22	0.04	1.31	0.83
	- Off-Set Equipment	*-7.96*	*-127.57*	*-136.65*	*-0.13*	*-3.71*	*-2.98*
	Total for WI 6ii and 7	-7.05	-110.20	-116.43	-0.09	-2.40	-2.16
SCAQMD Thresholds		75	100	550	150	150	55
Exceeds Thresholds?		No	No	No	No	No	No

Notes:

(1) Source: CalEEMod Version 2016.3.2, mitigated emissions (see note below).

(2) On-site emissions from equipment operated on-site that is not operated on public roads.

(3) Off-site emissions from equipment operated on public roads.

Note: All additional equipment for Work Items 1 through 7 will have Tier 3 engines; therefore, mitigated values were reported. Offset equipment also used engines better than Tier 0, as shown in mitigated emissions of the CalEEMod output. None of the Work Items will overlap.

Table 9
Maximum Number of Acres Disturbed Per Day[1]

Activity	Equipment	Number	Acres/8hr-day	Total Acres
Excavation, dirt hauling, PCS installation and engineered fill	Graders	3	0.5	1.5
	Rubber Tired Dozers	6	0.5	3
	Excavators	1	0.5	0.5
	Scrapers	13	1	13
	Tractors/Loaders/Backhoes	1	0.5	0.5
Total for phase		-	-	18.5

Notes:
(1) Source: South Coast AQMD, Fact Sheet for Applying CalEEMod to Localized Significance Thresholds, 2011b.

Note: Equipment totals above reflect additional equipment and off-set equipment, as they will all be working together.

Table 10
Local Construction Emissions at the Nearest Sensitive Receptors [1]

Activity	On-Site Pollutant Emissions (pounds/day)			
	NOx	CO	PM10	PM2.5
Work Items 1 and 2	11.34	14.89	1.27	0.79
Work Item 3	7.40	10.59	0.89	0.51
Work Item 4	71.99	80.68	2.78	2.74
Work Item 5	2.59	3.50	0.18	0.18
Work Item 6i	17.08	19.83	1.17	0.79
Work Items 6ii and 7	17.08	19.83	1.17	0.79
SCAQMD Threshold for 500 meters (1,640 feet)[2]	**1,072**	**29,256**	**207**	**105**
Exceeds Threshold?	No	No	No	No

Notes:

(1) Source: Calculated from CalEEMod and SCAQMD's Mass Rate Look-up Tables, Revised October 21, 2009 for five acres in Hemet/San Jacinto Valley. Since the Look-up Tables only provide emissions levels out to 500 meters; therefore, the five acre threshold at 500 meters were used to be conservative.

(2) The estimated distance from the landfill property line to the nearest sensitive receptor (Fisherman's Retreat RV Park) northeast of the project site is 1,175 meters (3,855 feet); therefore, to be conservative, the project's on-site emissions were compared to the 500 meter threshold.

7. LONG-TERM AIR QUALITY OPERATIONAL IMPACTS

The on-going operation of the proposed project would result in a long-term increase in air quality emissions. This increase would be due to emissions from the project-generated vehicle trips and through operational emissions from the on-going use of the proposed project. The following section provides an analysis of potential long-term air quality impacts due to: regional air quality and local air quality impacts with the on-going operations of the proposed project.

OPERATIONS-RELATED REGIONAL AIR QUALITY IMPACTS

The potential operations-related air emissions have been analyzed below for the criteria pollutants and cumulative impacts.

Operations-Related Criteria Pollutants Analysis

On-Site Equipment Emissions

The proposed increase in daily tonnage allowed and the new processing activities would require the addition of new equipment to the project site. Per RCDWR, any new equipment for this project would have at least Tier 3/EU Stage III. New equipment includes: 1 grinder, 1 trommel screen, 1 compost turner, 1 wheeled loader, and 1 landfill tipper. Table 11 provides a list of the proposed additional diesel equipment that will be used during operation of the project. The on-site equipment emissions were calculated using separate CalEEMod runs and the equipment was analyzed in the construction section as to allow for engine mitigation as needed (CalEEMod does not provide for operational mitigation of construction equipment). To be conservative, the additional equipment was modeled for be used for 12 hours per day, although the hours of use are likely to be less than 12 hours per day.

Area Sources

Area sources include emissions from consumer products, landscape equipment and architectural coatings. Landscape maintenance includes fuel combustion emissions from equipment such as lawn mowers, rototillers, shredders/grinders, blowers, trimmers, chain saws, and hedge trimmers, as well as air compressors, generators, and pumps. As specifics were not known about the landscaping equipment fleet, CalEEMod defaults were used to estimate emissions from landscaping equipment. No changes were made to the default area source parameters.

Energy Usage

Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the default energy usage parameters.

Vehicle Emissions

Vehicle emissions are those produced from the miles generated by the proposed project. The landfill's current allowed daily permitted vehicles per day is that of 612 and, as per RCDWR, this number would not change with the implementation of the proposed project. While it is anticipated that most of the organics will come from existing trips to the landfill; the addition of a compost operation[5] and the 500 ton per day increase would add an additional 30 waste delivery trucks (transfer trucks- 23 MSW/ 7 organics) each with an average roundtrip of 17.5 miles (8.75 mi for C-W HHDT vehicles only one way). 100 percent of the additional trips

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[5] The Badlands landfill receives approximately 150-200 tons per day of green waste/organic material, which may be used as feedstock for the proposed composting operation. Since the proposed windrow composting operation will be capped at 300 tpd, this AQ analysis evaluates the potential increase in vehicle emissions associated with the additional 150 tpd for the windrow composting operation.

are HHDT and the fleet mix was adjusted to reflect this. The additional HHDT transfer trucks were estimated to generate approximately 60 trips per day over the compost area and newly expanded operational area of 250 acres; which results in a trip generation rate of 0.24 trips/acre. Therefore, CalEEMod was revised with the above information to estimate emissions from the vehicle trips associated with the proposed project.

Compost Emissions

The proposed expansion would add a compost operation consisting of either a windrow with a permitted daily tonnage of up to 300 tons per day or an aerated static pile (ASP) with a permitted daily tonnage of up to 150 tons per day. This analysis evaluates the operation of both options separately; however, the proposed project would only implement one of the composting methods.

Composting of all types of food waste, green waste (grass clippings, woodchips, and prunings) results in an approximate 60 to 92 percent reduction in VOCs compared with natural decay. For purposes of this analysis, it is assumed that composting would reduce 60 percent of baseline VOCs as compared with natural decomposition. SCAQMD Rule 1133.3 uses an emission factor of 4.25 pounds VOC per ton of throughput. Emissions from natural decomposition would therefore be 10.63 pounds VOC per ton, as a 60 percent reduction yields 4.25 pounds VOC per ton.

ASP

Per the RCDWR, for ASP compost emissions, no analysis is required as RCDWR will use daily emission rates obtained from a source test completed for an ASP facility identical to the proposed BLIP ASP composting facility. The source test was completed in March 2016 for the Gore® Compost System located at the West Valley Transfer Station in the City of Fontana.

Windrow

This analysis assumes that a total of 300 tons per day would be composted at the site. If that total amount were decomposed naturally, it would result in 3,189 pounds of VOC emitted per day (300 tons x 10.63 lbs VOC per ton). Composting results in a 60 percent reduction; therefore, if the material were composted (through the project), the emissions would be a total of 1,275 pounds VOC per day (3,189 pounds minus 1,914 pounds); shown in Table 12 for the proposed 300 tons. Therefore, project emissions in compliance with Rule 1133.3, results in the elimination of approximately 1,914 pounds of VOC from entering the South Coast Air Basin through natural decomposition. This approach is valid because VOC is a regional pollutant. VOC is of concern because its presence contributes to the formation of ozone in the presence of sunlight and NOx. Therefore, reducing VOC in the basin would reduce ozone precursors in the basin and would reduce ozone.

SCAQMD’s Rule 1133.3 (d)(5) provides compost emission rates of 4.25 pounds of VOC and 0.46 pounds of ammonia per ton of compost during the active phase.

SCAQMD Rule 1133.3 (d)(3) requires that any composting operations processing greater than 5,000 tons per year of foodwaste throughput, use emission control devices on the composting operations that have a control efficiency of at least 80 percent for VOC and ammonia emissions. Since the proposed project would have greater than 5,000 tons per year of foodwaste throughput, the existing operations and the proposed project are required to meet the emission reduction requirements of Rule 1133.3 (d)(3). Implementation of Rule 1133.3 would result in emission rates of 0.93 pounds of VOC and 0.132 pounds of ammonia per ton of compost throughput.

Project Impacts

The worst-case summer or winter VOC, NOx, CO, SO2, PM10, and PM2.5, created from the proposed projects long-term operations (including on-site equipment and composting) have been calculated and are summarized below in Table 12. The data provided in Table 12 shows that none of the projects emissions would exceed the SCAQMD regional operational thresholds of significance discussed above in Section 5. However, to ensure that operational emissions comply with SCAQMD rules and regulations governing composting facilities, mitigation measure 1 has been included in Section 11 of this report.

Cumulative Regional Air Quality Impacts

Cumulative projects include local development as well as general growth within the project area. However, as with most development, the greatest source of emissions is from mobile sources, which travel well out of the local area. Therefore, from an air quality standpoint, the cumulative analysis would extend beyond any local projects and when wind patterns are considered would cover an even larger area. Accordingly, the cumulative analysis for the projects air quality must be generic by nature.

The project area is out of attainment for ozone and in 2016 was out of attainment for PM10. Construction and operation of cumulative projects will further degrade the local air quality, as well as the air quality of the South Coast Air Basin. The greatest cumulative impact on the quality of regional air cell will be the incremental addition of pollutants mainly from increased traffic volumes from residential, commercial, and industrial development and the use of heavy equipment and trucks associated with the construction of these projects. Air quality will be temporarily degraded during construction activities that occur separately or simultaneously. However, in accordance with the SCAQMD methodology, projects that do not exceed the SCAQMD criteria or can be mitigated to less than criteria levels are not significant and do not add to the overall cumulative impact. With respect to long-term emissions, this project would create a less than significant cumulative impact.

OPERATIONS-RELATED LOCAL AIR QUALITY IMPACTS

Project-related air emissions may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The proposed project has been analyzed for the potential local CO emission impacts from the project-generated vehicular trips and from the potential local air quality impacts from on-site operations. The following analysis analyzes the vehicular CO emissions, local impacts from on-site operations, and odor impacts.

Local CO Emission Impacts from Project-Generated Vehicular Trips

CO is the pollutant of major concern along roadways because the most notable source of CO is motor vehicles. For this reason, CO concentrations are usually indicative of the local air quality generated by a roadway network and are used as an indicator of potential local air quality impacts. Local air quality impacts can be assessed by comparing future without and with project CO levels to the State and Federal CO standards which were presented above in Section 5.

To determine if the proposed project could cause emission levels in excess of the CO standards discussed above in Section 5, a sensitivity analysis is typically conducted to determine the potential for CO “hot spots” at a number of intersections in the general project vicinity. Because of reduced speeds and vehicle queuing, “hot spots” potentially can occur at high traffic volume intersections with a Level of Service E or worse.

The analysis prepared for CO attainment in the South Coast Air Basin by the SCAQMD can be used to assist in evaluating the potential for CO exceedances in the South Coast Air Basin. CO attainment was thoroughly analyzed as part of the SCAQMD's 2003 Air Quality Management Plan (2003 AQMP) and the 1992 Federal Attainment Plan for Carbon Monoxide (1992 CO Plan). As discussed in the 1992 CO Plan, peak carbon monoxide concentrations in the South Coast Air Basin are due to unusual meteorological and topographical conditions, and not due to the impact of particular intersections. Considering the region’s unique meteorological conditions and the increasingly stringent CO emissions standards, CO modeling was performed as part of 1992 CO Plan and subsequent plan updates and air quality management plans. In the 1992 CO Plan, a CO hot spot analysis was conducted for four busy intersections in Los Angeles at the peak morning and afternoon time periods. The intersections evaluated included: South Long Beach Boulevard and Imperial Highway (Lynwood); Wilshire Boulevard and Veteran Avenue (Westwood); Sunset Boulevard and Highland Avenue (Hollywood); and La Cienega Boulevard and Century Boulevard (Inglewood). These analyses did not predict a violation of CO standards. The busiest intersection evaluated was that at Wilshire Boulevard and Veteran Avenue, which has a daily traffic volume of approximately 100,000 vehicles per day. The Los Angeles County Metropolitan Transportation Authority evaluated the Level of Service in the vicinity of the Wilshire Boulevard/Veteran Avenue intersection and found it to be Level of Service E during the morning peak hour and Level of Service F during the afternoon peak hour.

The proposed project will not change the daily permitted vehicles to the site (will remain at 612 vehicles permitted per day) and will only add 46 additional transfer truck trips; therefore, the proposed project would not decrease the Level of Service at any analyzed intersection. Therefore no CO "hot spot" modeling was performed and no significant long-term air quality impact is anticipated to local air quality with the on-going use of the proposed project.

Local Air Quality Impacts from On-Site Operations

Project-related air emissions from on-site sources such as diesel equipment and compost emissions as well as the operation of vehicles on-site may have the potential to exceed the State and Federal air quality standards in the project vicinity, even though these pollutant emissions may not be significant enough to create a regional impact to the South Coast Air Basin. The nearest sensitive receptor that may be impacted by the proposed project is the RV Park (Fisherman's Retreat) located approximately 0.73 miles (~1,175 meters) northeast of the project site.

The local air quality emissions from on-site operations were analyzed according to the methodology described in Localized Significance Threshold Methodology, prepared by SCAQMD, revised July 2008. The Look-up Tables were developed by the SCAQMD in order to readily determine if the daily emissions of CO, NOx, PM10, and PM2.5 from the proposed project could result in a significant impact to the local air quality. The emissions thresholds are based on the amount of emissions that would be required on-site to exceed the local concentration thresholds at the nearest sensitive receptor, due to the distance of the nearest sensitive receptor the local emissions thresholds are much greater than the regional thresholds for each of the criteria pollutants analyzed.

The nearest sensitive receptor to the proposed projects operational activities is the RV Park (Fisherman's Retreat) located as near as approximately 0.73 miles (~1,175 meters) northeast of the) to the nearest emissions source associated with the operation of the proposed project. The Localized Significance Threshold Methodology, provides screening distances out to 500 meters (1,640 feet). The 500 meter distance limit was utilized, and the SRA for Hemet/San Jacinto Valley, SRA 28. Per staff at SCAQMD, the 5-acre operational threshold can be used as a screening tool to determine if a more detailed, dispersion modeling-based analysis is required. As shown by the results in Table 13, none of the SCAQMD localized operational thresholds were exceeded. No mitigation is required. Impacts are less than significant.

Operations-Related Odor Impacts

The proposed project would be required to conform to the odor requirements provided in California Code of Regulations, Title 14, Chapter 3.1, Compostable Materials Handling Operations and Facilities Regulatory Requirements, which provides specific odor management requirements for compost facilities.

In order to conform with Title 14, Chapter 3.1, the existing Odor Impact Minimization Plan, for the site will apply to the proposed project. The Odor Impact Minimization Plan details potential odor impacts from the operation of the proposed project, develops a complaint response protocol and provides design considerations and operational procedures to minimize odors. Through compliance with the Odor Impact Minimization Plan, the operational odor impacts would be reduced to less than significant.

Table 11
Proposed Additional Operational Diesel Equipment[1]

Equipment Type	Number	CalEEMod Equipment Type	Rated Horsepower	Load Factor	Hours Per Day
Trommel/Screener	1	Other Material Handling	205	0.59	12
Compost Turner	1	Tractors/Loaders/Backhoes	255	0.55	12
Grinder	1	Crushing/Proc. Equipment	850	0.78	12
Landfill Tipper	1	Other Construction Equipment	172	0.42	12
Wheeled Loader	1	Rubber Tired Loader	203	0.36	12

Notes:

(1) Source: RCDWR RFP and CalEEMod defaults.

Table 12

Regional Operational Criteria Pollutant Emissions[1]

Activity	Pollutant Emissions (pounds/day)					
	ROG	NOx	CO	SO2	PM10	PM2.5
On-Site Equipment Emissions[2]	0.86	16.63	20.04	0.03	0.66	0.66
Area Sources[3]	3.86	0.00	0.03	0.00	0.00	0.00
Energy[4]	0.00	0.00	0.00	0.00	0.00	0.00
Mobile Sources[5]	0.19	8.61	1.27	0.02	0.47	0.14
Windrow Compost Emissions[6]						
-Proposed New (300 tons)	1275.00	0.00	0.00	0.00	0.00	0.00
VOC offset from composting - reduction of natural decomposition emissions[7]	-3,189.00					
Net Increase Compost Emissions	-1,914.00	0.00	0.00	0.00	0.00	0.00
Total Net Increase in Emissions	**-1,909.09**	**25.24**	**21.34**	**0.06**	**1.14**	**0.80**
SCAQMD Thresholds	**55**	**55**	**550**	**150**	**150**	**55**
Exceeds Threshold?	No	No	No	No	No	No

Notes:

(1) Source: CalEEMod Version 2016.3.2, which includes both on-site and off-site emissions calculations.

(2) On-site equipment includes exhaust emissions and fugitive dust created from off-road equipment. Proposed equipment modeled with year 2022 emissions. New equipment will have Tier 3 final or better engines., therefore mitigated values are reported.

(3) Area sources consist of emissions from consumer products, architectural coatings, and landscaping equipment.

(4) Energy usage consists of emissions from generation of electricity and on-site natural gas usage.

(5) Mobile sources consist of emissions from vehicles and road dust from the net increase in project vehicles.

(6) Compost emissions rates based on SCAQMD's Rule 1133.3.

(7) For purposes of this analysis, it is assumed that composting would reduce 60 percent of baseline VOCs as compared with natural decomposition. SCAQMD Rule 1133.3 uses an emission factor of 4.25 pounds VOC per ton of throughput. Emissions from natural decomposition would therefore be 10.63 pounds VOC per ton, as a 60 percent reduction yields 4.25 pounds VOC per ton (10.63 lbs/ton x 300 tons/day x 365 days).

Table 13
Local Operational Emissions at the Nearest Sensitive Receptors [1]

On-Site Emission Source	On-Site Pollutant Emissions (pounds/day)			
	NOx	CO	PM10	PM2.5
On-Site Equipment	16.63	20.04	0.66	0.66
Area Sources	0.00	0.03	0.00	0.00
On-Site Vehicle Emissions[2]	0.86	0.13	0.05	0.01
Windrow Compost Emissions	0.00	0.00	0.00	0.00
Total Emissions	**17.49**	**20.20**	**0.71**	**0.68**
SCAQMD Threshold for 500 meters (1,640 feet)[3]	**1,072**	**29,256**	**50**	**26**
Exceeds Threshold?	No	No	No	No

Notes:

(1) Source: Calculated from CalEEMod and SCAQMD's Mass Rate Look-up Tables for five acres in SRA 28 Hemet/San Jacinto Valley.

(2) On-site vehicular emissions based on 1/10 of the gross vehicular emissions and road dust, based on approximately 1/10 of trip length occurring on-site.

(3) The estimated distance from the project site to the nearest sensitive receptor (Fisherman's Retreat RV Park) northeast of the project site is 1,175 meters (3,855 feet). The more stringent 500 meter, 5 acre thresholds are used.

8. GLOBAL CLIMATE CHANGE ANALYSIS

The proposed project is anticipated to generate GHG emissions from area sources, energy usage, mobile sources, waste, water, and construction equipment. The following provides the methodology used to calculate the project-related GHG emissions, the project impacts and a consistency analysis of the proposed project with any applicable GHG reduction plans, policies or regulations.

METHODOLOGY

The CalEEMod Version 2016.3.2 was used to calculate the GHG emissions from all phases of the proposed project. The projects emissions were compared to the tier 3 SCAQMD draft screening threshold of 3,000 metric tons CO2e per year for all land uses.

Each source of GHG emissions is described in greater detail below.

Construction

The construction-related GHG emissions were also included in the analysis and were based on a 30 year amortization rate as recommended in the SCAQMD GHG Working Group meeting on November 19, 2009. The construction emission reductions from the offsets were also included in the construction totals. The construction-related GHG emissions were calculated by CalEEMod and detailed above in Section 6. The CalEEMod annual GHG emissions printouts are provided in Appendix C.

Energy Usage

Energy usage includes emissions from the generation of electricity and natural gas used on-site. No changes were made to the default energy usage parameters.

Vehicle Emissions

Mobile sources include emissions from the additional vehicle miles generated from the proposed project. Mobile sources were analyzed in the manner described in Section 7 above.

On-Site Equipment

The proposed increase in daily tonnage allowed and the new processing activities would require the addition of new equipment to the project site. Table 11, shown above in Section 7, provides a list of the proposed additional diesel equipment that will be used during operation of the project. As the new, additional on-site equipment will be Tier 3 or better and CalEEMod does not allow for mitigation of operational off-road equipment, the proposed equipment was analyzed in a separate CalEEMod run as construction phases that each lasted durations of one year in the CalEEMod model.

Water and Wastewater

Water and wastewater is based on the GHG emissions associated with the energy used to transport and filter the water as well as any GHG emissions from the treatment of the wastewater. The water and wastewater GHG emissions were calculated through use of the CalEEMod Model.

Feedstocks

The GHG emissions reductions associated with the addition of compost operations to the project site were calculated through use of the Waste Reduction Model (WARM) created by the EPA (see Appendix D for WARM output). The WARM model states that it accounts for the transport of the material to the recycling center as well as the on-site equipment, however in order to provide a conservative analysis the vehicle emissions were counted separately and detailed above. As stated previously, the proposed project will implement either a windrow with a daily tonnage of up to 300 tons per day of feedstock (approximately 200 tons per day greenwaste and 100 tons per day food waste) or an aerated static pile (ASP) with a daily tonnage of up to 150 tons per day. This analysis evaluates the operation of both options separately; however, the proposed project would only implement one of the composting methods.

Windrow

The anticipated 200 tons per day of additional greenwaste to be composted was entered into the WARM model based on 200 tons of yard trimmings. The 200 tons of compost was multiplied by 365 days in order to calculate the annual tons of greenwaste to be composted and it was assumed that 95 percent of the greenwaste would be composted and 5 percent would be sent to a landfill.

The anticipated 100 tons per day of food waste to be composted was also entered into the WARM Model. The 100 tons were multiplied by 365 days in order to calculate the annual tons and it was assumed that 80 percent of the food waste would be reduced and 20 percent would be sent to a landfill. The WARM model found that by composting, the proposed project would reduce GHG emissions over non-composting by 18,678.70 MTCO2e per year.

ASP

As stated previously, per RCDWR, for ASP compost emissions, no analysis is required as RCDWR will use emission rates obtained from a source test completed for an ASP facility identical to the proposed BLIP ASP composting facility. The source test was completed in March 2016 for the Gore® Compost System located at the West Valley Transfer Station in Fontana, CA. However, as the tonnage is the same, reductions in project-related GHG emissions would be similar to those reported above for Windrow.

PROJECT GREENHOUSE GAS EMISSIONS

The proposed projects GHG emissions have been calculated with the CalEEMod and WARM models based on the parameters detailed above. A summary of the results is shown below in Table 14. The CalEEMod model run for the proposed project is provided in Appendix C and the WARM model run for the proposed project is provided in Appendix D.

The data provided in Table 14 shows that development of the proposed project together with the reductions in GHGs due to composting, project-related GHG emissions would be reduced by 18,678.70 MTCO$_2$e per year. Since the proposed project would result in a reduction of GHG emissions (with a total emissions of -16,833.44 MTCO$_2$e per year), it is well below the SCAQMD draft threshold of significance of 3,000 MTCO$_2$e per year. Therefore, a less than significant generation of greenhouse gas emissions would occur from development and operation of the proposed project.

GREENHOUSE GAS PLAN CONSISTENCY

The proposed project could have the potential to conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases. The applicable plan for the proposed project is the County of Riverside Climate Action Plan, which includes goals and policies such as those pertaining to energy and water use reduction, promotion of green building measures, waste reduction, and reduction in vehicle miles traveled that are applicable to the proposed project.

As stated above, the GHG emissions generated by the proposed project would not exceed the SCAQMD and Riverside County CAP Screening GHG threshold of 3,000 metric tons per year of CO2e. Consequently, the implementation of the proposed project would not hinder the state's ability to achieve AB 32's goal of achieving 1990 levels of GHG emissions by 2020. In addition, once the energy and water consumption reductions from compliance with the mandatory requirements of CALGreen are accounted for, the GHG emissions associated with the proposed project would be even lower. Furthermore, emissions from vehicles, which are the main source of operational GHG emissions associated with the project, would also be reduced through implementation of the state Pavley standards, the federal CAFE standards, and the state LCFS.

Assembly Bill 939 (AB 939) requires that each jurisdiction in California to divert at least 50 percent of its waste away from landfills, whether through waste reduction, recycling or other means. The proposed project would promote implementation of AB 939 through expanding a waste diversion resource for the region.

SB-32 requires the state board to ensure that statewide greenhouse gas emissions are reduced to 40% below the 1990 level by 2030. SCAQMD's thresholds used Executive Order S-3-05 goal as the basis for deriving the screening level. The California Governor issued Executive Order S-3-05, GHG Emission, in June 2005, which established the following reduction targets:

- 2010: Reduce greenhouse gas emissions to 2000 levels
- 2020: Reduce greenhouse gas emissions to 1990 levels
- 2050: Reduce greenhouse gas emissions to 80 percent below 1990 levels.

As the SCAQMD uses EO S-3-05 as the basis for their GHG emissions screening level, and EO S-3-05 includes the long-term goal to reduce greenhouse gas emissions to 80 percent below 1990 levels by 2050, the project would also be consistent with the goal of SB 32 (to reduce greenhouse gas emissions to 40 percent below 1990 levels by 2030). Therefore, projects that meet the current interim emissions targets/thresholds established by SCAQMD (as described in Section 5, Air Quality Standards) would also be on track to meet the reduction targets for 2030. Furthermore, all of the post 2020 reductions in GHG emissions are addressed via regulatory requirements at the State level and the project will be required to comply with these regulations as they come into effect.

The proposed project would reduce GHG emissions, promote the implementation of AB 939, SB 32, AB 341, and Title 24 Part 11. Therefore, the proposed project would not conflict with any applicable plan, policy or regulation of an agency adopted for the purpose of reducing the emissions of greenhouse gases.

Table 14
Project-Related Greenhouse Gas Emissions[1]

Category	Greenhouse Gas Emissions (Metric Tons/Year)					
	Bio-CO2	NonBio-CO_2	CO_2	CH_4	N_2O	CO_2e
Area[2]	0.00	0.01	0.01	0.00	0.00	0.01
Energy[3]	0.00	0.00	0.00	0.00	0.00	0.00
Mobile	0.00	356.52	356.52	0.03	0.00	357.33
Waste[4]	0.00	0.00	0.00	0.00	0.00	0.00
Water[5]	0.00	0.00	0.00	0.00	0.00	0.00
Construction[6]	0.00	918.97	918.97	0.24	0.00	925.39
On-site Equipment[7]	0.00	558.02	558.02	0.18	0.00	562.54
Windrow Composting[8]	0.00	0.00	0.00	0.00	0.00	-18,678.70
Total Emissions						**-16,833.44**
SCAQMD Draft Threshold						**3,000**
Exceeds Threshold?						No

Notes:

(1) Source: CalEEMod Version 2016.3.2.

(2) Area sources consist of GHG emissions from consumer products, architectural coatings, and landscape equipment.

(3) Energy usage consist of GHG emissions from electricity and natural gas usage.

(4) Solid waste includes the CO_2 and CH_4 emissions created from the solid waste placed in landfills.

(5) Water includes GHG emissions from electricity used for transport of water and processing of wastewater.

(6) Construction GHG emissions based on a 30 year amortization rate. Offset emissions were subtracted from the mitigated construction emissions (as all new equipment will be Tier 3) and were multiplied by 17 to account for GHG emissions from the total excavation of all 17 stages.

(7) Mitigated construction emissions (as all new operational equipment will be Tier 3).

(8) Feedstocks were calculated through use of the WARM Model.

9. AIR QUALITY COMPLIANCE

The California Environmental Quality Act (CEQA) requires a discussion of any inconsistencies between a proposed project and applicable General Plans and Regional Plans (CEQA Guidelines Section 15125). The regional plan that applies to the proposed project includes the SCAQMD Air Quality Management Plan (AQMP). Therefore, this section discusses any potential inconsistencies of the proposed project with the AQMP.

The purpose of this discussion is to set forth the issues regarding consistency with the assumptions and objectives of the AQMP and discuss whether the proposed project would interfere with the region’s ability to comply with Federal and State air quality standards. If the decision-makers determine that the proposed project is inconsistent, the lead agency may consider project modifications or inclusion of mitigation to eliminate the inconsistency.

The SCAQMD CEQA Handbook states that "New or amended General Plan Elements (including land use zoning and density amendments), Specific Plans, and significant projects must be analyzed for consistency with the AQMP". Strict consistency with all aspects of the plan is usually not required. A proposed project should be considered to be consistent with the AQMP if it furthers one or more policies and does not obstruct other policies. The SCAQMD CEQA Handbook identifies two key indicators of consistency:

(1) Whether the project will result in an increase in the frequency or severity of existing air quality violations or cause or contribute to new violations, or delay timely attainment of air quality standards or the interim emission reductions specified in the AQMP.
(2) Whether the project will exceed the assumptions in the AQMP in 2016 or increments based on the year of project buildout and phase.

Both of these criteria are evaluated in the following sections.

CRITERIA 1 – INCREASE IN THE FREQUENCY OR SEVERITY OF VIOLATIONS

Based on the air quality modeling analysis contained in this Air Analysis, short-term construction impacts will not result in significant impacts based on the SCAQMD regional and local thresholds of significance. This Air Analysis also found that long-term operations impacts will not result in significant impacts based on the SCAQMD local and regional thresholds of significance.

Therefore, the proposed project is not projected to contribute to the exceedance of any air pollutant concentration standards and is found to be consistent with the AQMP for the first criterion.

CRITERIA 2 – EXCEED ASSUMPTIONS IN THE AQMP?

Consistency with the AQMP assumptions is determined by performing an analysis of the proposed project with the assumptions in the AQMP. The emphasis of this criterion is to ensure that the analyses conducted for the proposed project are based on the same forecasts as the AQMP. The 2016-2040 Regional Transportation/Sustainable Communities Strategy prepared by SCAG (2016) includes chapters on: the challenges in a changing region, creating a plan for our future, and the road to greater mobility and sustainable growth. These chapters currently respond directly to federal and state requirements placed on SCAG. Local governments are required to use these as the basis of their plans for purposes of consistency with applicable regional plans under CEQA. For this project, the County of Riverside General Plan defines the assumptions that are represented in the AQMP.

The project site is currently designated as Public Facilities in the Reche Canyon/Badlands Area Plan Land Use Plan. The proposed expansion project is consistent with the current land use designation and would not require a General Plan Amendment or zone change. Therefore, the proposed project would not result in an inconsistency with the current land use designation. Therefore, the proposed project is not anticipated to exceed the AQMP assumptions for the project site and is found to be consistent with the AQMP for the second criterion.

Based on the above, the proposed project will not result in an inconsistency with the SCAQMD AQMP. Therefore, a less than significant impact will occur.

10. MITIGATION MEASURES

STANDARD CONDITIONS

The proposed project will be required to comply with the following regulatory conditions from the SCAQMD and State of California (State).

South Coast Air Quality management District Rules

Under federal and state law, the SCAQMD is under legal obligation to enforce air pollution regulations. These regulations are primarily meant to ensure that the ambient air meets federal and state air quality standards. SCAQMD also has broad authority to regulate toxic and hazardous air emissions, and these regulations are enforced in the same manner as those that pertain to the ambient air quality standards.

New Source Review (NSR)

The facility operator shall comply with the current New Source Review regulation codified by SCAQMD Regulation XIII.

Note: NSR is a preconstruction review required under both federal and state statutes for new and modified sources located in non-attainment areas that do not meet the Clean Air Act standards. NSR applies to both individual permits and entire facilities.

Air Quality Permits

The facility operator shall file applications for a Permit to Construct and Permit to Operate prior to installation of new or relocated equipment or emission control device, or prior to modifications of existing equipment or emission control device.

The facility operator shall obtain a Change of Operator Permit for changes of operator for an existing permit.

Source Specific Requirements

Rule 402 – Nuisance

Rule 402 prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other material which causes injury, detriment, nuisance, or annoyance to any considerable number of persons or to the public, or which endanger the comfort, repose, health or safety of any such persons or the public, or which cause, or have a natural tendency to cause, injury or damage to business or property. Compliance with Rule 402 will reduce local air quality and odor impacts to nearby sensitive receptors.

Rule 403 Fugitive Dust

Rule 403 governs emissions of fugitive dust during construction and operational activities and requires that no person shall cause or allow the emissions of fugitive dust such that dust remains visible in the atmosphere beyond the property line or the dust emission exceeds 20 percent opacity, if the dust is from the operation of a motorized vehicle. Compliance with this rule is achieved through application of standard Best Available Control Measures, which include but are not limited to the measures below. Compliance with these rules would reduce local air quality impacts to nearby sensitive receptors.

- Utilize either a pad of washed gravel 50 feet long, 100 feet of paved surface, a wheel shaker, or a wheel washing device to remove material from vehicle tires and undercarriages before leaving project site.
- Do not allow any track out of material to extend more than 25 feet onto a public roadway and remove all track out at the end of each workday.
- Restrict traffic speeds on all unpaved roads to 15 miles per hour or less.

- The facility operator shall prepare a Fugitive Dust Control Plan for project construction and operations.
- The facility operator shall conduct on-site wind monitoring during project construction and operations to suspend or curtail all grading and/or organic materials management activities when wind speeds exceed 25 miles per hour.
- The facility operator shall conduct watering as necessary to prevent visible emissions and/or apply nontoxic chemical soil stabilizers according to manufacturers' specifications to all inactive areas.

Rule 1108 – Asphalt
Rule 1108 governs the sale, use, and manufacturing of asphalt and limits the volatile organic compounds (VOC) content in asphalt used in the Basin. This rule would regulate the VOC content of asphalt used during construction. Therefore, all asphalt used during construction of the proposed project must comply with SCAQMD Rule 1108.

Rule 1113 – Architectural Coatings
Rule 1113 governs the sale, use, and manufacturing of architectural coatings and limits the VOC content in sealers, coatings, paints and solvents. This rule regulates the VOC contents of paints available during construction. Therefore, all paints and solvents used during construction and operation of the proposed project must comply with SCAQMD Rule 1113.

Rule 1133 – Composting General Administrative Requirements
Rule 1133 governs chipping and grinding activities and composting operations and details registration and fee requirements with the SCAQMD for all composting that occurs within the SCAQMD's jurisdiction.

The facility operator shall complete Rule 1133 Registration and Annual Updates, comply with the chipping and grinding and stockpile operations requirements of Rule 1133.1, and Rule 1133.3 emissions reductions from greenwaste composting operations.

Rule 1133.1 – Chipping and Grinding Activities
Rule 1133.1 governs chipping and grinding activities within the SCAQMD and places limitations on foodwaste. It also requires that mixed greenwaste be chipped within 48 hours of receipt, excluding holidays. Rule 1133.1 also requires operators to maintain operational records for the prior five year period and shall include daily amounts of greenwaste received, daily weather conditions and moisture content of the piles.

Rule 1133.2 – Emissions Reductions from Co-Composting Operations
Rule 1133.2 governs co-composting, which is defined as where biosolids and/or manure are mixed with bulking agents to produce compost. Rule 1133.2 requires that all new co-composting activities either occur within an enclosure that has set air flow rates or through development of a compliance plan that demonstrates an overall emission reduction of 80 percent for both ammonia and VOC emissions. Rule 1133.2 also requires that co-composting operations do not result in a measurable increase in background levels of ammonia or VOC, which is required to be verified through regular measurements of the co-composting operations.

The facility operator shall require that all foodwaste composting greater than 5,000 tons per year throughput and/or any active phase composting more than 10 percent foodwaste, by weight, shall be conducted using an emission control device designed and operated with an overall system control efficiency of at least 80 percent, by weight, each for VOC and ammonia emissions.

Note: This would require the combined VOC emissions from both the active and curing phases of foodwaste composting to be reduced to 0.65 pounds per ton of compost throughput.

Rule 1133.3 – Emissions Reductions from Greenwaste Composting Operations
Rule 1133.3 governs greenwaste composting operations within the SCAQMD and requires that any active composting that contains more than 10 percent foodwaste is required to be operated with either an emission control system that has an overall control efficiency of at least 80 percent for VOC and ammonia emissions

or a control alternative that achieves the same reductions. Rule 1133.3 also requires that each active pile is covered with a minimum of 6 inches of finished compost, requires that water be applied before turning a pile, and is required to limit manure to 20 percent or less of the compost pile. Rule 1133.3 also requires regular measurements to be taken of the ammonia and VOC emissions from the piles in order to ensure compliance with the 80 percent control efficiency requirements and that records of the source testing of the piles to be maintained for a minimum of five years.

Rule 1157 – PM10 Emissions Reductions from Aggregate Operations

Rule 1157 governs the PM10 emissions from aggregate operations within the SCAQMD that would occur as part of the C & D activities. Rule 1157 provides specific limitations on the amount of discharge of PM10 that may occur from the project site as well as specific PM10 emission reduction measures that are required to be implemented such as the utilization of dust suppressants on piles and dirt roads.

Rule 1193 – Clean On-Road Residential and Commercial Refuse Collection Vehicles

Rule 1193 applies to government agencies that operate solid waste collection fleets with 15 or more solid waste collection vehicles and private operators that provide solid waste collection services to governmental agencies within the SCAQMD. Rule 1193 requires that any governmental agency that obtains new solid waste collection services from a private company shall require that 100 percent of the vehicles are powered by alternative fuel. For existing services, Rule 1193 provides a 5 year phase in period before all vehicles are required to be powered by alternative fuel. Although, this rule does not directly regulate the proposed project, it has been included here since several of the customers of the compost facility are required to meet the requirements of Rule 1193.

State of California Rules

The following lists the State of California rules that are applicable to all industrial projects in the State. If specialized uses or stationary emissions sources are developed on the project site, additional rules may apply.

CARB Regulations for In-Use Off-Road Diesel Vehicles

On July 26, 2007, the California Air Resources Board (CARB) adopted a regulation that amended Sections 2449, 2449.1, and 2449.2 of the California Code of Regulations in order to reduce diesel particulate matter (DPM) and NOx emissions from in-use off-road heavy-duty diesel vehicles in California. Such vehicles are used in construction, mining, and industrial operations. The regulation limits idling to no more than five consecutive minutes, requires reporting and labeling, and requires disclosure of the regulation upon vehicle sale. Performance requirements of the rule are based on a fleet's average NOx emissions, which can be met by replacing older vehicles with newer, cleaner vehicles or by applying exhaust retrofits. The regulation was amended in 2010 to delay the original timeline of the performance requirement making the first compliance deadline January 1, 2014 for large fleets (over 5,000 horsepower), 2017 for medium fleets (2,501-5,000 horsepower), and 2019 for small fleets (2,500 horsepower or less).

Note: The Off-Road Regulation imposes limits on idling, requires a written idling policy, and requires a disclosure when selling vehicles; requires all vehicles to be reported to ARB (using the Diesel Off-Road Online Reporting System, DOORS) and labeled; restricts the adding of older vehicles into fleets; and requires fleets to reduce their emissions by retiring, replacing, or repowering older engines, or installing Verified Diesel Emission Control Strategies, VDECS (i.e., exhaust retrofits).

CARB Resolution 08-43 for On-Road Diesel Truck Fleets

On December 12, 2008 the CARB adopted Resolution 08-43, which limits NOx, PM10 and PM2.5 emissions from on-road diesel truck fleets that operate in California. On October 12, 2009 Executive Order R-09-010 was adopted that codified Resolution 08-43 into Section 2025, title 13 of the California Code of Regulations. This regulation requires that by the year 2023 all commercial diesel trucks that operate in California shall meet model year 2010 (Tier 4 Final) or latter emission standards. In the interim period, this regulation provides annual interim targets for fleet owners to meet. For the anticipated project opening year of 2015, 50 percent of a truck fleet is required to have installed Best Available Control Technology (BACT) for NOx emissions and 100 percent of a truck fleet installed BACT for PM10 emissions. This regulation also provides a few exemptions including a onetime per year 3-day pass for trucks registered outside of California. All on-road diesel trucks operating on the project site will be required to comply with Resolution 08-43.

California Code of Regulations (CCR) Title 14, Chapter 3.1 Materials Odors

CCR Title 14, Chapter 3.1, Compostable Materials Handling Operations and Facilities Regulatory Requirements, was adopted to implement the California Integrated Waste Management Act of 1989 and provides a variety of regulatory requirements for composting operations including the preparation of an Odor Impact Mitigation Plan that includes an odor monitoring protocol, a complaint response protocol, and methods for implementing additional mitigation to reduce odor impacts.

The facility operator shall prepare and maintain an Odor Impact Minimization Plan required by California Code of Regulations (CCR), Title 14.

Note: During construction and operations, the project must comply with Title 14, Chapter 3.1. An Odor Impact Minimization Plan, is in force at the existing facility and will also apply to the practices employed in the expansion area. The Odor Minimization Plan details potential odor impacts from the operation of the proposed project, develops a complaint response protocol and provides design considerations and operational procedures to minimize odors. Through compliance with the Odor Impact Minimization Plan, the operational odor impacts would be reduced to less than significant.

CONSTRUCTION MEASURES

Adherence to SCAQMD Rule 403 is required.

None required.

OPERATIONAL MEASURES

Mitigation Measure 1. The project applicant shall require that all composting meet an 80 percent control efficiency in VOC emissions over the unmitigated emission rates provided in SCAQMD Rule 1133.3 (d)(5). This would require the combined VOC emissions from both the active and curing phases to be reduced to 0.65 pounds per ton of compost throughput. The reduction in VOC emissions shall be verified through the source testing methodology and requirements as detailed in SCAQMD Rules 1133.2 and 1133.3.

11. REFERENCES

California Air Pollution Control Officers Association

2009 Health Risk Assessments for Proposed Land Use Projects

California Air Resources Board

2008 Resolution 08-43

2008 Airborne Toxic Control Measure for in-use Diesel-Fueled Transport Refrigeration Units (TRU) and TRU Generator Sets, Section 2477 of Division 3, Chapter 9, Title 13, California Code of Regulations

2008 Recommended Approaches for Setting Interim Significance Thresholds for Greenhouse Gases under the California Environmental Quality Act

2008 ARB Recommended Interim Risk Management Policy for Inhalation-Based Residential Cancer Risk – Frequently Asked Questions

2008 Climate Change Scoping Plan, a framework for change.

2011 Supplement to the AB 32 Scoping Plan Functional Equivalent Document

2013 Almanac of Emissions and Air Quality.
Source: https://www.arb.ca.gov/aqd/almanac/almanac13/almanac13.htm

2014 First Update to the Climate Change Scoping Plan, Building on the Framework Pursuant to AB32, the California Global Warming Solutions Act of 2006. May.

2017 California's 2017 Climate Change Scoping Plan. November.

2018 Historical Air Quality, Top 4 Summary

California Department of Conservation

2000 A General Guide for Ultramafic Rocks in California – Areas More Likely to Contain Naturally Occurring Asbestos

California Integrated Waste Management Board

2007 Emissions Testing of Volatile Organic Compounds from Greenwaste Composting at the Modesto Compost Facility in the San Joaquin Valley

County of Riverside

2008 Comprehensive Update to the General Plan

2015 County of Riverside Draft Climate Action Plan. February

2015 Reche Canyon/Badlands Area Plan. December.

Governor's Office of Planning and Research

2008 CEQA and Climate: Addressing Climate Change Through California Environmental Quality Act (CEQA) Review

2009 CEQA Guideline Sections to be Added or Amended

Intergovernmental Panel on Climate Change (IPCC)

2014 IPCC Fifth Assessment Report, Climate Change 2014: Synthesis Report

Office of Environmental Health Hazard Assessment

2003 Air Toxics Hot Spots Program Risk Assessment Guidelines

2015 Air Toxics Hot Spots Program Risk Assessment Guidelines

South Coast Air Quality Management District

1993 CEQA Air Quality Handbook

2001 Source Test Report 01-171 Ammonia and Volatile Organic Compound (VOC) Emissions from a Greenwaste Composting Operation

2001 Source Test Report 01-176 Remote Sensing Tests for Ammonia and Volatile Organic Compound (VOC) Emissions from a Greenwaste Composting Operation

2003 Health Risk Assessment Guidance for Analyzing Cancer Risks from Mobile Source Diesel Idling Emissions for CEQA Air Quality Analysis

2005 Rule 403 Fugitive Dust

2007 2007 Air Quality Management Plan

2008 Final Localized Significance Threshold Methodology, Revised

2012 Final 2012 Air Quality Management Plan

2016 2016 Air Quality Management Plan

2017 Historical Data by Year. 2015, 2016 and 2017 Air Quality Data Tables.
Source: http://www.aqmd.gov/home/library/air-quality-data-studies/historical-data-by-year

Southern California Association of Governments

2012 2012-2035 Regional Transportation Plan/Sustainable Communities Strategy

U.S. Environmental Protection Agency (EPA)

2011 Reducing Greenhouse Gas Emissions through Recycling and Composting

2017 Understanding Global Warming Potentials
(Source: https://www.epa.gov/ghgemissions/understanding-global-warming-potentials)

U.S. Geological Survey

2011 Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California

APPENDICES

Appendix A Glossary of Terms

Appendix B CalEEMod Model Daily Emissions Printouts

Appendix C CalEEMod Model Annual Emissions Printouts

Appendix D WARM Model Printouts

APPENDIX A

GLOSSARY OF TERMS

AQMP	Air Quality Management Plan
BACT	Best Available Control Technologies
CAAQS	California Ambient Air Quality Standards
CalEPA	California Environmental Protection Agency
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCAR	California Climate Action Registry
CEQA	California Environmental Quality Act
CFCs	Chlorofluorocarbons
CH_4	Methane
CNG	Compressed natural gas
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2e	Carbon dioxide equivalent
DPM	Diesel particulate matter
EPA	U.S. Environmental Protection Agency
GHG	Greenhouse gas
GWP	Global warming potential
HIDPM	Hazard Index Diesel Particulate Matter
HFCs	Hydrofluorocarbons
IPCC	International Panel on Climate Change
LCFS	Low Carbon Fuel Standard
LST	Localized Significant Thresholds
$MTCO_2e$	Metric tons of carbon dioxide equivalent
$MMTCO_2e$	Million metric tons of carbon dioxide equivalent
MPO	Metropolitan Planning Organization
NAAQS	National Ambient Air Quality Standards
NOx	Nitrogen Oxides
NO_2	Nitrogen dioxide
N_2O	Nitrous oxide
O_3	Ozone
OPR	Governor's Office of Planning and Research
PFCs	Perfluorocarbons
PM	Particle matter
PM10	Particles that are less than 10 micrometers in diameter
PM2.5	Particles that are less than 2.5 micrometers in diameter
PMI	Point of maximum impact
PPM	Parts per million
PPB	Parts per billion
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
SANBAG	San Bernardino Association of Governments
SCAB	South Coast Air Basin
SCAG	Southern California Association of Governments
SCAQMD	South Coast Air Quality Management District
SSAB	Salton Sea Air Basin
SF_6	Sulfur hexafluoride
SIP	State Implementation Plan
SOx	Sulfur Oxides
TAC	Toxic air contaminants
VOC	Volatile organic compounds

APPENDIX B

CALEEMOD MODEL DAILY EMISSIONS PRINTOUTS

6842 BLIP Existing OPS heavy duty equipment only

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	150.00	Acre	150.00	6,534,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Analysis of existing construction-type operational equipment for off-sets ONLY.

Land Use - Existing site is 150 acres

Construction Phase - Operating 6 days a week per year, existing OPS modeled under grading phase

Off-road Equipment - .

Off-road Equipment - Offset credits for existing equipment: 5 scrapers, 3 tracked bulldozers, 2 graders, 1 excavator, 1 backhoe for 8 hours a day.

Trips and VMT - Worker trip length 30 miles round trip. 4 vendor trips added for 2 on-road dump trucks and 2 on-road water trucks

Grading - Existing site is 150 acres. Grading does not occur over entire site.

Energy Use -

Construction Off-road Equipment Mitigation - Engines:Tracked dozers (crawler tractors) avg of Tier 2; Graders avg of Tier 3; Excavators Tier 2; scrapers avg of Tier 1; backhoe Tier 1.

Mobile Land Use Mitigation -

Area Coating - No coatings

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	392040	0
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	55
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	55
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 1
tblConstEquipMitigation	Tier	No Change	Tier 1
tblConstructionPhase	NumDays	310.00	312.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	AcresOfGrading	2,340.00	150.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	9.4482	117.0550	62.9559	0.1256	0.8777	4.5678	5.4454	0.1532	4.2025	4.3557	0.0000	12,638.0896	12,638.0896	3.8080	0.0000	12,733.2901
Maximum	**9.4482**	**117.0550**	**62.9559**	**0.1256**	**0.8777**	**4.5678**	**5.4454**	**0.1532**	**4.2025**	**4.3557**	**0.0000**	**12,638.0896**	**12,638.0896**	**3.8080**	**0.0000**	**12,733.2901**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	7.9589	127.5702	136.6519	0.1256	0.8777	2.8314	3.7090	0.1532	2.8310	2.9842	0.0000	12,638.0896	12,638.0896	3.8080	0.0000	12,733.2901
Maximum	**7.9589**	**127.5702**	**136.6519**	**0.1256**	**0.8777**	**2.8314**	**3.7090**	**0.1532**	**2.8310**	**2.9842**	**0.0000**	**12,638.0896**	**12,638.0896**	**3.8080**	**0.0000**	**12,733.2901**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**15.76**	**-8.98**	**-117.06**	**0.00**	**0.00**	**38.01**	**31.89**	**0.00**	**32.63**	**31.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2018	12/29/2018	6	312	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 150

Acres of Paving: 150

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	0	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Paving	Pavers	0	8.00	130	0.42
Paving	Paving Equipment	0	8.00	132	0.36
Paving	Rollers	0	8.00	80	0.38
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Crawler Tractors	3	8.00	212	0.43
Grading	Excavators	1	8.00	158	0.38

Grading	Graders	2	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	5	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	12	30.00	4.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5099	0.0000	0.5099	0.0551	0.0000	0.0551			0.0000			0.0000
Off-Road	9.2503	116.4520	61.3510	0.1209		4.5615	4.5615		4.1966	4.1966		12,167.4196	12,167.4196	3.7879		12,262.1167
Total	**9.2503**	**116.4520**	**61.3510**	**0.1209**	**0.5099**	**4.5615**	**5.0714**	**0.0551**	**4.1966**	**4.2517**		**12,167.4196**	**12,167.4196**	**3.7879**		**12,262.1167**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0147	0.4860	0.0940	1.0600e-003	0.0256	4.0800e-003	0.0297	7.3800e-003	3.9000e-003	0.0113		111.6527	111.6527	9.2200e-003		111.8832
Worker	0.1832	0.1170	1.5108	3.6100e-003	0.3422	2.1300e-003	0.3443	0.0907	1.9700e-003	0.0927		359.0173	359.0173	0.0109		359.2902
Total	**0.1979**	**0.6030**	**1.6048**	**4.6700e-003**	**0.3678**	**6.2100e-003**	**0.3740**	**0.0981**	**5.8700e-003**	**0.1040**		**470.6700**	**470.6700**	**0.0201**		**471.1734**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5099	0.0000	0.5099	0.0551	0.0000	0.0551			0.0000			0.0000
Off-Road	7.7610	126.9673	135.0471	0.1209		2.8251	2.8251		2.8251	2.8251	0.0000	12,167.4196	12,167.4196	3.7879		12,262.1167
Total	**7.7610**	**126.9673**	**135.0471**	**0.1209**	**0.5099**	**2.8251**	**3.3350**	**0.0551**	**2.8251**	**2.8802**	**0.0000**	**12,167.4196**	**12,167.4196**	**3.7879**		**12,262.1167**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0147	0.4860	0.0940	1.0600e-003	0.0256	4.0800e-003	0.0297	7.3800e-003	3.9000e-003	0.0113		111.6527	111.6527	9.2200e-003		111.8832
Worker	0.1832	0.1170	1.5108	3.6100e-003	0.3422	2.1300e-003	0.3443	0.0907	1.9700e-003	0.0927		359.0173	359.0173	0.0109		359.2902
Total	**0.1979**	**0.6030**	**1.6048**	**4.6700e-003**	**0.3678**	**6.2100e-003**	**0.3740**	**0.0981**	**5.8700e-003**	**0.1040**		**470.6700**	**470.6700**	**0.0201**		**471.1734**

6842 BLIP Existing OPS heavy duty equipment only

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	150.00	Acre	150.00	6,534,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Analysis of existing construction-type operational equipment for off-sets ONLY.

Land Use - Existing site is 150 acres

Construction Phase - Operating 6 days a week per year, existing OPS modeled under grading phase

Off-road Equipment - .

Off-road Equipment - Offset credits for existing equipment: 5 scrapers, 3 tracked bulldozers, 2 graders, 1 excavator, 1 backhoe for 8 hours a day.

Trips and VMT - Worker trip length 30 miles round trip. 4 vendor trips added for 2 on-road dump trucks and 2 on-road water trucks

Grading - Existing site is 150 acres. Grading does not occur over entire site.

Energy Use -

Construction Off-road Equipment Mitigation - Engines:Tracked dozers (crawler tractors) avg of Tier 2; Graders avg of Tier 3; Excavators Tier 2; scrapers avg of Tier 1; backhoe Tier 1.

Mobile Land Use Mitigation -

Area Coating - No coatings

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	392040	0
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	55
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	55
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 1
tblConstEquipMitigation	Tier	No Change	Tier 1
tblConstructionPhase	NumDays	310.00	312.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	AcresOfGrading	2,340.00	150.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	9.4447	117.0588	62.6865	0.1252	0.8777	4.5678	5.4454	0.1532	4.2025	4.3557	0.0000	12,597.0315	12,597.0315	3.8076	0.0000	12,692.2221
Maximum	**9.4447**	**117.0588**	**62.6865**	**0.1252**	**0.8777**	**4.5678**	**5.4454**	**0.1532**	**4.2025**	**4.3557**	**0.0000**	**12,597.0315**	**12,597.0315**	**3.8076**	**0.0000**	**12,692.2221**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2018	7.9554	127.5740	136.3825	0.1252	0.8777	2.8314	3.7090	0.1532	2.8311	2.9842	0.0000	12,597.0315	12,597.0315	3.8076	0.0000	12,692.2221
Maximum	**7.9554**	**127.5740**	**136.3825**	**0.1252**	**0.8777**	**2.8314**	**3.7090**	**0.1532**	**2.8311**	**2.9842**	**0.0000**	**12,597.0315**	**12,597.0315**	**3.8076**	**0.0000**	**12,692.2221**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**15.77**	**-8.98**	**-117.56**	**0.00**	**0.00**	**38.01**	**31.89**	**0.00**	**32.63**	**31.49**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.3158	1.4000e-004	0.0155	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0328	0.0328	9.0000e-005		0.0351
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**2.3158**	**1.4000e-004**	**0.0155**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**		**0.0328**	**0.0328**	**9.0000e-005**	**0.0000**	**0.0351**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	2.3158	1.4000e-004	0.0155	0.0000		6.0000e-005	6.0000e-005		6.0000e-005	6.0000e-005		0.0328	0.0328	9.0000e-005		0.0351
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**2.3158**	**1.4000e-004**	**0.0155**	**0.0000**	**0.0000**	**6.0000e-005**	**6.0000e-005**	**0.0000**	**6.0000e-005**	**6.0000e-005**		**0.0328**	**0.0328**	**9.0000e-005**	**0.0000**	**0.0351**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2018	12/29/2018	6	312	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 150

Acres of Paving: 150

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	0	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Paving	Pavers	0	8.00	130	0.42
Paving	Paving Equipment	0	8.00	132	0.36
Paving	Rollers	0	8.00	80	0.38

Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Crawler Tractors	3	8.00	212	0.43
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	2	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	5	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	12	30.00	4.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5099	0.0000	0.5099	0.0551	0.0000	0.0551			0.0000			0.0000
Off-Road	9.2503	116.4520	61.3510	0.1209		4.5615	4.5615		4.1966	4.1966		12,167.4196	12,167.4196	3.7879		12,262.1167
Total	**9.2503**	**116.4520**	**61.3510**	**0.1209**	**0.5099**	**4.5615**	**5.0714**	**0.0551**	**4.1966**	**4.2517**		**12,167.4196**	**12,167.4196**	**3.7879**		**12,262.1167**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0154	0.4856	0.1084	1.0200e-003	0.0256	4.1200e-003	0.0297	7.3800e-003	3.9500e-003	0.0113		107.4937	107.4937	0.0102		107.7493
Worker	0.1790	0.1212	1.2270	3.2400e-003	0.3422	2.1300e-003	0.3443	0.0907	1.9700e-003	0.0927		322.1182	322.1182	9.5100e-003		322.3561
Total	**0.1945**	**0.6068**	**1.3354**	**4.2600e-003**	**0.3678**	**6.2500e-003**	**0.3740**	**0.0981**	**5.9200e-003**	**0.1040**		**429.6119**	**429.6119**	**0.0197**		**430.1054**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5099	0.0000	0.5099	0.0551	0.0000	0.0551			0.0000			0.0000
Off-Road	7.7610	126.9673	135.0471	0.1209		2.8251	2.8251		2.8251	2.8251	0.0000	12,167.4196	12,167.4196	3.7879		12,262.1167
Total	**7.7610**	**126.9673**	**135.0471**	**0.1209**	**0.5099**	**2.8251**	**3.3350**	**0.0551**	**2.8251**	**2.8802**	**0.0000**	**12,167.4196**	**12,167.4196**	**3.7879**		**12,262.1167**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0154	0.4856	0.1084	1.0200e-003	0.0256	4.1200e-003	0.0297	7.3800e-003	3.9500e-003	0.0113		107.4937	107.4937	0.0102		107.7493
Worker	0.1790	0.1212	1.2270	3.2400e-003	0.3422	2.1300e-003	0.3443	0.0907	1.9700e-003	0.0927		322.1182	322.1182	9.5100e-003		322.3561
Total	**0.1945**	**0.6068**	**1.3354**	**4.2600e-003**	**0.3678**	**6.2500e-003**	**0.3740**	**0.0981**	**5.9200e-003**	**0.1040**		**429.6119**	**429.6119**	**0.0197**		**430.1054**

6842 BLIP Project Construction Only

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	26.00	Acre	26.00	1,132,560.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Analysis of construction only. Operational emissions analyzed in separate CalEEMod run

Land Use - Analysis of worst case phase; 26 acres. Project to be excavated in 17 phases ranging from 11 to 26 acres per phase.

Construction Phase - WI1&2 (site prp1/1/2020-1/28/2020);WI3(site prp1/29/2020-3/3/2020);WI4(gradg3/4/2020-9/28/2021);WI5(blg con9/29/2021-4/5/2022);WI6i(grdg4/6/2022-5/10/2022); WI6ii&7(gdg5/11/2022-6/14/2022)

Off-road Equipment -

Off-road Equipment - 1 loader, 1 forklift for 8 hrs/day

Off-road Equipment - 8 scrapers, 3 bulldozers (crawler tractors), 1 grader for 8 hrs/day

Off-road Equipment - 1 scraper, 1 tracked bulldozer (crawler tractor), 1 grader, 1 pump for 8 hours a day

Off-road Equipment - 1 scraper, 1 tracked bulldozer (crawler tractor), 1 grader, 1 concrete pump for 8 hours a day

Off-road Equipment - 1 backhoe, 2 900 GPM water pumps, 1 loader for 8 hour/day. 1 tracked dozer (crawler tractor) for 4 hrs/day.

Off-road Equipment - 1 excavator, 1 loader, and 1 rock crusher for 8 hrs/day

Trips and VMT - WI1:2 onrd fltbed trcks; WI2:1 h2o trck; WI3 uses 1 h2o trck, 2 onroad dmp trcks (stckpile site ~1 mi); WI4 uses 3 h2o trcks, 20,800 haul trips to stckpile areas 1 or 2,WI5 1h2o trk and same# of wrkr trps as WI4; WI6i:1 h2o trk;WI6ii&7 2 fltbds, 1 h20 trk

Grading - 2.4 million CY to be excavated over 17 phases; therefore, largest phase (26 acres) would involve the maximum excation of approx. 208,000 CY of material transported to on-site stockpile site

Area Coating - No asphalt/painting

Energy Use -

Construction Off-road Equipment Mitigation - All Engines Tier 3 or better

Mobile Land Use Mitigation -

Vehicle Trips -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	67954	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstructionPhase	NumDays	20.00	25.00
tblConstructionPhase	NumDays	45.00	410.00
tblConstructionPhase	NumDays	440.00	135.00
tblConstructionPhase	NumDays	45.00	25.00
tblConstructionPhase	NumDays	45.00	25.00
tblGrading	AcresOfGrading	5.00	26.00
tblGrading	AcresOfGrading	0.00	26.00
tblGrading	AcresOfGrading	4,100.00	26.00
tblGrading	AcresOfGrading	50.00	26.00
tblGrading	AcresOfGrading	50.00	26.00
tblGrading	MaterialExported	0.00	208,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	8.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	HaulingTripNumber	26,000.00	20,800.00
tblTripsAndVMT	HaulingTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	186.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	10.4280	128.9417	70.7712	0.1646	1.5461	4.7187	5.2867	0.1937	4.3414	4.4745	0.0000	16,038.2297	16,038.2297	4.9310	0.0000	16,161.5036
2021	9.7956	118.4434	66.7680	0.1645	5.4355	4.3109	5.6630	1.4416	3.9662	4.1013	0.0000	16,022.3664	16,022.3664	4.9230	0.0000	16,145.4405
2022	2.4218	23.4644	19.9376	0.0549	5.4355	0.8998	5.6267	1.4416	0.8403	1.6176	0.0000	5,457.1117	5,457.1117	0.9681	0.0000	5,463.5563
Maximum	**10.4280**	**128.9417**	**70.7712**	**0.1646**	**5.4355**	**4.7187**	**5.6630**	**1.4416**	**4.3414**	**4.4745**	**0.0000**	**16,038.2297**	**16,038.2297**	**4.9310**	**0.0000**	**16,161.5036**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	3.9960	78.2485	82.4687	0.1646	0.7052	2.7383	3.2262	0.1228	2.7379	2.8607	0.0000	16,038.2297	16,038.2297	4.9310	0.0000	16,161.5036
2021	3.9779	77.9844	82.3387	0.1645	5.4355	2.7365	5.6494	1.4416	2.7361	2.8608	0.0000	16,022.3663	16,022.3663	4.9230	0.0000	16,145.4405
2022	2.2572	17.3659	20.2238	0.0549	5.4355	0.7455	5.6485	1.4416	0.7454	1.6522	0.0000	5,457.1117	5,457.1117	0.9681	0.0000	5,463.5563
Maximum	**3.9960**	**78.2485**	**82.4687**	**0.1646**	**5.4355**	**2.7383**	**5.6494**	**1.4416**	**2.7379**	**2.8608**	**0.0000**	**16,038.2297**	**16,038.2297**	**4.9310**	**0.0000**	**16,161.5036**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**54.82**	**35.91**	**-17.50**	**0.00**	**6.77**	**37.36**	**12.38**	**2.31**	**32.01**	**27.66**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site PreparationWI1and2	Site Preparation	1/1/2020	1/28/2020	5	20	
2	Site PreparationWI3	Site Preparation	1/29/2020	3/3/2020	5	25	
3	GradingWI4	Grading	3/4/2020	9/28/2021	5	410	
4	Building ConstructionWI5	Building Construction	9/29/2021	4/5/2022	5	135	
5	GradingWI6i	Grading	4/6/2022	5/10/2022	5	25	
6	GradingWI6iiand7	Grading	5/11/2022	6/14/2022	5	25	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 26

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site PreparationWI1and2	Air Compressors	0	6.00	78	0.48
Site PreparationWI1and2	Crawler Tractors	1	4.00	212	0.43
Site PreparationWI1and2	Pumps	2	8.00	84	0.74
Site PreparationWI1and2	Rubber Tired Dozers	0	8.00	247	0.40
Site PreparationWI1and2	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site PreparationWI3	Crushing/Proc. Equipment	1	8.00	85	0.78
Site PreparationWI3	Excavators	1	8.00	158	0.38
Site PreparationWI3	Rubber Tired Dozers	0	8.00	247	0.40
Site PreparationWI3	Tractors/Loaders/Backhoes	1	8.00	97	0.37
GradingWI4	Concrete/Industrial Saws	0		81	0.73
GradingWI4	Crawler Tractors	3	8.00	212	0.43
GradingWI4	Excavators	0	8.00	158	0.38
GradingWI4	Graders	1	8.00	187	0.41
GradingWI4	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI4	Scrapers	8	8.00	367	0.48
GradingWI4	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Building ConstructionWI5	Cranes	0	7.00	231	0.29
Building ConstructionWI5	Forklifts	1	8.00	89	0.20
Building ConstructionWI5	Generator Sets	0	8.00	84	0.74
Building ConstructionWI5	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building ConstructionWI5	Welders	0	8.00	46	0.45
GradingWI6i	Crawler Tractors	1	8.00	212	0.43
GradingWI6i	Excavators	0	8.00	158	0.38

GradingWI6i	Graders	1	8.00	187	0.41
GradingWI6i	Pumps	1	8.00	84	0.74
GradingWI6i	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI6i	Scrapers	1	8.00	367	0.48
GradingWI6i	Tractors/Loaders/Backhoes	0	8.00	97	0.37
GradingWI6iiand7	Crawler Tractors	1	8.00	212	0.43
GradingWI6iiand7	Excavators	0	8.00	158	0.38
GradingWI6iiand7	Graders	1	8.00	187	0.41
GradingWI6iiand7	Pavers	0		130	0.42
GradingWI6iiand7	Paving Equipment	0		132	0.36
GradingWI6iiand7	Pumps	1	8.00	84	0.74
GradingWI6iiand7	Rollers	0		80	0.38
GradingWI6iiand7	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI6iiand7	Scrapers	1	8.00	367	0.48
GradingWI6iiand7	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site PreparationWI1and2	5	13.00	3.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site PreparationWI3	3	8.00	1.00	2.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
GradingWI4	12	30.00	3.00	20,800.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
Building ConstructionWI5	2	476.00	1.00	1.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
GradingWI6i	4	10.00	1.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT
GradingWI6iiand7	4	10.00	3.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site PreparationWl1and2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3787	0.0000	1.3787	0.1489	0.0000	0.1489			0.0000			0.0000
Off-Road	1.5548	14.9922	13.3345	0.0233		0.8210	0.8210		0.7885	0.7885		2,227.8004	2,227.8004	0.3921		2,237.6019
Total	**1.5548**	**14.9922**	**13.3345**	**0.0233**	**1.3787**	**0.8210**	**2.1996**	**0.1489**	**0.7885**	**0.9373**		**2,227.8004**	**2,227.8004**	**0.3921**		**2,237.6019**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	8.3600e-003	0.3087	0.0565	7.8000e-004	0.0192	1.7600e-003	0.0210	5.5300e-003	1.6800e-003	7.2100e-003		82.6173	82.6173	6.2000e-003		82.7722
Worker	0.0671	0.0398	0.5338	1.4700e-003	0.1483	9.0000e-004	0.1492	0.0393	8.3000e-004	0.0402		146.0695	146.0695	3.7400e-003		146.1630
Total	**0.0755**	**0.3485**	**0.5902**	**2.2500e-003**	**0.1675**	**2.6600e-003**	**0.1701**	**0.0449**	**2.5100e-003**	**0.0474**		**228.6868**	**228.6868**	**9.9400e-003**		**228.9352**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5377	0.0000	0.5377	0.0581	0.0000	0.0581			0.0000			0.0000
Off-Road	0.5115	11.3416	14.8870	0.0233		0.7348	0.7348		0.7348	0.7348	0.0000	2,227.8004	2,227.8004	0.3921		2,237.6019
Total	**0.5115**	**11.3416**	**14.8870**	**0.0233**	**0.5377**	**0.7348**	**1.2725**	**0.0581**	**0.7348**	**0.7929**	**0.0000**	**2,227.8004**	**2,227.8004**	**0.3921**		**2,237.6019**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	8.3600e-003	0.3087	0.0565	7.8000e-004	0.0192	1.7600e-003	0.0210	5.5300e-003	1.6800e-003	7.2100e-003		82.6173	82.6173	6.2000e-003		82.7722
Worker	0.0671	0.0398	0.5338	1.4700e-003	0.1483	9.0000e-004	0.1492	0.0393	8.3000e-004	0.0402		146.0695	146.0695	3.7400e-003		146.1630
Total	**0.0755**	**0.3485**	**0.5902**	**2.2500e-003**	**0.1675**	**2.6600e-003**	**0.1701**	**0.0449**	**2.5100e-003**	**0.0474**		**228.6868**	**228.6868**	**9.9400e-003**		**228.9352**

3.3 Site PreparationWI3 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1029	0.0000	1.1029	0.1191	0.0000	0.1191			0.0000			0.0000
Off-Road	1.0076	8.3169	9.8998	0.0153		0.4909	0.4909		0.4709	0.4709		1,465.4170	1,465.4170	0.3081		1,473.1204
Total	**1.0076**	**8.3169**	**9.8998**	**0.0153**	**1.1029**	**0.4909**	**1.5938**	**0.1191**	**0.4709**	**0.5900**		**1,465.4170**	**1,465.4170**	**0.3081**		**1,473.1204**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7000e-004	9.2300e-003	7.9000e-004	1.0000e-005	7.0000e-005	1.0000e-005	8.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005		1.5115	1.5115	2.8000e-004		1.5184
Vendor	2.7900e-003	0.1029	0.0188	2.6000e-004	6.4000e-003	5.9000e-004	6.9900e-003	1.8400e-003	5.6000e-004	2.4000e-003		27.5391	27.5391	2.0700e-003		27.5907
Worker	0.0413	0.0245	0.3285	9.0000e-004	0.0912	5.5000e-004	0.0918	0.0242	5.1000e-004	0.0247		89.8889	89.8889	2.3000e-003		89.9465
Total	**0.0443**	**0.1366**	**0.3481**	**1.1700e-003**	**0.0977**	**1.1500e-003**	**0.0989**	**0.0261**	**1.0800e-003**	**0.0271**		**118.9396**	**118.9396**	**4.6500e-003**		**119.0556**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4301	0.0000	0.4301	0.0464	0.0000	0.0464			0.0000			0.0000
Off-Road	0.3434	7.3951	10.5866	0.0153		0.4647	0.4647		0.4647	0.4647	0.0000	1,465.4170	1,465.4170	0.3081		1,473.1204
Total	**0.3434**	**7.3951**	**10.5866**	**0.0153**	**0.4301**	**0.4647**	**0.8948**	**0.0464**	**0.4647**	**0.5111**	**0.0000**	**1,465.4170**	**1,465.4170**	**0.3081**		**1,473.1204**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.7000e-004	9.2300e-003	7.9000e-004	1.0000e-005	7.0000e-005	1.0000e-005	8.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005		1.5115	1.5115	2.8000e-004		1.5184
Vendor	2.7900e-003	0.1029	0.0188	2.6000e-004	6.4000e-003	5.9000e-004	6.9900e-003	1.8400e-003	5.6000e-004	2.4000e-003		27.5391	27.5391	2.0700e-003		27.5907
Worker	0.0413	0.0245	0.3285	9.0000e-004	0.0912	5.5000e-004	0.0918	0.0242	5.1000e-004	0.0247		89.8889	89.8889	2.3000e-003		89.9465
Total	**0.0443**	**0.1366**	**0.3481**	**1.1700e-003**	**0.0977**	**1.1500e-003**	**0.0989**	**0.0261**	**1.0800e-003**	**0.0271**		**118.9396**	**118.9396**	**4.6500e-003**		**119.0556**

3.4 GradingWI4 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1315	0.0000	0.1315	0.0170	0.0000	0.0170			0.0000			0.0000
Off-Road	10.1557	122.6852	68.9832	0.1514		4.7111	4.7111		4.3342	4.3342		14,660.0048	14,660.0048	4.7413		14,778.5384
Total	**10.1557**	**122.6852**	**68.9832**	**0.1514**	**0.1315**	**4.7111**	**4.8426**	**0.0170**	**4.3342**	**4.3512**		**14,660.0048**	**14,660.0048**	**4.7413**		**14,778.5384**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1091	5.8559	0.4998	9.0600e-003	0.0752	3.7400e-003	0.0790	0.0199	3.5800e-003	0.0234		958.5241	958.5241	0.1748		962.8937
Vendor	8.3600e-003	0.3087	0.0565	7.8000e-004	0.0192	1.7600e-003	0.0210	5.5300e-003	1.6800e-003	7.2100e-003		82.6173	82.6173	6.2000e-003		82.7722
Worker	0.1548	0.0919	1.2318	3.3800e-003	0.3422	2.0700e-003	0.3442	0.0907	1.9000e-003	0.0927		337.0835	337.0835	8.6300e-003		337.2993
Total	**0.2723**	**6.2565**	**1.7880**	**0.0132**	**0.4366**	**7.5700e-003**	**0.4442**	**0.1161**	**7.1600e-003**	**0.1233**		**1,378.2249**	**1,378.2249**	**0.1896**		**1,382.9652**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0513	0.0000	0.0513	6.6300e-003	0.0000	6.6300e-003			0.0000			0.0000
Off-Road	3.7237	71.9920	80.6807	0.1514		2.7307	2.7307		2.7307	2.7307	0.0000	14,660.0048	14,660.0048	4.7413		14,778.5384
Total	**3.7237**	**71.9920**	**80.6807**	**0.1514**	**0.0513**	**2.7307**	**2.7820**	**6.6300e-003**	**2.7307**	**2.7374**	**0.0000**	**14,660.0048**	**14,660.0048**	**4.7413**		**14,778.5384**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1091	5.8559	0.4998	9.0600e-003	0.0752	3.7400e-003	0.0790	0.0199	3.5800e-003	0.0234		958.5241	958.5241	0.1748		962.8937
Vendor	8.3600e-003	0.3087	0.0565	7.8000e-004	0.0192	1.7600e-003	0.0210	5.5300e-003	1.6800e-003	7.2100e-003		82.6173	82.6173	6.2000e-003		82.7722
Worker	0.1548	0.0919	1.2318	3.3800e-003	0.3422	2.0700e-003	0.3442	0.0907	1.9000e-003	0.0927		337.0835	337.0835	8.6300e-003		337.2993
Total	**0.2723**	**6.2565**	**1.7880**	**0.0132**	**0.4366**	**7.5700e-003**	**0.4442**	**0.1161**	**7.1600e-003**	**0.1233**		**1,378.2249**	**1,378.2249**	**0.1896**		**1,382.9652**

3.4 GradingWI4 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1315	0.0000	0.1315	0.0170	0.0000	0.0170			0.0000			0.0000
Off-Road	9.5414	112.4510	65.1100	0.1514		4.3052	4.3052		3.9608	3.9608		14,666.0624	14,666.0624	4.7433		14,784.6449
Total	**9.5414**	**112.4510**	**65.1100**	**0.1514**	**0.1315**	**4.3052**	**4.4367**	**0.0170**	**3.9608**	**3.9778**		**14,666.0624**	**14,666.0624**	**4.7433**		**14,784.6449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1029	5.6323	0.4790	8.9600e-003	0.0831	3.1900e-003	0.0863	0.0218	3.0500e-003	0.0248		948.5194	948.5194	0.1660		952.6704
Vendor	7.0000e-003	0.2776	0.0495	7.8000e-004	0.0192	5.3000e-004	0.0197	5.5300e-003	5.1000e-004	6.0400e-003		81.9753	81.9753	5.8600e-003		82.1219
Worker	0.1443	0.0825	1.1295	3.2700e-003	0.3422	2.0100e-003	0.3442	0.0907	1.8500e-003	0.0926		325.8092	325.8092	7.7600e-003		326.0032
Total	**0.2542**	**5.9924**	**1.6580**	**0.0130**	**0.4445**	**5.7300e-003**	**0.4502**	**0.1181**	**5.4100e-003**	**0.1235**		**1,356.3040**	**1,356.3040**	**0.1797**		**1,360.7956**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0513	0.0000	0.0513	6.6300e-003	0.0000	6.6300e-003			0.0000			0.0000
Off-Road	3.7237	71.9920	80.6807	0.1514		2.7307	2.7307		2.7307	2.7307	0.0000	14,666.0624	14,666.0624	4.7433		14,784.6449
Total	**3.7237**	**71.9920**	**80.6807**	**0.1514**	**0.0513**	**2.7307**	**2.7820**	**6.6300e-003**	**2.7307**	**2.7374**	**0.0000**	**14,666.0624**	**14,666.0624**	**4.7433**		**14,784.6449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1029	5.6323	0.4790	8.9600e-003	0.0831	3.1900e-003	0.0863	0.0218	3.0500e-003	0.0248		948.5194	948.5194	0.1660		952.6704
Vendor	7.0000e-003	0.2776	0.0495	7.8000e-004	0.0192	5.3000e-004	0.0197	5.5300e-003	5.1000e-004	6.0400e-003		81.9753	81.9753	5.8600e-003		82.1219
Worker	0.1443	0.0825	1.1295	3.2700e-003	0.3422	2.0100e-003	0.3442	0.0907	1.8500e-003	0.0926		325.8092	325.8092	7.7600e-003		326.0032
Total	**0.2542**	**5.9924**	**1.6580**	**0.0130**	**0.4445**	**5.7300e-003**	**0.4502**	**0.1181**	**5.4100e-003**	**0.1235**		**1,356.3040**	**1,356.3040**	**0.1797**		**1,360.7956**

3.5 Building ConstructionWI5 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3166	3.0749	3.4281	4.6300e-003		0.1955	0.1955		0.1798	0.1798		448.9309	448.9309	0.1452		452.5607
Total	**0.3166**	**3.0749**	**3.4281**	**4.6300e-003**		**0.1955**	**0.1955**		**0.1798**	**0.1798**		**448.9309**	**448.9309**	**0.1452**		**452.5607**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0000e-005	8.2000e-004	7.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1385	0.1385	2.0000e-005		0.1391
Vendor	2.3300e-003	0.0925	0.0165	2.6000e-004	6.4000e-003	1.8000e-004	6.5800e-003	1.8400e-003	1.7000e-004	2.0100e-003		27.3251	27.3251	1.9500e-003		27.3740
Worker	2.2891	1.3092	17.9210	0.0519	5.4290	0.0319	5.4610	1.4398	0.0294	1.4692		5,169.5065	5,169.5065	0.1231		5,172.5848
Total	**2.2914**	**1.4026**	**17.9376**	**0.0522**	**5.4355**	**0.0321**	**5.4676**	**1.4416**	**0.0296**	**1.4712**		**5,196.9701**	**5,196.9701**	**0.1251**		**5,200.0979**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1136	2.5946	3.5036	4.6300e-003		0.1818	0.1818		0.1818	0.1818	0.0000	448.9309	448.9309	0.1452		452.5607
Total	**0.1136**	**2.5946**	**3.5036**	**4.6300e-003**		**0.1818**	**0.1818**		**0.1818**	**0.1818**	**0.0000**	**448.9309**	**448.9309**	**0.1452**		**452.5607**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0000e-005	8.2000e-004	7.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1385	0.1385	2.0000e-005		0.1391
Vendor	2.3300e-003	0.0925	0.0165	2.6000e-004	6.4000e-003	1.8000e-004	6.5800e-003	1.8400e-003	1.7000e-004	2.0100e-003		27.3251	27.3251	1.9500e-003		27.3740
Worker	2.2891	1.3092	17.9210	0.0519	5.4290	0.0319	5.4610	1.4398	0.0294	1.4692		5,169.5065	5,169.5065	0.1231		5,172.5848
Total	**2.2914**	**1.4026**	**17.9376**	**0.0522**	**5.4355**	**0.0321**	**5.4676**	**1.4416**	**0.0296**	**1.4712**		**5,196.9701**	**5,196.9701**	**0.1251**		**5,200.0979**

3.5 Building ConstructionWI5 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2783	2.7305	3.3917	4.6400e-003		0.1600	0.1600		0.1472	0.1472		449.2698	449.2698	0.1453		452.9024
Total	**0.2783**	**2.7305**	**3.3917**	**4.6400e-003**		**0.1600**	**0.1600**		**0.1472**	**0.1472**		**449.2698**	**449.2698**	**0.1453**		**452.9024**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.0000e-005	7.9000e-004	7.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1372	0.1372	2.0000e-005		0.1377
Vendor	2.1800e-003	0.0873	0.0154	2.6000e-004	6.4000e-003	1.5000e-004	6.5500e-003	1.8400e-003	1.4000e-004	1.9900e-003		27.0925	27.0925	1.8500e-003		27.1388
Worker	2.1413	1.1782	16.5304	0.0500	5.4290	0.0311	5.4601	1.4398	0.0286	1.4684		4,980.6123	4,980.6123	0.1106		4,983.3774
Total	**2.1435**	**1.2663**	**16.5459**	**0.0502**	**5.4355**	**0.0312**	**5.4667**	**1.4416**	**0.0288**	**1.4704**		**5,007.8420**	**5,007.8420**	**0.1125**		**5,010.6539**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1136	2.5946	3.5036	4.6400e-003		0.1818	0.1818		0.1818	0.1818	0.0000	449.2698	449.2698	0.1453		452.9024
Total	**0.1136**	**2.5946**	**3.5036**	**4.6400e-003**		**0.1818**	**0.1818**		**0.1818**	**0.1818**	**0.0000**	**449.2698**	**449.2698**	**0.1453**		**452.9024**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.0000e-005	7.9000e-004	7.0000e-005	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1372	0.1372	2.0000e-005		0.1377
Vendor	2.1800e-003	0.0873	0.0154	2.6000e-004	6.4000e-003	1.5000e-004	6.5500e-003	1.8400e-003	1.4000e-004	1.9900e-003		27.0925	27.0925	1.8500e-003		27.1388
Worker	2.1413	1.1782	16.5304	0.0500	5.4290	0.0311	5.4601	1.4398	0.0286	1.4684		4,980.6123	4,980.6123	0.1106		4,983.3774
Total	**2.1435**	**1.2663**	**16.5459**	**0.0502**	**5.4355**	**0.0312**	**5.4667**	**1.4416**	**0.0288**	**1.4704**		**5,007.8420**	**5,007.8420**	**0.1125**		**5,010.6539**

3.6 GradingWl6i - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1029	0.0000	1.1029	0.1191	0.0000	0.1191			0.0000			0.0000
Off-Road	2.0781	23.1778	14.1442	0.0362		0.8987	0.8987		0.8393	0.8393		3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**2.0781**	**23.1778**	**14.1442**	**0.0362**	**1.1029**	**0.8987**	**2.0016**	**0.1191**	**0.8393**	**0.9584**		**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.1800e-003	0.0873	0.0154	2.6000e-004	6.4000e-003	1.5000e-004	6.5500e-003	1.8400e-003	1.4000e-004	1.9900e-003		27.0925	27.0925	1.8500e-003		27.1388
Worker	0.0450	0.0248	0.3473	1.0500e-003	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		104.6347	104.6347	2.3200e-003		104.6928
Total	**0.0472**	**0.1121**	**0.3626**	**1.3100e-003**	**0.1205**	**8.0000e-004**	**0.1213**	**0.0321**	**7.4000e-004**	**0.0328**		**131.7272**	**131.7272**	**4.1700e-003**		**131.8316**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4301	0.0000	0.4301	0.0464	0.0000	0.0464			0.0000			0.0000
Off-Road	0.8596	17.0792	19.8304	0.0362		0.7444	0.7444		0.7444	0.7444	0.0000	3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**0.8596**	**17.0792**	**19.8304**	**0.0362**	**0.4301**	**0.7444**	**1.1745**	**0.0464**	**0.7444**	**0.7908**	**0.0000**	**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.1800e-003	0.0873	0.0154	2.6000e-004	6.4000e-003	1.5000e-004	6.5500e-003	1.8400e-003	1.4000e-004	1.9900e-003		27.0925	27.0925	1.8500e-003		27.1388
Worker	0.0450	0.0248	0.3473	1.0500e-003	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		104.6347	104.6347	2.3200e-003		104.6928
Total	**0.0472**	**0.1121**	**0.3626**	**1.3100e-003**	**0.1205**	**8.0000e-004**	**0.1213**	**0.0321**	**7.4000e-004**	**0.0328**		**131.7272**	**131.7272**	**4.1700e-003**		**131.8316**

3.7 GradingWl6iiand7 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1029	0.0000	1.1029	0.1191	0.0000	0.1191			0.0000			0.0000
Off-Road	2.0781	23.1778	14.1442	0.0362		0.8987	0.8987		0.8393	0.8393		3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**2.0781**	**23.1778**	**14.1442**	**0.0362**	**1.1029**	**0.8987**	**2.0016**	**0.1191**	**0.8393**	**0.9584**		**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.5300e-003	0.2619	0.0461	7.7000e-004	0.0192	4.4000e-004	0.0197	5.5300e-003	4.2000e-004	5.9600e-003		81.2776	81.2776	5.5500e-003		81.4164
Worker	0.0450	0.0248	0.3473	1.0500e-003	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		104.6347	104.6347	2.3200e-003		104.6928
Total	**0.0515**	**0.2867**	**0.3934**	**1.8200e-003**	**0.1333**	**1.0900e-003**	**0.1344**	**0.0358**	**1.0200e-003**	**0.0368**		**185.9123**	**185.9123**	**7.8700e-003**		**186.1092**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4301	0.0000	0.4301	0.0464	0.0000	0.0464			0.0000			0.0000
Off-Road	0.8596	17.0792	19.8304	0.0362		0.7444	0.7444		0.7444	0.7444	0.0000	3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**0.8596**	**17.0792**	**19.8304**	**0.0362**	**0.4301**	**0.7444**	**1.1745**	**0.0464**	**0.7444**	**0.7908**	**0.0000**	**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.5300e-003	0.2619	0.0461	7.7000e-004	0.0192	4.4000e-004	0.0197	5.5300e-003	4.2000e-004	5.9600e-003		81.2776	81.2776	5.5500e-003		81.4164
Worker	0.0450	0.0248	0.3473	1.0500e-003	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		104.6347	104.6347	2.3200e-003		104.6928
Total	**0.0515**	**0.2867**	**0.3934**	**1.8200e-003**	**0.1333**	**1.0900e-003**	**0.1344**	**0.0358**	**1.0200e-003**	**0.0368**		**185.9123**	**185.9123**	**7.8700e-003**		**186.1092**

6842 BLIP Project Construction Only
Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	26.00	Acre	26.00	1,132,560.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Analysis of construction only. Operational emissions analyzed in separate CalEEMod run

Land Use - Analysis of worst case phase; 26 acres. Project to be excavated in 17 phases ranging from 11 to 26 acres per phase.

Construction Phase - WI1&2 (site prp1/1/2020-1/28/2020);WI3(site prp1/29/2020-3/3/2020);WI4(gradg3/4/2020-9/28/2021);WI5(blg con9/29/2021-4/5/2022);WI6i(grdg4/6/2022-5/10/2022); WI6ii&7(gdg5/11/2022-6/14/2022)
Off-road Equipment -

Off-road Equipment - 1 loader, 1 forklift for 8 hrs/day

Off-road Equipment - 8 scrapers, 3 bulldozers (crawler tractors), 1 grader for 8 hrs/day

Off-road Equipment - 1 scraper, 1 tracked bulldozer (crawler tractor), 1 grader, 1 pump for 8 hours a day

Off-road Equipment - 1 scraper, 1 tracked bulldozer (crawler tractor), 1 grader, 1 concrete pump for 8 hours a day

Off-road Equipment - 1 backhoe, 2 900 GPM water pumps, 1 loader for 8 hour/day. 1 tracked dozer (crawler tractor) for 4 hrs/day.

Off-road Equipment - 1 excavator, 1 loader, and 1 rock crusher for 8 hrs/day

Trips and VMT - WI1:2 onrd fltbed trcks; WI2:1 h2o trck; WI3 uses 1 h2o trck, 2 onroad dmp trcks (stckpile site ~1 mi); WI4 uses 3 h2o trcks, 20,800 haul trips to stckpile areas 1 or 2,WI5 1h2o trk and same# of wrkr trps as WI4; WI6i:1 h2o trk;WI6ii&7 2 fltbds, 1 h20 trk

Grading - 2.4 million CY to be excavated over 17 phases; therefore, largest phase (26 acres) would involve the maximum excation of approx. 208,000 CY of material transported to on-site stockpile site

Area Coating - No asphalt/painting

Energy Use -

Construction Off-road Equipment Mitigation - All Engines Tier 3 or better

Mobile Land Use Mitigation -

Vehicle Trips -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	67954	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	20.00	25.00

tblConstructionPhase	NumDays	45.00	410.00
tblConstructionPhase	NumDays	440.00	135.00
tblConstructionPhase	NumDays	45.00	25.00
tblConstructionPhase	NumDays	45.00	25.00
tblGrading	AcresOfGrading	5.00	26.00
tblGrading	AcresOfGrading	0.00	26.00
tblGrading	AcresOfGrading	4,100.00	26.00
tblGrading	AcresOfGrading	50.00	26.00
tblGrading	AcresOfGrading	50.00	26.00
tblGrading	MaterialExported	0.00	208,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	8.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	HaulingTripNumber	26,000.00	20,800.00
tblTripsAndVMT	HaulingTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	186.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	10.4391	128.7264	70.8030	0.1632	1.5461	4.7192	5.2873	0.1937	4.3419	4.4750	0.0000	15,897.9023	15,897.9023	4.9537	0.0000	16,021.7436
2021	9.8066	118.2366	66.8045	0.1631	5.4355	4.3114	5.6630	1.4416	3.9667	4.1017	0.0000	15,883.8650	15,883.8650	4.9448	0.0000	16,007.4848
2022	2.3917	23.4627	16.7223	0.0497	5.4355	0.8998	5.6267	1.4416	0.8403	1.6176	0.0000	4,943.6780	4,943.6780	0.9684	0.0000	4,949.7684
Maximum	**10.4391**	**128.7264**	**70.8030**	**0.1632**	**5.4355**	**4.7192**	**5.6630**	**1.4416**	**4.3419**	**4.4750**	**0.0000**	**15,897.9023**	**15,897.9023**	**4.9537**	**0.0000**	**16,021.7436**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2020	4.0071	78.0332	82.5005	0.1632	0.7052	2.7389	3.2267	0.1228	2.7384	2.8612	0.0000	15,897.9023	15,897.9023	4.9537	0.0000	16,021.7435
2021	3.9889	77.7776	82.3752	0.1631	5.4355	2.7370	5.6494	1.4416	2.7366	2.8613	0.0000	15,883.8650	15,883.8650	4.9448	0.0000	16,007.4847
2022	2.2270	17.3641	20.1648	0.0497	5.4355	0.7455	5.6485	1.4416	0.7454	1.6522	0.0000	4,943.6780	4,943.6780	0.9684	0.0000	4,949.7684
Maximum	**4.0071**	**78.0332**	**82.5005**	**0.1632**	**5.4355**	**2.7389**	**5.6494**	**1.4416**	**2.7384**	**2.8613**	**0.0000**	**15,897.9023**	**15,897.9023**	**4.9537**	**0.0000**	**16,021.7435**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**54.84**	**35.96**	**-19.90**	**0.00**	**6.77**	**37.35**	**12.38**	**2.31**	**32.01**	**27.66**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site PreparationWI1and2	Site Preparation	1/1/2020	1/28/2020	5	20	
2	Site PreparationWI3	Site Preparation	1/29/2020	3/3/2020	5	25	
3	GradingWI4	Grading	3/4/2020	9/28/2021	5	410	
4	Building ConstructionWI5	Building Construction	9/29/2021	4/5/2022	5	135	
5	GradingWI6i	Grading	4/6/2022	5/10/2022	5	25	
6	GradingWI6iiand7	Grading	5/11/2022	6/14/2022	5	25	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 26

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site PreparationWI1and2	Air Compressors	0	6.00	78	0.48
Site PreparationWI1and2	Crawler Tractors	1	4.00	212	0.43
Site PreparationWI1and2	Pumps	2	8.00	84	0.74
Site PreparationWI1and2	Rubber Tired Dozers	0	8.00	247	0.40
Site PreparationWI1and2	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site PreparationWI3	Crushing/Proc. Equipment	1	8.00	85	0.78
Site PreparationWI3	Excavators	1	8.00	158	0.38
Site PreparationWI3	Rubber Tired Dozers	0	8.00	247	0.40
Site PreparationWI3	Tractors/Loaders/Backhoes	1	8.00	97	0.37
GradingWI4	Concrete/Industrial Saws	0		81	0.73
GradingWI4	Crawler Tractors	3	8.00	212	0.43

GradingWI4	Excavators	0	8.00	158	0.38
GradingWI4	Graders	1	8.00	187	0.41
GradingWI4	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI4	Scrapers	8	8.00	367	0.48
GradingWI4	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Building ConstructionWI5	Cranes	0	7.00	231	0.29
Building ConstructionWI5	Forklifts	1	8.00	89	0.20
Building ConstructionWI5	Generator Sets	0	8.00	84	0.74
Building ConstructionWI5	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building ConstructionWI5	Welders	0	8.00	46	0.45
GradingWI6i	Crawler Tractors	1	8.00	212	0.43
GradingWI6i	Excavators	0	8.00	158	0.38
GradingWI6i	Graders	1	8.00	187	0.41
GradingWI6i	Pumps	1	8.00	84	0.74
GradingWI6i	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI6i	Scrapers	1	8.00	367	0.48
GradingWI6i	Tractors/Loaders/Backhoes	0	8.00	97	0.37
GradingWI6iiand7	Crawler Tractors	1	8.00	212	0.43
GradingWI6iiand7	Excavators	0	8.00	158	0.38
GradingWI6iiand7	Graders	1	8.00	187	0.41
GradingWI6iiand7	Pavers	0		130	0.42
GradingWI6iiand7	Paving Equipment	0		132	0.36
GradingWI6iiand7	Pumps	1	8.00	84	0.74
GradingWI6iiand7	Rollers	0		80	0.38
GradingWI6iiand7	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI6iiand7	Scrapers	1	8.00	367	0.48
GradingWI6iiand7	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site PreparationWI1and2	5	13.00	3.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site PreparationWI3	3	8.00	1.00	2.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
GradingWI4	12	30.00	3.00	20,800.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
Building ConstructionWI5	2	476.00	1.00	1.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
GradingWI6i	4	10.00	1.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT
GradingWI6iiand7	4	10.00	3.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site PreparationWI1and2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.3787	0.0000	1.3787	0.1489	0.0000	0.1489			0.0000			0.0000
Off-Road	1.5548	14.9922	13.3345	0.0233		0.8210	0.8210		0.7885	0.7885		2,227.8004	2,227.8004	0.3921		2,237.6019
Total	**1.5548**	**14.9922**	**13.3345**	**0.0233**	**1.3787**	**0.8210**	**2.1996**	**0.1489**	**0.7885**	**0.9373**		**2,227.8004**	**2,227.8004**	**0.3921**		**2,237.6019**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	8.8200e-003	0.3071	0.0661	7.5000e-004	0.0192	1.7800e-003	0.0210	5.5300e-003	1.7000e-003	7.2300e-003		79.5128	79.5128	6.9000e-003		79.6852
Worker	0.0658	0.0412	0.4314	1.3100e-003	0.1483	9.0000e-004	0.1492	0.0393	8.3000e-004	0.0402		131.0342	131.0342	3.2500e-003		131.1154
Total	**0.0746**	**0.3483**	**0.4976**	**2.0600e-003**	**0.1675**	**2.6800e-003**	**0.1702**	**0.0449**	**2.5300e-003**	**0.0474**		**210.5470**	**210.5470**	**0.0102**		**210.8006**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.5377	0.0000	0.5377	0.0581	0.0000	0.0581			0.0000			0.0000
Off-Road	0.5115	11.3416	14.8870	0.0233		0.7348	0.7348		0.7348	0.7348	0.0000	2,227.8004	2,227.8004	0.3921		2,237.6019
Total	**0.5115**	**11.3416**	**14.8870**	**0.0233**	**0.5377**	**0.7348**	**1.2725**	**0.0581**	**0.7348**	**0.7929**	**0.0000**	**2,227.8004**	**2,227.8004**	**0.3921**		**2,237.6019**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	8.8200e-003	0.3071	0.0661	7.5000e-004	0.0192	1.7800e-003	0.0210	5.5300e-003	1.7000e-003	7.2300e-003		79.5128	79.5128	6.9000e-003		79.6852
Worker	0.0658	0.0412	0.4314	1.3100e-003	0.1483	9.0000e-004	0.1492	0.0393	8.3000e-004	0.0402		131.0342	131.0342	3.2500e-003		131.1154
Total	**0.0746**	**0.3483**	**0.4976**	**2.0600e-003**	**0.1675**	**2.6800e-003**	**0.1702**	**0.0449**	**2.5300e-003**	**0.0474**		**210.5470**	**210.5470**	**0.0102**		**210.8006**

3.3 Site PreparationWI3 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1029	0.0000	1.1029	0.1191	0.0000	0.1191			0.0000			0.0000
Off-Road	1.0076	8.3169	9.8998	0.0153		0.4909	0.4909		0.4709	0.4709		1,465.4170	1,465.4170	0.3081		1,473.1204
Total	**1.0076**	**8.3169**	**9.8998**	**0.0153**	**1.1029**	**0.4909**	**1.5938**	**0.1191**	**0.4709**	**0.5900**		**1,465.4170**	**1,465.4170**	**0.3081**		**1,473.1204**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9000e-004	8.8900e-003	1.2000e-003	1.0000e-005	7.0000e-005	1.0000e-005	8.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005		1.3498	1.3498	3.1000e-004		1.3577
Vendor	2.9400e-003	0.1024	0.0220	2.5000e-004	6.4000e-003	5.9000e-004	7.0000e-003	1.8400e-003	5.7000e-004	2.4100e-003		26.5043	26.5043	2.3000e-003		26.5617
Worker	0.0405	0.0254	0.2655	8.1000e-004	0.0912	5.5000e-004	0.0918	0.0242	5.1000e-004	0.0247		80.6364	80.6364	2.0000e-003		80.6864
Total	**0.0436**	**0.1366**	**0.2887**	**1.0700e-003**	**0.0977**	**1.1500e-003**	**0.0989**	**0.0261**	**1.0900e-003**	**0.0272**		**108.4905**	**108.4905**	**4.6100e-003**		**108.6058**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4301	0.0000	0.4301	0.0464	0.0000	0.0464			0.0000			0.0000
Off-Road	0.3434	7.3951	10.5866	0.0153		0.4647	0.4647		0.4647	0.4647	0.0000	1,465.4170	1,465.4170	0.3081		1,473.1204
Total	**0.3434**	**7.3951**	**10.5866**	**0.0153**	**0.4301**	**0.4647**	**0.8948**	**0.0464**	**0.4647**	**0.5111**	**0.0000**	**1,465.4170**	**1,465.4170**	**0.3081**		**1,473.1204**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	1.9000e-004	8.8900e-003	1.2000e-003	1.0000e-005	7.0000e-005	1.0000e-005	8.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005		1.3498	1.3498	3.1000e-004		1.3577
Vendor	2.9400e-003	0.1024	0.0220	2.5000e-004	6.4000e-003	5.9000e-004	7.0000e-003	1.8400e-003	5.7000e-004	2.4100e-003		26.5043	26.5043	2.3000e-003		26.5617
Worker	0.0405	0.0254	0.2655	8.1000e-004	0.0912	5.5000e-004	0.0918	0.0242	5.1000e-004	0.0247		80.6364	80.6364	2.0000e-003		80.6864
Total	**0.0436**	**0.1366**	**0.2887**	**1.0700e-003**	**0.0977**	**1.1500e-003**	**0.0989**	**0.0261**	**1.0900e-003**	**0.0272**		**108.4905**	**108.4905**	**4.6100e-003**		**108.6058**

3.4 GradingWI4 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1315	0.0000	0.1315	0.0170	0.0000	0.0170			0.0000			0.0000
Off-Road	10.1557	122.6852	68.9832	0.1514		4.7111	4.7111		4.3342	4.3342		14,660.0048	14,660.0048	4.7413		14,778.5384
Total	**10.1557**	**122.6852**	**68.9832**	**0.1514**	**0.1315**	**4.7111**	**4.8426**	**0.0170**	**4.3342**	**4.3512**		**14,660.0048**	**14,660.0048**	**4.7413**		**14,778.5384**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1227	5.6390	0.7581	8.0900e-003	0.0752	4.2800e-003	0.0795	0.0199	4.1000e-003	0.0240		855.9981	855.9981	0.1979		860.9459
Vendor	8.8200e-003	0.3071	0.0661	7.5000e-004	0.0192	1.7800e-003	0.0210	5.5300e-003	1.7000e-003	7.2300e-003		79.5128	79.5128	6.9000e-003		79.6852
Worker	0.1519	0.0951	0.9956	3.0300e-003	0.3422	2.0700e-003	0.3442	0.0907	1.9000e-003	0.0927		302.3866	302.3866	7.5000e-003		302.5741
Total	**0.2834**	**6.0412**	**1.8198**	**0.0119**	**0.4366**	**8.1300e-003**	**0.4447**	**0.1161**	**7.7000e-003**	**0.1238**		**1,237.8975**	**1,237.8975**	**0.2123**		**1,243.2052**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio-CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0513	0.0000	0.0513	6.6300e-003	0.0000	6.6300e-003			0.0000			0.0000
Off-Road	3.7237	71.9920	80.6807	0.1514		2.7307	2.7307		2.7307	2.7307	0.0000	14,660.0048	14,660.0048	4.7413		14,778.5384
Total	**3.7237**	**71.9920**	**80.6807**	**0.1514**	**0.0513**	**2.7307**	**2.7820**	**6.6300e-003**	**2.7307**	**2.7374**	**0.0000**	**14,660.0048**	**14,660.0048**	**4.7413**		**14,778.5384**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1227	5.6390	0.7581	8.0900e-003	0.0752	4.2800e-003	0.0795	0.0199	4.1000e-003	0.0240		855.9981	855.9981	0.1979		860.9459
Vendor	8.8200e-003	0.3071	0.0661	7.5000e-004	0.0192	1.7800e-003	0.0210	5.5300e-003	1.7000e-003	7.2300e-003		79.5128	79.5128	6.9000e-003		79.6852
Worker	0.1519	0.0951	0.9956	3.0300e-003	0.3422	2.0700e-003	0.3442	0.0907	1.9000e-003	0.0927		302.3866	302.3866	7.5000e-003		302.5741
Total	**0.2834**	**6.0412**	**1.8198**	**0.0119**	**0.4366**	**8.1300e-003**	**0.4447**	**0.1161**	**7.7000e-003**	**0.1238**		**1,237.8975**	**1,237.8975**	**0.2123**		**1,243.2052**

3.4 GradingWI4 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.1315	0.0000	0.1315	0.0170	0.0000	0.0170			0.0000			0.0000
Off-Road	9.5414	112.4510	65.1100	0.1514		4.3052	4.3052		3.9608	3.9608		14,666.0624	14,666.0624	4.7433		14,784.6449
Total	**9.5414**	**112.4510**	**65.1100**	**0.1514**	**0.1315**	**4.3052**	**4.4367**	**0.0170**	**3.9608**	**3.9778**		**14,666.0624**	**14,666.0624**	**4.7433**		**14,784.6449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1159	5.4251	0.7249	8.0000e-003	0.0831	3.6800e-003	0.0868	0.0218	3.5200e-003	0.0253		846.6348	846.6348	0.1882		851.3401
Vendor	7.4400e-003	0.2752	0.0586	7.5000e-004	0.0192	5.4000e-004	0.0198	5.5300e-003	5.2000e-004	6.0500e-003		78.8920	78.8920	6.5300e-003		79.0553
Worker	0.1418	0.0853	0.9110	2.9300e-003	0.3422	2.0100e-003	0.3442	0.0907	1.8500e-003	0.0926		292.2758	292.2758	6.7400e-003		292.4444
Total	**0.2652**	**5.7856**	**1.6945**	**0.0117**	**0.4445**	**6.2300e-003**	**0.4507**	**0.1181**	**5.8900e-003**	**0.1240**		**1,217.8026**	**1,217.8026**	**0.2015**		**1,222.8398**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0513	0.0000	0.0513	6.6300e-003	0.0000	6.6300e-003			0.0000			0.0000
Off-Road	3.7237	71.9920	80.6807	0.1514		2.7307	2.7307		2.7307	2.7307	0.0000	14,666.0624	14,666.0624	4.7433		14,784.6449
Total	**3.7237**	**71.9920**	**80.6807**	**0.1514**	**0.0513**	**2.7307**	**2.7820**	**6.6300e-003**	**2.7307**	**2.7374**	**0.0000**	**14,666.0624**	**14,666.0624**	**4.7433**		**14,784.6449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.1159	5.4251	0.7249	8.0000e-003	0.0831	3.6800e-003	0.0868	0.0218	3.5200e-003	0.0253		846.6348	846.6348	0.1882		851.3401
Vendor	7.4400e-003	0.2752	0.0586	7.5000e-004	0.0192	5.4000e-004	0.0198	5.5300e-003	5.2000e-004	6.0500e-003		78.8920	78.8920	6.5300e-003		79.0553
Worker	0.1418	0.0853	0.9110	2.9300e-003	0.3422	2.0100e-003	0.3442	0.0907	1.8500e-003	0.0926		292.2758	292.2758	6.7400e-003		292.4444
Total	**0.2652**	**5.7856**	**1.6945**	**0.0117**	**0.4445**	**6.2300e-003**	**0.4507**	**0.1181**	**5.8900e-003**	**0.1240**		**1,217.8026**	**1,217.8026**	**0.2015**		**1,222.8398**

3.5 Building ConstructionWI5 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.3166	3.0749	3.4281	4.6300e-003		0.1955	0.1955		0.1798	0.1798		448.9309	448.9309	0.1452		452.5607
Total	**0.3166**	**3.0749**	**3.4281**	**4.6300e-003**		**0.1955**	**0.1955**		**0.1798**	**0.1798**		**448.9309**	**448.9309**	**0.1452**		**452.5607**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0000e-005	7.9000e-004	1.1000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1236	0.1236	3.0000e-005		0.1243
Vendor	2.4800e-003	0.0917	0.0195	2.5000e-004	6.4000e-003	1.8000e-004	6.5800e-003	1.8400e-003	1.7000e-004	2.0200e-003		26.2973	26.2973	2.1800e-003		26.3518
Worker	2.2500	1.3539	14.4539	0.0465	5.4290	0.0319	5.4610	1.4398	0.0294	1.4692		4,637.4427	4,637.4427	0.1070		4,640.1177
Total	**2.2525**	**1.4465**	**14.4735**	**0.0468**	**5.4355**	**0.0321**	**5.4676**	**1.4416**	**0.0296**	**1.4712**		**4,663.8636**	**4,663.8636**	**0.1092**		**4,666.5938**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1136	2.5946	3.5036	4.6300e-003		0.1818	0.1818		0.1818	0.1818	0.0000	448.9309	448.9309	0.1452		452.5607
Total	**0.1136**	**2.5946**	**3.5036**	**4.6300e-003**		**0.1818**	**0.1818**		**0.1818**	**0.1818**	**0.0000**	**448.9309**	**448.9309**	**0.1452**		**452.5607**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0000e-005	7.9000e-004	1.1000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1236	0.1236	3.0000e-005		0.1243
Vendor	2.4800e-003	0.0917	0.0195	2.5000e-004	6.4000e-003	1.8000e-004	6.5800e-003	1.8400e-003	1.7000e-004	2.0200e-003		26.2973	26.2973	2.1800e-003		26.3518
Worker	2.2500	1.3539	14.4539	0.0465	5.4290	0.0319	5.4610	1.4398	0.0294	1.4692		4,637.4427	4,637.4427	0.1070		4,640.1177
Total	**2.2525**	**1.4465**	**14.4735**	**0.0468**	**5.4355**	**0.0321**	**5.4676**	**1.4416**	**0.0296**	**1.4712**		**4,663.8636**	**4,663.8636**	**0.1092**		**4,666.5938**

3.5 Building ConstructionWI5 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.2783	2.7305	3.3917	4.6400e-003		0.1600	0.1600		0.1472	0.1472		449.2698	449.2698	0.1453		452.9024
Total	**0.2783**	**2.7305**	**3.3917**	**4.6400e-003**		**0.1600**	**0.1600**		**0.1472**	**0.1472**		**449.2698**	**449.2698**	**0.1453**		**452.9024**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0000e-005	7.6000e-004	1.0000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1223	0.1223	3.0000e-005		0.1230
Vendor	2.3200e-003	0.0864	0.0182	2.5000e-004	6.4000e-003	1.5000e-004	6.5600e-003	1.8400e-003	1.5000e-004	1.9900e-003		26.0677	26.0677	2.0700e-003		26.1193
Worker	2.1110	1.2180	13.3122	0.0448	5.4290	0.0311	5.4601	1.4398	0.0286	1.4684		4,468.2182	4,468.2182	0.0962		4,470.6237
Total	**2.1133**	**1.3052**	**13.3306**	**0.0451**	**5.4355**	**0.0312**	**5.4667**	**1.4416**	**0.0288**	**1.4704**		**4,494.4083**	**4,494.4083**	**0.0983**		**4,496.8661**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Off-Road	0.1136	2.5946	3.5036	4.6400e-003		0.1818	0.1818		0.1818	0.1818	0.0000	449.2698	449.2698	0.1453		452.9024
Total	**0.1136**	**2.5946**	**3.5036**	**4.6400e-003**		**0.1818**	**0.1818**		**0.1818**	**0.1818**	**0.0000**	**449.2698**	**449.2698**	**0.1453**		**452.9024**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	2.0000e-005	7.6000e-004	1.0000e-004	0.0000	1.0000e-005	0.0000	1.0000e-005	0.0000	0.0000	0.0000		0.1223	0.1223	3.0000e-005		0.1230
Vendor	2.3200e-003	0.0864	0.0182	2.5000e-004	6.4000e-003	1.5000e-004	6.5600e-003	1.8400e-003	1.5000e-004	1.9900e-003		26.0677	26.0677	2.0700e-003		26.1193
Worker	2.1110	1.2180	13.3122	0.0448	5.4290	0.0311	5.4601	1.4398	0.0286	1.4684		4,468.2182	4,468.2182	0.0962		4,470.6237
Total	**2.1133**	**1.3052**	**13.3306**	**0.0451**	**5.4355**	**0.0312**	**5.4667**	**1.4416**	**0.0288**	**1.4704**		**4,494.4083**	**4,494.4083**	**0.0983**		**4,496.8661**

3.6 GradingWI6i - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1029	0.0000	1.1029	0.1191	0.0000	0.1191			0.0000			0.0000
Off-Road	2.0781	23.1778	14.1442	0.0362		0.8987	0.8987		0.8393	0.8393		3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**2.0781**	**23.1778**	**14.1442**	**0.0362**	**1.1029**	**0.8987**	**2.0016**	**0.1191**	**0.8393**	**0.9584**		**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.3200e-003	0.0864	0.0182	2.5000e-004	6.4000e-003	1.5000e-004	6.5600e-003	1.8400e-003	1.5000e-004	1.9900e-003		26.0677	26.0677	2.0700e-003		26.1193
Worker	0.0444	0.0256	0.2797	9.4000e-004	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		93.8701	93.8701	2.0200e-003		93.9207
Total	**0.0467**	**0.1120**	**0.2979**	**1.1900e-003**	**0.1205**	**8.0000e-004**	**0.1213**	**0.0321**	**7.5000e-004**	**0.0328**		**119.9378**	**119.9378**	**4.0900e-003**		**120.0400**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4301	0.0000	0.4301	0.0464	0.0000	0.0464			0.0000			0.0000
Off-Road	0.8596	17.0792	19.8304	0.0362		0.7444	0.7444		0.7444	0.7444	0.0000	3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**0.8596**	**17.0792**	**19.8304**	**0.0362**	**0.4301**	**0.7444**	**1.1745**	**0.0464**	**0.7444**	**0.7908**	**0.0000**	**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	2.3200e-003	0.0864	0.0182	2.5000e-004	6.4000e-003	1.5000e-004	6.5600e-003	1.8400e-003	1.5000e-004	1.9900e-003		26.0677	26.0677	2.0700e-003		26.1193
Worker	0.0444	0.0256	0.2797	9.4000e-004	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		93.8701	93.8701	2.0200e-003		93.9207
Total	**0.0467**	**0.1120**	**0.2979**	**1.1900e-003**	**0.1205**	**8.0000e-004**	**0.1213**	**0.0321**	**7.5000e-004**	**0.0328**		**119.9378**	**119.9378**	**4.0900e-003**		**120.0400**

3.7 GradingWI6iiand7 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					1.1029	0.0000	1.1029	0.1191	0.0000	0.1191			0.0000			0.0000
Off-Road	2.0781	23.1778	14.1442	0.0362		0.8987	0.8987		0.8393	0.8393		3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**2.0781**	**23.1778**	**14.1442**	**0.0362**	**1.1029**	**0.8987**	**2.0016**	**0.1191**	**0.8393**	**0.9584**		**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.9500e-003	0.2593	0.0547	7.4000e-004	0.0192	4.6000e-004	0.0197	5.5300e-003	4.4000e-004	5.9700e-003		78.2031	78.2031	6.2000e-003		78.3580
Worker	0.0444	0.0256	0.2797	9.4000e-004	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		93.8701	93.8701	2.0200e-003		93.9207
Total	**0.0513**	**0.2849**	**0.3344**	**1.6800e-003**	**0.1333**	**1.1100e-003**	**0.1344**	**0.0358**	**1.0400e-003**	**0.0368**		**172.0733**	**172.0733**	**8.2200e-003**		**172.2787**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.4301	0.0000	0.4301	0.0464	0.0000	0.0464			0.0000			0.0000
Off-Road	0.8596	17.0792	19.8304	0.0362		0.7444	0.7444		0.7444	0.7444	0.0000	3,493.6398	3,493.6398	0.9602		3,517.6449
Total	**0.8596**	**17.0792**	**19.8304**	**0.0362**	**0.4301**	**0.7444**	**1.1745**	**0.0464**	**0.7444**	**0.7908**	**0.0000**	**3,493.6398**	**3,493.6398**	**0.9602**		**3,517.6449**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	6.9500e-003	0.2593	0.0547	7.4000e-004	0.0192	4.6000e-004	0.0197	5.5300e-003	4.4000e-004	5.9700e-003		78.2031	78.2031	6.2000e-003		78.3580
Worker	0.0444	0.0256	0.2797	9.4000e-004	0.1141	6.5000e-004	0.1147	0.0303	6.0000e-004	0.0309		93.8701	93.8701	2.0200e-003		93.9207
Total	**0.0513**	**0.2849**	**0.3344**	**1.6800e-003**	**0.1333**	**1.1100e-003**	**0.1344**	**0.0358**	**1.0400e-003**	**0.0368**		**172.0733**	**172.0733**	**8.2200e-003**		**172.2787**

6842 BLIP operational equipment - no construction

Riverside-South Coast County, Summer

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	250.00	Acre	250.00	10,890,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction analyzed under separate CalEEMod run. Operational off-road vehicle analysis (plus extra waste delivery trips) only.

Land Use - Project site will be expanded from 150 acres to 400 acres; expansion of refuse area footprint = 250 acres

Construction Phase - Project anticipated to be operational in 2022; therefore, onsite heavy equipment was analyzed for a full year in 2022, operating 7 days a week

Off-road Equipment -

Off-road Equipment - Additional operational equip: 1 grinder (850 HP), 1 trommel screen (205 HP), 1 compost turner (255 HP), 1 wheeled loader, and 1 landfill tipper (other const equip)

Trips and VMT - Off-site trips calculated in operational emissions.

Grading - Expansion refuse area is 250 acres

Vehicle Trips - Adding 30 HHDT transfer trucks (60 trips/day) over 250 acres = 0.24 trips/acre. Operating Mon-Sat. One-way trip = 8.75 mi for C-W only (100% of the additional trips).

Consumer Products -

Area Coating - No coating

Energy Use -

Construction Off-road Equipment Mitigation - All additional equipment will have at least Tier 3 engines

Mobile Land Use Mitigation -

Fleet Mix - All additional vehicles are HHD transfer trucks

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	653400	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	180.00	365.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblFleetMix	HHD	0.07	1.00
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.19	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	4.9700e-003	0.00

tblFleetMix	MCY	4.5470e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.6500e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.3970e-003	0.00
tblFleetMix	SBUS	9.3200e-004	0.00
tblFleetMix	UBUS	1.1600e-003	0.00
tblOffRoadEquipment	HorsePower	85.00	850.00
tblOffRoadEquipment	HorsePower	168.00	205.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	HorsePower	97.00	255.00
tblOffRoadEquipment	LoadFactor	0.40	0.59
tblOffRoadEquipment	LoadFactor	0.40	0.00
tblOffRoadEquipment	LoadFactor	0.37	0.55
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblVehicleTrips	CW_TL	16.60	8.75
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	0.24
tblVehicleTrips	SU_TR	0.00	0.24
tblVehicleTrips	WD_TR	0.00	0.24

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	1.5520	15.5684	11.3617	0.0348	0.0000	0.6078	0.6078	0.0000	0.5591	0.5591	0.0000	3,370.5036	3,370.5036	1.0901	0.0000	3,397.7558
Maximum	**1.5520**	**15.5684**	**11.3617**	**0.0348**	**0.0000**	**0.6078**	**0.6078**	**0.0000**	**0.5591**	**0.5591**	**0.0000**	**3,370.5036**	**3,370.5036**	**1.0901**	**0.0000**	**3,397.7558**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.8604	16.6339	20.0430	0.0348	0.0000	0.6615	0.6615	0.0000	0.6615	0.6615	0.0000	3,370.5036	3,370.5036	1.0901	0.0000	3,397.7558
Maximum	**0.8604**	**16.6339**	**20.0430**	**0.0348**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**3,370.5036**	**3,370.5036**	**1.0901**	**0.0000**	**3,397.7558**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**44.56**	**-6.84**	**-76.41**	**0.00**	**0.00**	**-8.85**	**-8.85**	**0.00**	**-18.31**	**-18.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1785	8.6072	0.9933	0.0242	0.4586	0.0150	0.4736	0.1257	0.0144	0.1400		2,572.6707	2,572.6707	0.2182		2,578.1262
Total	**4.0381**	**8.6074**	**1.0188**	**0.0242**	**0.4586**	**0.0151**	**0.4737**	**0.1257**	**0.0145**	**0.1401**		**2,572.7254**	**2,572.7254**	**0.2184**	**0.0000**	**2,578.1845**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Area	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1785	8.6072	0.9933	0.0242	0.4586	0.0150	0.4736	0.1257	0.0144	0.1400		2,572.6707	2,572.6707	0.2182		2,578.1262
Total	**4.0381**	**8.6074**	**1.0188**	**0.0242**	**0.4586**	**0.0151**	**0.4737**	**0.1257**	**0.0145**	**0.1401**		**2,572.7254**	**2,572.7254**	**0.2184**	**0.0000**	**2,578.1845**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2022	12/31/2022	7	365	Onsite operations

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 250

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crushing/Proc. Equipment	1	8.00	850	0.78
Site Preparation	Other Construction Equipment	1	8.00	172	0.42
Site Preparation	Other Material Handling Equipment	1	8.00	205	0.59
Site Preparation	Rubber Tired Dozers	0	0.00	0	0.00
Site Preparation	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	255	0.55

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	1.5520	15.5684	11.3617	0.0348		0.6078	0.6078		0.5591	0.5591		3,370.5036	3,370.5036	1.0901		3,397.7558
Total	**1.5520**	**15.5684**	**11.3617**	**0.0348**	**0.0000**	**0.6078**	**0.6078**	**0.0000**	**0.5591**	**0.5591**		**3,370.5036**	**3,370.5036**	**1.0901**		**3,397.7558**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.8604	16.6339	20.0430	0.0348		0.6615	0.6615		0.6615	0.6615	0.0000	3,370.5036	3,370.5036	1.0901		3,397.7558
Total	**0.8604**	**16.6339**	**20.0430**	**0.0348**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**3,370.5036**	**3,370.5036**	**1.0901**		**3,397.7558**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1785	8.6072	0.9933	0.0242	0.4586	0.0150	0.4736	0.1257	0.0144	0.1400		2,572.6707	2,572.6707	0.2182		2,578.1262
Unmitigated	0.1785	8.6072	0.9933	0.0242	0.4586	0.0150	0.4736	0.1257	0.0144	0.1400		2,572.6707	2,572.6707	0.2182		2,578.1262

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	60.00	60.00	60.00	191,100	191,100
Total	60.00	60.00	60.00	191,100	191,100

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	8.75	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Unmitigated	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.8572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3800e-003	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Total	**3.8596**	**2.3000e-004**	**0.0256**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0547**	**0.0547**	**1.4000e-004**		**0.0583**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.8572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3800e-003	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Total	**3.8596**	**2.3000e-004**	**0.0256**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0547**	**0.0547**	**1.4000e-004**		**0.0583**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

6842 BLIP operational equipment - no construction

Riverside-South Coast County, Winter

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	250.00	Acre	250.00	10,890,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction analyzed under separate CalEEMod run. Operational off-road vehicle analysis (plus extra waste delivery trips) only.

Land Use - Project site will be expanded from 150 acres to 400 acres; expansion of refuse area footprint = 250 acres

Construction Phase - Project anticipated to be operational in 2022; therefore, onsite heavy equipment was analyzed for a full year in 2022, operating 7 days a week

Off-road Equipment -

Off-road Equipment - Additional operational equip: 1 grinder (850 HP), 1 trommel screen (205 HP), 1 compost turner (255 HP), 1 wheeled loader, and 1 landfill tipper (other const equip)

Trips and VMT - Off-site trips calculated in operational emissions.

Grading - Expansion refuse area is 250 acres

Vehicle Trips - Adding 30 HHDT transfer trucks (60 trips/day) over 250 acres = 0.24 trips/acre. Operating Mon-Sat. One-way trip = 8.75 mi for C-W only (100% of the additional trips).

Consumer Products -

Area Coating - No coating

Energy Use -

Construction Off-road Equipment Mitigation - All additional equipment will have at least Tier 3 engines

Mobile Land Use Mitigation -

Fleet Mix - All additional vehicles are HHD transfer trucks

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	653400	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	180.00	365.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblFleetMix	HHD	0.07	1.00
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.19	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	4.9700e-003	0.00

tblFleetMix	MCY	4.5470e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.6500e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.3970e-003	0.00
tblFleetMix	SBUS	9.3200e-004	0.00
tblFleetMix	UBUS	1.1600e-003	0.00
tblOffRoadEquipment	HorsePower	85.00	850.00
tblOffRoadEquipment	HorsePower	168.00	205.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	HorsePower	97.00	255.00
tblOffRoadEquipment	LoadFactor	0.40	0.59
tblOffRoadEquipment	LoadFactor	0.40	0.00
tblOffRoadEquipment	LoadFactor	0.37	0.55
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblVehicleTrips	CW_TL	16.60	8.75
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	0.24
tblVehicleTrips	SU_TR	0.00	0.24
tblVehicleTrips	WD_TR	0.00	0.24

2.0 Emissions Summary

2.1 Overall Construction (Maximum Daily Emission)

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	1.5520	15.5684	11.3617	0.0348	0.0000	0.6078	0.6078	0.0000	0.5591	0.5591	0.0000	3,370.5036	3,370.5036	1.0901	0.0000	3,397.7558
Maximum	**1.5520**	**15.5684**	**11.3617**	**0.0348**	**0.0000**	**0.6078**	**0.6078**	**0.0000**	**0.5591**	**0.5591**	**0.0000**	**3,370.5036**	**3,370.5036**	**1.0901**	**0.0000**	**3,397.7558**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	lb/day										lb/day					
2022	0.8604	16.6339	20.0430	0.0348	0.0000	0.6615	0.6615	0.0000	0.6615	0.6615	0.0000	3,370.5036	3,370.5036	1.0901	0.0000	3,397.7558
Maximum	**0.8604**	**16.6339**	**20.0430**	**0.0348**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**3,370.5036**	**3,370.5036**	**1.0901**	**0.0000**	**3,397.7558**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**44.56**	**-6.84**	**-76.41**	**0.00**	**0.00**	**-8.85**	**-8.85**	**0.00**	**-18.31**	**-18.31**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

2.2 Overall Operational

Unmitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Area	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1931	8.4876	1.2686	0.0231	0.4586	0.0156	0.4741	0.1257	0.0149	0.1405		2,452.5401	2,452.5401	0.2433		2,458.6222
Total	**4.0527**	**8.4878**	**1.2942**	**0.0231**	**0.4586**	**0.0156**	**0.4742**	**0.1257**	**0.0150**	**0.1406**		**2,452.5948**	**2,452.5948**	**0.2434**	**0.0000**	**2,458.6805**

Mitigated Operational

Category	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
	lb/day										lb/day					
Area	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.1931	8.4876	1.2686	0.0231	0.4586	0.0156	0.4741	0.1257	0.0149	0.1405		2,452.5401	2,452.5401	0.2433		2,458.6222
Total	**4.0527**	**8.4878**	**1.2942**	**0.0231**	**0.4586**	**0.0156**	**0.4742**	**0.1257**	**0.0150**	**0.1406**		**2,452.5948**	**2,452.5948**	**0.2434**	**0.0000**	**2,458.6805**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2022	12/31/2022	7	365	Onsite operations

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 250

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crushing/Proc. Equipment	1	8.00	850	0.78
Site Preparation	Other Construction Equipment	1	8.00	172	0.42
Site Preparation	Other Material Handling Equipment	1	8.00	205	0.59
Site Preparation	Rubber Tired Dozers	0	0.00	0	0.00
Site Preparation	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	255	0.55

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	1.5520	15.5684	11.3617	0.0348		0.6078	0.6078		0.5591	0.5591		3,370.5036	3,370.5036	1.0901		3,397.7558
Total	**1.5520**	**15.5684**	**11.3617**	**0.0348**	**0.0000**	**0.6078**	**0.6078**	**0.0000**	**0.5591**	**0.5591**		**3,370.5036**	**3,370.5036**	**1.0901**		**3,397.7558**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000			0.0000			0.0000
Off-Road	0.8604	16.6339	20.0430	0.0348		0.6615	0.6615		0.6615	0.6615	0.0000	3,370.5036	3,370.5036	1.0901		3,397.7558
Total	**0.8604**	**16.6339**	**20.0430**	**0.0348**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**0.6615**	**0.6615**	**0.0000**	**3,370.5036**	**3,370.5036**	**1.0901**		**3,397.7558**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000	0.0000		0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**		**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	0.1931	8.4876	1.2686	0.0231	0.4586	0.0156	0.4741	0.1257	0.0149	0.1405		2,452.5401	2,452.5401	0.2433		2,458.6222
Unmitigated	0.1931	8.4876	1.2686	0.0231	0.4586	0.0156	0.4741	0.1257	0.0149	0.1405		2,452.5401	2,452.5401	0.2433		2,458.6222

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	60.00	60.00	60.00	191,100	191,100
Total	60.00	60.00	60.00	191,100	191,100

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	8.75	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	lb/day										lb/day					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	lb/day										lb/day					
Mitigated	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Unmitigated	3.8596	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.8572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3800e-003	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Total	**3.8596**	**2.3000e-004**	**0.0256**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0547**	**0.0547**	**1.4000e-004**		**0.0583**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	lb/day										lb/day					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Consumer Products	3.8572					0.0000	0.0000		0.0000	0.0000			0.0000			0.0000
Landscaping	2.3800e-003	2.3000e-004	0.0256	0.0000		9.0000e-005	9.0000e-005		9.0000e-005	9.0000e-005		0.0547	0.0547	1.4000e-004		0.0583
Total	**3.8596**	**2.3000e-004**	**0.0256**	**0.0000**		**9.0000e-005**	**9.0000e-005**		**9.0000e-005**	**9.0000e-005**		**0.0547**	**0.0547**	**1.4000e-004**		**0.0583**

7.0 Water Detail

7.1 Mitigation Measures Water

8.0 Waste Detail

8.1 Mitigation Measures Waste

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX C

CALEEMOD MODEL ANNUAL EMISSIONS PRINTOUTS

6842 BLIP Existing OPS heavy duty equipment only

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	150.00	Acre	150.00	6,534,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2019
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Analysis of existing construction-type operational equipment for off-sets ONLY.

Land Use - Existing site is 150 acres

Construction Phase - Operating 6 days a week per year, existing OPS modeled under grading phase

Off-road Equipment - .

Off-road Equipment - Offset credits for existing equipment: 5 scrapers, 3 tracked bulldozers, 2 graders, 1 excavator, 1 backhoe for 8 hours a day.

Trips and VMT - Worker trip length 30 miles round trip. 4 vendor trips added for 2 on-road dump trucks and 2 on-road water trucks

Grading - Existing site is 150 acres. Grading does not occur over entire site.

Energy Use -

Construction Off-road Equipment Mitigation - Engines:Tracked dozers (crawler tractors) avg of Tier 2; Graders avg of Tier 3; Excavators Tier 2; scrapers avg of Tier 1; backhoe Tier 1.

Mobile Land Use Mitigation -

Area Coating - No coatings

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	392040	0
tblConstDustMitigation	WaterExposedAreaPM10PercentReduction	61	55
tblConstDustMitigation	WaterExposedAreaPM25PercentReduction	61	55
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	2.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	5.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 2
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 1
tblConstEquipMitigation	Tier	No Change	Tier 1
tblConstructionPhase	NumDays	310.00	312.00
tblConstructionPhase	NumDaysWeek	5.00	6.00
tblGrading	AcresOfGrading	2,340.00	150.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	2.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	5.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	4.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	1.4712	18.2630	9.7882	0.0195	0.1360	0.7126	0.8485	0.0237	0.6556	0.6793	0.0000	1,784.2547	1,784.2547	0.5388	0.0000	1,797.7252
Maximum	**1.4712**	**18.2630**	**9.7882**	**0.0195**	**0.1360**	**0.7126**	**0.8485**	**0.0237**	**0.6556**	**0.6793**	**0.0000**	**1,784.2547**	**1,784.2547**	**0.5388**	**0.0000**	**1,797.7252**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2018	1.2389	19.9034	21.2847	0.0195	0.1360	0.4417	0.5777	0.0237	0.4416	0.4653	0.0000	1,784.2526	1,784.2526	0.5388	0.0000	1,797.7232
Maximum	**1.2389**	**19.9034**	**21.2847**	**0.0195**	**0.1360**	**0.4417**	**0.5777**	**0.0237**	**0.4416**	**0.4653**	**0.0000**	**1,784.2526**	**1,784.2526**	**0.5388**	**0.0000**	**1,797.7232**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**15.79**	**-8.98**	**-117.45**	**0.00**	**0.00**	**38.01**	**31.92**	**0.00**	**32.63**	**31.50**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2018**	**3-31-2018**	4.8794	5.2276
2	**4-1-2018**	**6-30-2018**	4.9336	5.2856
3	**7-1-2018**	**9-30-2018**	4.9878	5.3437
		Highest	4.9878	5.3437

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Grading	Grading	1/1/2018	12/29/2018	6	312	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 150

Acres of Paving: 150

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Architectural Coating	Air Compressors	0	6.00	78	0.48
Building Construction	Cranes	0	7.00	231	0.29
Building Construction	Forklifts	0	8.00	89	0.20
Building Construction	Generator Sets	0	8.00	84	0.74
Building Construction	Tractors/Loaders/Backhoes	0	7.00	97	0.37
Building Construction	Welders	0	8.00	46	0.45
Demolition	Concrete/Industrial Saws	0	8.00	81	0.73
Demolition	Excavators	0	8.00	158	0.38
Demolition	Rubber Tired Dozers	0	8.00	247	0.40
Paving	Pavers	0	8.00	130	0.42
Paving	Paving Equipment	0	8.00	132	0.36

Paving	Rollers	0	8.00	80	0.38
Site Preparation	Rubber Tired Dozers	0	8.00	247	0.40
Site Preparation	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Grading	Crawler Tractors	3	8.00	212	0.43
Grading	Excavators	1	8.00	158	0.38
Grading	Graders	2	8.00	187	0.41
Grading	Rubber Tired Dozers	0	8.00	247	0.40
Grading	Scrapers	5	8.00	367	0.48
Grading	Tractors/Loaders/Backhoes	1	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Grading	12	30.00	4.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

3.2 Grading - 2018

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0795	0.0000	0.0795	8.5900e-003	0.0000	8.5900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.4431	18.1665	9.5708	0.0189		0.7116	0.7116		0.6547	0.6547	0.0000	1,721.9432	1,721.9432	0.5361	0.0000	1,735.3448
Total	**1.4431**	**18.1665**	**9.5708**	**0.0189**	**0.0795**	**0.7116**	**0.7911**	**8.5900e-003**	**0.6547**	**0.6633**	**0.0000**	**1,721.9432**	**1,721.9432**	**0.5361**	**0.0000**	**1,735.3448**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3400e-003	0.0770	0.0157	1.6000e-004	3.9400e-003	6.4000e-004	4.5800e-003	1.1400e-003	6.1000e-004	1.7500e-003	0.0000	15.5540	15.5540	1.3700e-003	0.0000	15.5882
Worker	0.0258	0.0196	0.2017	5.2000e-004	0.0525	3.3000e-004	0.0528	0.0139	3.1000e-004	0.0142	0.0000	46.7575	46.7575	1.3900e-003	0.0000	46.7923
Total	**0.0281**	**0.0965**	**0.2174**	**6.8000e-004**	**0.0564**	**9.7000e-004**	**0.0574**	**0.0151**	**9.2000e-004**	**0.0160**	**0.0000**	**62.3115**	**62.3115**	**2.7600e-003**	**0.0000**	**62.3804**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0795	0.0000	0.0795	8.5900e-003	0.0000	8.5900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.2107	19.8069	21.0673	0.0189		0.4407	0.4407		0.4407	0.4407	0.0000	1,721.9411	1,721.9411	0.5361	0.0000	1,735.3427
Total	**1.2107**	**19.8069**	**21.0673**	**0.0189**	**0.0795**	**0.4407**	**0.5203**	**8.5900e-003**	**0.4407**	**0.4493**	**0.0000**	**1,721.9411**	**1,721.9411**	**0.5361**	**0.0000**	**1,735.3427**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	2.3400e-003	0.0770	0.0157	1.6000e-004	3.9400e-003	6.4000e-004	4.5800e-003	1.1400e-003	6.1000e-004	1.7500e-003	0.0000	15.5540	15.5540	1.3700e-003	0.0000	15.5882
Worker	0.0258	0.0196	0.2017	5.2000e-004	0.0525	3.3000e-004	0.0528	0.0139	3.1000e-004	0.0142	0.0000	46.7575	46.7575	1.3900e-003	0.0000	46.7923
Total	**0.0281**	**0.0965**	**0.2174**	**6.8000e-004**	**0.0564**	**9.7000e-004**	**0.0574**	**0.0151**	**9.2000e-004**	**0.0160**	**0.0000**	**62.3115**	**62.3115**	**2.7600e-003**	**0.0000**	**62.3804**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	0.00	0.00	0.00		
Total	0.00	0.00	0.00		

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	16.60	8.40	6.90	0.00	0.00	0.00	0	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.533383	0.039495	0.183627	0.126156	0.018688	0.005561	0.017029	0.066607	0.001345	0.001247	0.004677	0.000974	0.001211

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.4226	2.0000e-005	1.9300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7200e-003	3.7200e-003	1.0000e-005	0.0000	3.9700e-003
Unmitigated	0.4226	2.0000e-005	1.9300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7200e-003	3.7200e-003	1.0000e-005	0.0000	3.9700e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4224					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.8000e-004	2.0000e-005	1.9300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7200e-003	3.7200e-003	1.0000e-005	0.0000	3.9700e-003
Total	**0.4226**	**2.0000e-005**	**1.9300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.7200e-003**	**3.7200e-003**	**1.0000e-005**	**0.0000**	**3.9700e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.4224					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	1.8000e-004	2.0000e-005	1.9300e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	3.7200e-003	3.7200e-003	1.0000e-005	0.0000	3.9700e-003
Total	**0.4226**	**2.0000e-005**	**1.9300e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**3.7200e-003**	**3.7200e-003**	**1.0000e-005**	**0.0000**	**3.9700e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6842 BLIP Project Construction Only

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	26.00	Acre	26.00	1,132,560.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Analysis of construction only. Operational emissions analyzed in separate CalEEMod run

Land Use - Analysis of worst case phase; 26 acres. Project to be excavated in 17 phases ranging from 11 to 26 acres per phase.

Construction Phase - WI1&2 (site prp1/1/2020-1/28/2020);WI3(site prp1/29/2020-3/3/2020);WI4(gradg3/4/2020-9/28/2021);WI5(blg con9/29/2021-4/5/2022);WI6i(grdg4/6/2022-5/10/2022); WI6ii&7(gdg5/11/2022-6/14/2022)

Off-road Equipment -

Off-road Equipment - 1 loader, 1 forklift for 8 hrs/day

Off-road Equipment - 8 scrapers, 3 bulldozers (crawler tractors), 1 grader for 8 hrs/day

Off-road Equipment - 1 scraper, 1 tracked bulldozer (crawler tractor), 1 grader, 1 pump for 8 hours a day

Off-road Equipment - 1 scraper, 1 tracked bulldozer (crawler tractor), 1 grader, 1 concrete pump for 8 hours a day

Off-road Equipment - 1 backhoe, 2 900 GPM water pumps, 1 loader for 8 hour/day. 1 tracked dozer (crawler tractor) for 4 hrs/day.

Off-road Equipment - 1 excavator, 1 loader, and 1 rock crusher for 8 hrs/day

Trips and VMT - WI1:2 onrd fltbed trcks; WI2:1 h2o trck; WI3 uses 1 h2o trck, 2 onroad dmp trcks (stckpile site ~1 mi); WI4 uses 3 h2o trcks, 20,800 haul trips to stckpile areas 1 or 2,WI5 1h2o trk and same# of wrkr trps as WI4; WI6i:1 h2o trk;WI6ii&7 2 fltbds, 1 h20 trk

Grading - 2.4 million CY to be excavated over 17 phases; therefore, largest phase (26 acres) would involve the maximum excavation of approx. 208,000 CY of material transported to on-site stockpile site

Area Coating - No asphalt/painting

Energy Use -

Construction Off-road Equipment Mitigation - All Engines Tier 3 or better

Mobile Land Use Mitigation -

Vehicle Trips -

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	67954	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	6.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	3.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	10.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	4.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3

tblConstructionPhase	NumDays	20.00	25.00
tblConstructionPhase	NumDays	45.00	410.00
tblConstructionPhase	NumDays	440.00	135.00
tblConstructionPhase	NumDays	45.00	25.00
tblConstructionPhase	NumDays	45.00	25.00
tblGrading	AcresOfGrading	5.00	26.00
tblGrading	AcresOfGrading	0.00	26.00
tblGrading	AcresOfGrading	4,100.00	26.00
tblGrading	AcresOfGrading	50.00	26.00
tblGrading	AcresOfGrading	50.00	26.00
tblGrading	MaterialExported	0.00	208,000.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	8.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	2.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	2.00

tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	1.00	0.00
tblOffRoadEquipment	UsageHours	7.00	8.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripLength	20.00	1.00
tblTripsAndVMT	HaulingTripNumber	0.00	2.00
tblTripsAndVMT	HaulingTripNumber	26,000.00	20,800.00
tblTripsAndVMT	HaulingTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	VendorTripNumber	186.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	1.00
tblTripsAndVMT	VendorTripNumber	0.00	3.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00
tblTripsAndVMT	WorkerTripLength	14.70	15.00

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	1.1598	14.2420	7.9377	0.0182	0.1040	0.5264	0.6304	0.0196	0.4849	0.5045	0.0000	1,611.6666	1,611.6666	0.4935	0.0000	1,624.0033
2021	1.0258	11.5787	7.0733	0.0176	0.2509	0.4238	0.6746	0.0630	0.3899	0.4528	0.0000	1,557.9180	1,557.9180	0.4397	0.0000	1,568.9109
2022	0.1275	0.7212	0.9466	2.6500e-003	0.2098	0.0289	0.2386	0.0514	0.0269	0.0783	0.0000	236.3845	236.3845	0.0294	0.0000	237.1198
Maximum	**1.1598**	**14.2420**	**7.9377**	**0.0182**	**0.2509**	**0.5264**	**0.6746**	**0.0630**	**0.4849**	**0.5045**	**0.0000**	**1,611.6666**	**1,611.6666**	**0.4935**	**0.0000**	**1,624.0033**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2020	0.4432	8.6938	9.2310	0.0182	0.0707	0.3103	0.3810	0.0157	0.3103	0.3260	0.0000	1,611.6649	1,611.6649	0.4935	0.0000	1,624.0015
2021	0.4575	7.6580	8.5784	0.0176	0.2344	0.2714	0.5058	0.0608	0.2712	0.3321	0.0000	1,557.9164	1,557.9164	0.4397	0.0000	1,568.9094
2022	0.0916	0.5641	1.0926	2.6500e-003	0.1929	0.0258	0.2187	0.0496	0.0257	0.0752	0.0000	236.3844	236.3844	0.0294	0.0000	237.1197
Maximum	**0.4575**	**8.6938**	**9.2310**	**0.0182**	**0.2344**	**0.3103**	**0.5058**	**0.0608**	**0.3103**	**0.3321**	**0.0000**	**1,611.6649**	**1,611.6649**	**0.4935**	**0.0000**	**1,624.0015**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**57.10**	**36.27**	**-18.45**	**0.00**	**11.78**	**37.95**	**28.38**	**5.88**	**32.66**	**29.19**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2020**	**3-31-2020**	1.6802	1.0421
2	**4-1-2020**	**6-30-2020**	4.5295	2.6729
3	**7-1-2020**	**9-30-2020**	4.5793	2.7023
4	**10-1-2020**	**12-31-2020**	4.5726	2.6956
5	**1-1-2021**	**3-31-2021**	4.1157	2.6282
6	**4-1-2021**	**6-30-2021**	4.1678	2.6638
7	**7-1-2021**	**9-30-2021**	4.1270	2.6391
8	**10-1-2021**	**12-31-2021**	0.2330	0.2105
9	**1-1-2022**	**3-31-2022**	0.2066	0.1969
10	**4-1-2022**	**6-30-2022**	0.9690	0.6941
		Highest	4.5793	2.7023

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site PreparationWI1and2	Site Preparation	1/1/2020	1/28/2020	5	20	
2	Site PreparationWI3	Site Preparation	1/29/2020	3/3/2020	5	25	
3	GradingWI4	Grading	3/4/2020	9/28/2021	5	410	
4	Building ConstructionWI5	Building Construction	9/29/2021	4/5/2022	5	135	
5	GradingWI6i	Grading	4/6/2022	5/10/2022	5	25	
6	GradingWI6iiand7	Grading	5/11/2022	6/14/2022	5	25	

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 26

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site PreparationWI1and2	Air Compressors	0	6.00	78	0.48
Site PreparationWI1and2	Crawler Tractors	1	4.00	212	0.43
Site PreparationWI1and2	Pumps	2	8.00	84	0.74
Site PreparationWI1and2	Rubber Tired Dozers	0	8.00	247	0.40
Site PreparationWI1and2	Tractors/Loaders/Backhoes	2	8.00	97	0.37
Site PreparationWI3	Crushing/Proc. Equipment	1	8.00	85	0.78
Site PreparationWI3	Excavators	1	8.00	158	0.38
Site PreparationWI3	Rubber Tired Dozers	0	8.00	247	0.40
Site PreparationWI3	Tractors/Loaders/Backhoes	1	8.00	97	0.37
GradingWI4	Concrete/Industrial Saws	0		81	0.73
GradingWI4	Crawler Tractors	3	8.00	212	0.43
GradingWI4	Excavators	0	8.00	158	0.38
GradingWI4	Graders	1	8.00	187	0.41
GradingWI4	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI4	Scrapers	8	8.00	367	0.48
GradingWI4	Tractors/Loaders/Backhoes	0	8.00	97	0.37
Building ConstructionWI5	Cranes	0	7.00	231	0.29
Building ConstructionWI5	Forklifts	1	8.00	89	0.20
Building ConstructionWI5	Generator Sets	0	8.00	84	0.74
Building ConstructionWI5	Tractors/Loaders/Backhoes	1	8.00	97	0.37
Building ConstructionWI5	Welders	0	8.00	46	0.45
GradingWI6i	Crawler Tractors	1	8.00	212	0.43
GradingWI6i	Excavators	0	8.00	158	0.38
GradingWI6i	Graders	1	8.00	187	0.41
GradingWI6i	Pumps	1	8.00	84	0.74
GradingWI6i	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI6i	Scrapers	1	8.00	367	0.48
GradingWI6i	Tractors/Loaders/Backhoes	0	8.00	97	0.37
GradingWI6iiand7	Crawler Tractors	1	8.00	212	0.43

GradingWI6iiand7	Excavators	0	8.00	158	0.38
GradingWI6iiand7	Graders	1	8.00	187	0.41
GradingWI6iiand7	Pavers	0		130	0.42
GradingWI6iiand7	Paving Equipment	0		132	0.36
GradingWI6iiand7	Pumps	1	8.00	84	0.74
GradingWI6iiand7	Rollers	0		80	0.38
GradingWI6iiand7	Rubber Tired Dozers	0	8.00	247	0.40
GradingWI6iiand7	Scrapers	1	8.00	367	0.48
GradingWI6iiand7	Tractors/Loaders/Backhoes	0	8.00	97	0.37

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site PreparationWI1and2	5	13.00	3.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT
Site PreparationWI3	3	8.00	1.00	2.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
GradingWI4	12	30.00	3.00	20,800.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
Building ConstructionWI5	2	476.00	1.00	1.00	15.00	6.90	1.00	LD_Mix	HDT_Mix	HHDT
GradingWI6i	4	10.00	1.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT
GradingWI6iiand7	4	10.00	3.00	0.00	15.00	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site PreparationWI1and2 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0138	0.0000	0.0138	1.4900e-003	0.0000	1.4900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0156	0.1499	0.1333	2.3000e-004		8.2100e-003	8.2100e-003		7.8800e-003	7.8800e-003	0.0000	20.2103	20.2103	3.5600e-003	0.0000	20.2992
Total	**0.0156**	**0.1499**	**0.1333**	**2.3000e-004**	**0.0138**	**8.2100e-003**	**0.0220**	**1.4900e-003**	**7.8800e-003**	**9.3700e-003**	**0.0000**	**20.2103**	**20.2103**	**3.5600e-003**	**0.0000**	**20.2992**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.1200e-003	6.1000e-004	1.0000e-005	1.9000e-004	2.0000e-005	2.1000e-004	5.0000e-005	2.0000e-005	7.0000e-005	0.0000	0.7377	0.7377	6.0000e-005	0.0000	0.7391
Worker	6.1000e-004	4.3000e-004	4.5500e-003	1.0000e-005	1.4600e-003	1.0000e-005	1.4700e-003	3.9000e-004	1.0000e-005	4.0000e-004	0.0000	1.2193	1.2193	3.0000e-005	0.0000	1.2201
Total	**7.0000e-004**	**3.5500e-003**	**5.1600e-003**	**2.0000e-005**	**1.6500e-003**	**3.0000e-005**	**1.6800e-003**	**4.4000e-004**	**3.0000e-005**	**4.7000e-004**	**0.0000**	**1.9570**	**1.9570**	**9.0000e-005**	**0.0000**	**1.9592**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3800e-003	0.0000	5.3800e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	5.1200e-003	0.1134	0.1489	2.3000e-004		7.3500e-003	7.3500e-003		7.3500e-003	7.3500e-003	0.0000	20.2102	20.2102	3.5600e-003	0.0000	20.2992
Total	**5.1200e-003**	**0.1134**	**0.1489**	**2.3000e-004**	**5.3800e-003**	**7.3500e-003**	**0.0127**	**5.8000e-004**	**7.3500e-003**	**7.9300e-003**	**0.0000**	**20.2102**	**20.2102**	**3.5600e-003**	**0.0000**	**20.2992**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	9.0000e-005	3.1200e-003	6.1000e-004	1.0000e-005	1.9000e-004	2.0000e-005	2.1000e-004	5.0000e-005	2.0000e-005	7.0000e-005	0.0000	0.7377	0.7377	6.0000e-005	0.0000	0.7391
Worker	6.1000e-004	4.3000e-004	4.5500e-003	1.0000e-005	1.4600e-003	1.0000e-005	1.4700e-003	3.9000e-004	1.0000e-005	4.0000e-004	0.0000	1.2193	1.2193	3.0000e-005	0.0000	1.2201
Total	**7.0000e-004**	**3.5500e-003**	**5.1600e-003**	**2.0000e-005**	**1.6500e-003**	**3.0000e-005**	**1.6800e-003**	**4.4000e-004**	**3.0000e-005**	**4.7000e-004**	**0.0000**	**1.9570**	**1.9570**	**9.0000e-005**	**0.0000**	**1.9592**

3.3 Site PreparationWI3 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0138	0.0000	0.0138	1.4900e-003	0.0000	1.4900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0126	0.1040	0.1238	1.9000e-004		6.1400e-003	6.1400e-003		5.8900e-003	5.8900e-003	0.0000	16.6176	16.6176	3.4900e-003	0.0000	16.7049
Total	**0.0126**	**0.1040**	**0.1238**	**1.9000e-004**	**0.0138**	**6.1400e-003**	**0.0199**	**1.4900e-003**	**5.8900e-003**	**7.3800e-003**	**0.0000**	**16.6176**	**16.6176**	**3.4900e-003**	**0.0000**	**16.7049**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.1000e-004	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0164	0.0164	0.0000	0.0000	0.0165
Vendor	4.0000e-005	1.3000e-003	2.5000e-004	0.0000	8.0000e-005	1.0000e-005	9.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005	0.0000	0.3074	0.3074	2.0000e-005	0.0000	0.3080
Worker	4.7000e-004	3.3000e-004	3.5000e-003	1.0000e-005	1.1200e-003	1.0000e-005	1.1300e-003	3.0000e-004	1.0000e-005	3.0000e-004	0.0000	0.9380	0.9380	2.0000e-005	0.0000	0.9385
Total	**5.1000e-004**	**1.7400e-003**	**3.7600e-003**	**1.0000e-005**	**1.2000e-003**	**2.0000e-005**	**1.2200e-003**	**3.2000e-004**	**2.0000e-005**	**3.3000e-004**	**0.0000**	**1.2617**	**1.2617**	**4.0000e-005**	**0.0000**	**1.2630**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3800e-003	0.0000	5.3800e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	4.2900e-003	0.0924	0.1323	1.9000e-004		5.8100e-003	5.8100e-003		5.8100e-003	5.8100e-003	0.0000	16.6175	16.6175	3.4900e-003	0.0000	16.7049
Total	**4.2900e-003**	**0.0924**	**0.1323**	**1.9000e-004**	**5.3800e-003**	**5.8100e-003**	**0.0112**	**5.8000e-004**	**5.8100e-003**	**6.3900e-003**	**0.0000**	**16.6175**	**16.6175**	**3.4900e-003**	**0.0000**	**16.7049**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	1.1000e-004	1.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0164	0.0164	0.0000	0.0000	0.0165
Vendor	4.0000e-005	1.3000e-003	2.5000e-004	0.0000	8.0000e-005	1.0000e-005	9.0000e-005	2.0000e-005	1.0000e-005	3.0000e-005	0.0000	0.3074	0.3074	2.0000e-005	0.0000	0.3080
Worker	4.7000e-004	3.3000e-004	3.5000e-003	1.0000e-005	1.1200e-003	1.0000e-005	1.1300e-003	3.0000e-004	1.0000e-005	3.0000e-004	0.0000	0.9380	0.9380	2.0000e-005	0.0000	0.9385
Total	**5.1000e-004**	**1.7400e-003**	**3.7600e-003**	**1.0000e-005**	**1.2000e-003**	**2.0000e-005**	**1.2200e-003**	**3.2000e-004**	**2.0000e-005**	**3.3000e-004**	**0.0000**	**1.2617**	**1.2617**	**4.0000e-005**	**0.0000**	**1.2630**

3.4 GradingWI4 - 2020

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0270	0.0000	0.0270	3.4800e-003	0.0000	3.4800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	1.1019	13.3113	7.4847	0.0164		0.5112	0.5112		0.4703	0.4703	0.0000	1,442.9776	1,442.9776	0.4667	0.0000	1,454.6448
Total	**1.1019**	**13.3113**	**7.4847**	**0.0164**	**0.0270**	**0.5112**	**0.5381**	**3.4800e-003**	**0.4703**	**0.4737**	**0.0000**	**1,442.9776**	**1,442.9776**	**0.4667**	**0.0000**	**1,454.6448**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0125	0.6270	0.0665	9.4000e-004	8.0300e-003	4.3000e-004	8.4600e-003	2.1200e-003	4.1000e-004	2.5300e-003	0.0000	90.1086	90.1086	0.0182	0.0000	90.5632
Vendor	9.2000e-004	0.0339	6.6200e-003	8.0000e-005	2.0600e-003	1.9000e-004	2.2500e-003	5.9000e-004	1.8000e-004	7.8000e-004	0.0000	8.0036	8.0036	6.4000e-004	0.0000	8.0196
Worker	0.0152	0.0107	0.1139	3.4000e-004	0.0365	2.2000e-004	0.0367	9.6900e-003	2.1000e-004	9.9000e-003	0.0000	30.5303	30.5303	7.6000e-004	0.0000	30.5493
Total	**0.0286**	**0.6715**	**0.1870**	**1.3600e-003**	**0.0466**	**8.4000e-004**	**0.0474**	**0.0124**	**8.0000e-004**	**0.0132**	**0.0000**	**128.6425**	**128.6425**	**0.0196**	**0.0000**	**129.1322**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0105	0.0000	0.0105	1.3600e-003	0.0000	1.3600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.4040	7.8111	8.7538	0.0164		0.2963	0.2963		0.2963	0.2963	0.0000	1,442.9759	1,442.9759	0.4667	0.0000	1,454.6431
Total	**0.4040**	**7.8111**	**8.7538**	**0.0164**	**0.0105**	**0.2963**	**0.3068**	**1.3600e-003**	**0.2963**	**0.2976**	**0.0000**	**1,442.9759**	**1,442.9759**	**0.4667**	**0.0000**	**1,454.6431**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0125	0.6270	0.0665	9.4000e-004	8.0300e-003	4.3000e-004	8.4600e-003	2.1200e-003	4.1000e-004	2.5300e-003	0.0000	90.1086	90.1086	0.0182	0.0000	90.5632
Vendor	9.2000e-004	0.0339	6.6200e-003	8.0000e-005	2.0600e-003	1.9000e-004	2.2500e-003	5.9000e-004	1.8000e-004	7.8000e-004	0.0000	8.0036	8.0036	6.4000e-004	0.0000	8.0196
Worker	0.0152	0.0107	0.1139	3.4000e-004	0.0365	2.2000e-004	0.0367	9.6900e-003	2.1000e-004	9.9000e-003	0.0000	30.5303	30.5303	7.6000e-004	0.0000	30.5493
Total	**0.0286**	**0.6715**	**0.1870**	**1.3600e-003**	**0.0466**	**8.4000e-004**	**0.0474**	**0.0124**	**8.0000e-004**	**0.0132**	**0.0000**	**128.6425**	**128.6425**	**0.0196**	**0.0000**	**129.1322**

3.4 GradingWI4 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0270	0.0000	0.0270	3.4800e-003	0.0000	3.4800e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.9208	10.8515	6.2831	0.0146		0.4155	0.4155		0.3822	0.3822	0.0000	1,283.9159	1,283.9159	0.4152	0.0000	1,294.2970
Total	**0.9208**	**10.8515**	**6.2831**	**0.0146**	**0.0270**	**0.4155**	**0.4424**	**3.4800e-003**	**0.3822**	**0.3857**	**0.0000**	**1,283.9159**	**1,283.9159**	**0.4152**	**0.0000**	**1,294.2970**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0105	0.5363	0.0566	8.3000e-004	7.8900e-003	3.3000e-004	8.2200e-003	2.0700e-003	3.1000e-004	2.3800e-003	0.0000	79.2904	79.2904	0.0154	0.0000	79.6747
Vendor	6.9000e-004	0.0270	5.1900e-003	7.0000e-005	1.8300e-003	5.0000e-005	1.8800e-003	5.3000e-004	5.0000e-005	5.8000e-004	0.0000	7.0630	7.0630	5.4000e-004	0.0000	7.0765
Worker	0.0126	8.5200e-003	0.0928	2.9000e-004	0.0325	1.9000e-004	0.0327	8.6200e-003	1.8000e-004	8.8000e-003	0.0000	26.2457	26.2457	6.1000e-004	0.0000	26.2610
Total	**0.0238**	**0.5718**	**0.1545**	**1.1900e-003**	**0.0422**	**5.7000e-004**	**0.0428**	**0.0112**	**5.4000e-004**	**0.0118**	**0.0000**	**112.5992**	**112.5992**	**0.0165**	**0.0000**	**113.0122**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0105	0.0000	0.0105	1.3600e-003	0.0000	1.3600e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.3593	6.9472	7.7857	0.0146		0.2635	0.2635		0.2635	0.2635	0.0000	1,283.9144	1,283.9144	0.4152	0.0000	1,294.2955
Total	**0.3593**	**6.9472**	**7.7857**	**0.0146**	**0.0105**	**0.2635**	**0.2740**	**1.3600e-003**	**0.2635**	**0.2649**	**0.0000**	**1,283.9144**	**1,283.9144**	**0.4152**	**0.0000**	**1,294.2955**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0105	0.5363	0.0566	8.3000e-004	7.8900e-003	3.3000e-004	8.2200e-003	2.0700e-003	3.1000e-004	2.3800e-003	0.0000	79.2904	79.2904	0.0154	0.0000	79.6747
Vendor	6.9000e-004	0.0270	5.1900e-003	7.0000e-005	1.8300e-003	5.0000e-005	1.8800e-003	5.3000e-004	5.0000e-005	5.8000e-004	0.0000	7.0630	7.0630	5.4000e-004	0.0000	7.0765
Worker	0.0126	8.5200e-003	0.0928	2.9000e-004	0.0325	1.9000e-004	0.0327	8.6200e-003	1.8000e-004	8.8000e-003	0.0000	26.2457	26.2457	6.1000e-004	0.0000	26.2610
Total	**0.0238**	**0.5718**	**0.1545**	**1.1900e-003**	**0.0422**	**5.7000e-004**	**0.0428**	**0.0112**	**5.4000e-004**	**0.0118**	**0.0000**	**112.5992**	**112.5992**	**0.0165**	**0.0000**	**113.0122**

3.5 Building ConstructionWI5 - 2021

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	0.0108	0.1046	0.1166	1.6000e-004		6.6500e-003	6.6500e-003		6.1100e-003	6.1100e-003	0.0000	13.8470	13.8470	4.4800e-003	0.0000	13.9589
Total	**0.0108**	**0.1046**	**0.1166**	**1.6000e-004**		**6.6500e-003**	**6.6500e-003**		**6.1100e-003**	**6.1100e-003**	**0.0000**	**13.8470**	**13.8470**	**4.4800e-003**	**0.0000**	**13.9589**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.0800e-003	4.0800e-003	0.0000	0.0000	4.1000e-003
Vendor	8.0000e-005	3.1700e-003	6.1000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.8295	0.8295	6.0000e-005	0.0000	0.8311
Worker	0.0705	0.0476	0.5185	1.6200e-003	0.1815	1.0900e-003	0.1826	0.0482	1.0000e-003	0.0492	0.0000	146.7223	146.7223	3.4100e-003	0.0000	146.8076
Total	**0.0705**	**0.0508**	**0.5191**	**1.6300e-003**	**0.1817**	**1.1000e-003**	**0.1828**	**0.0483**	**1.0100e-003**	**0.0493**	**0.0000**	**147.5559**	**147.5559**	**3.4700e-003**	**0.0000**	**147.6428**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8600e-003	0.0882	0.1191	1.6000e-004		6.1800e-003	6.1800e-003		6.1800e-003	6.1800e-003	0.0000	13.8469	13.8469	4.4800e-003	0.0000	13.9589
Total	**3.8600e-003**	**0.0882**	**0.1191**	**1.6000e-004**		**6.1800e-003**	**6.1800e-003**		**6.1800e-003**	**6.1800e-003**	**0.0000**	**13.8469**	**13.8469**	**4.4800e-003**	**0.0000**	**13.9589**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	4.0800e-003	4.0800e-003	0.0000	0.0000	4.1000e-003
Vendor	8.0000e-005	3.1700e-003	6.1000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.8295	0.8295	6.0000e-005	0.0000	0.8311
Worker	0.0705	0.0476	0.5185	1.6200e-003	0.1815	1.0900e-003	0.1826	0.0482	1.0000e-003	0.0492	0.0000	146.7223	146.7223	3.4100e-003	0.0000	146.8076
Total	**0.0705**	**0.0508**	**0.5191**	**1.6300e-003**	**0.1817**	**1.1000e-003**	**0.1828**	**0.0483**	**1.0100e-003**	**0.0493**	**0.0000**	**147.5559**	**147.5559**	**3.4700e-003**	**0.0000**	**147.6428**

3.5 Building ConstructionWI5 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	9.3200e-003	0.0915	0.1136	1.6000e-004		5.3600e-003	5.3600e-003		4.9300e-003	4.9300e-003	0.0000	13.6536	13.6536	4.4200e-003	0.0000	13.7640
Total	**9.3200e-003**	**0.0915**	**0.1136**	**1.6000e-004**		**5.3600e-003**	**5.3600e-003**		**4.9300e-003**	**4.9300e-003**	**0.0000**	**13.6536**	**13.6536**	**4.4200e-003**	**0.0000**	**13.7640**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.9800e-003	3.9800e-003	0.0000	0.0000	4.0000e-003
Vendor	7.0000e-005	2.9400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.8103	0.8103	6.0000e-005	0.0000	0.8118
Worker	0.0651	0.0422	0.4706	1.5400e-003	0.1788	1.0400e-003	0.1799	0.0475	9.6000e-004	0.0485	0.0000	139.2891	139.2891	3.0200e-003	0.0000	139.3647
Total	**0.0651**	**0.0452**	**0.4712**	**1.5500e-003**	**0.1791**	**1.0500e-003**	**0.1801**	**0.0476**	**9.6000e-004**	**0.0485**	**0.0000**	**140.1034**	**140.1034**	**3.0800e-003**	**0.0000**	**140.1804**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Off-Road	3.8100e-003	0.0869	0.1174	1.6000e-004		6.0900e-003	6.0900e-003		6.0900e-003	6.0900e-003	0.0000	13.6536	13.6536	4.4200e-003	0.0000	13.7640
Total	**3.8100e-003**	**0.0869**	**0.1174**	**1.6000e-004**		**6.0900e-003**	**6.0900e-003**		**6.0900e-003**	**6.0900e-003**	**0.0000**	**13.6536**	**13.6536**	**4.4200e-003**	**0.0000**	**13.7640**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	3.0000e-005	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	3.9800e-003	3.9800e-003	0.0000	0.0000	4.0000e-003
Vendor	7.0000e-005	2.9400e-003	5.6000e-004	1.0000e-005	2.1000e-004	1.0000e-005	2.2000e-004	6.0000e-005	0.0000	7.0000e-005	0.0000	0.8103	0.8103	6.0000e-005	0.0000	0.8118
Worker	0.0651	0.0422	0.4706	1.5400e-003	0.1788	1.0400e-003	0.1799	0.0475	9.6000e-004	0.0485	0.0000	139.2891	139.2891	3.0200e-003	0.0000	139.3647
Total	**0.0651**	**0.0452**	**0.4712**	**1.5500e-003**	**0.1791**	**1.0500e-003**	**0.1801**	**0.0476**	**9.6000e-004**	**0.0485**	**0.0000**	**140.1034**	**140.1034**	**3.0800e-003**	**0.0000**	**140.1804**

3.6 GradingWl6i - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0138	0.0000	0.0138	1.4900e-003	0.0000	1.4900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0260	0.2897	0.1768	4.5000e-004		0.0112	0.0112		0.0105	0.0105	0.0000	39.6172	39.6172	0.0109	0.0000	39.8894
Total	**0.0260**	**0.2897**	**0.1768**	**4.5000e-004**	**0.0138**	**0.0112**	**0.0250**	**1.4900e-003**	**0.0105**	**0.0120**	**0.0000**	**39.6172**	**39.6172**	**0.0109**	**0.0000**	**39.8894**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.1000e-003	2.1000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.3023	0.3023	2.0000e-005	0.0000	0.3029
Worker	5.1000e-004	3.3000e-004	3.6900e-003	1.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.0919	1.0919	2.0000e-005	0.0000	1.0925
Total	**5.4000e-004**	**1.4300e-003**	**3.9000e-003**	**1.0000e-005**	**1.4800e-003**	**1.0000e-005**	**1.4900e-003**	**3.9000e-004**	**1.0000e-005**	**4.0000e-004**	**0.0000**	**1.3942**	**1.3942**	**4.0000e-005**	**0.0000**	**1.3954**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3800e-003	0.0000	5.3800e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0107	0.2135	0.2479	4.5000e-004		9.3000e-003	9.3000e-003		9.3000e-003	9.3000e-003	0.0000	39.6172	39.6172	0.0109	0.0000	39.8894
Total	**0.0107**	**0.2135**	**0.2479**	**4.5000e-004**	**5.3800e-003**	**9.3000e-003**	**0.0147**	**5.8000e-004**	**9.3000e-003**	**9.8800e-003**	**0.0000**	**39.6172**	**39.6172**	**0.0109**	**0.0000**	**39.8894**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	3.0000e-005	1.1000e-003	2.1000e-004	0.0000	8.0000e-005	0.0000	8.0000e-005	2.0000e-005	0.0000	2.0000e-005	0.0000	0.3023	0.3023	2.0000e-005	0.0000	0.3029
Worker	5.1000e-004	3.3000e-004	3.6900e-003	1.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.0919	1.0919	2.0000e-005	0.0000	1.0925
Total	**5.4000e-004**	**1.4300e-003**	**3.9000e-003**	**1.0000e-005**	**1.4800e-003**	**1.0000e-005**	**1.4900e-003**	**3.9000e-004**	**1.0000e-005**	**4.0000e-004**	**0.0000**	**1.3942**	**1.3942**	**4.0000e-005**	**0.0000**	**1.3954**

3.7 GradingWI6iiand7 - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0138	0.0000	0.0138	1.4900e-003	0.0000	1.4900e-003	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0260	0.2897	0.1768	4.5000e-004		0.0112	0.0112		0.0105	0.0105	0.0000	39.6172	39.6172	0.0109	0.0000	39.8894
Total	**0.0260**	**0.2897**	**0.1768**	**4.5000e-004**	**0.0138**	**0.0112**	**0.0250**	**1.4900e-003**	**0.0105**	**0.0120**	**0.0000**	**39.6172**	**39.6172**	**0.0109**	**0.0000**	**39.8894**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0000e-005	3.2900e-003	6.3000e-004	1.0000e-005	2.4000e-004	1.0000e-005	2.4000e-004	7.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9070	0.9070	7.0000e-005	0.0000	0.9087
Worker	5.1000e-004	3.3000e-004	3.6900e-003	1.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.0919	1.0919	2.0000e-005	0.0000	1.0925
Total	**5.9000e-004**	**3.6200e-003**	**4.3200e-003**	**2.0000e-005**	**1.6400e-003**	**2.0000e-005**	**1.6500e-003**	**4.4000e-004**	**2.0000e-005**	**4.5000e-004**	**0.0000**	**1.9989**	**1.9989**	**9.0000e-005**	**0.0000**	**2.0012**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					5.3800e-003	0.0000	5.3800e-003	5.8000e-004	0.0000	5.8000e-004	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.0107	0.2135	0.2479	4.5000e-004		9.3000e-003	9.3000e-003		9.3000e-003	9.3000e-003	0.0000	39.6172	39.6172	0.0109	0.0000	39.8894
Total	**0.0107**	**0.2135**	**0.2479**	**4.5000e-004**	**5.3800e-003**	**9.3000e-003**	**0.0147**	**5.8000e-004**	**9.3000e-003**	**9.8800e-003**	**0.0000**	**39.6172**	**39.6172**	**0.0109**	**0.0000**	**39.8894**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	8.0000e-005	3.2900e-003	6.3000e-004	1.0000e-005	2.4000e-004	1.0000e-005	2.4000e-004	7.0000e-005	1.0000e-005	7.0000e-005	0.0000	0.9070	0.9070	7.0000e-005	0.0000	0.9087
Worker	5.1000e-004	3.3000e-004	3.6900e-003	1.0000e-005	1.4000e-003	1.0000e-005	1.4100e-003	3.7000e-004	1.0000e-005	3.8000e-004	0.0000	1.0919	1.0919	2.0000e-005	0.0000	1.0925
Total	**5.9000e-004**	**3.6200e-003**	**4.3200e-003**	**2.0000e-005**	**1.6400e-003**	**2.0000e-005**	**1.6500e-003**	**4.4000e-004**	**2.0000e-005**	**4.5000e-004**	**0.0000**	**1.9989**	**1.9989**	**9.0000e-005**	**0.0000**	**2.0012**

6842 BLIP operational equipment - no construction

Riverside-South Coast County, Annual

1.0 Project Characteristics

1.1 Land Usage

Land Uses	Size	Metric	Lot Acreage	Floor Surface Area	Population
Other Non-Asphalt Surfaces	250.00	Acre	250.00	10,890,000.00	0

1.2 Other Project Characteristics

Urbanization	Urban	**Wind Speed (m/s)**	2.4	**Precipitation Freq (Days)**	28
Climate Zone	10			**Operational Year**	2022
Utility Company	Southern California Edison				
CO2 Intensity (lb/MWhr)	702.44	**CH4 Intensity (lb/MWhr)**	0.029	**N2O Intensity (lb/MWhr)**	0.006

1.3 User Entered Comments & Non-Default Data

Project Characteristics - Construction analyzed under separate CalEEMod run. Operational off-road vehicle analysis (plus extra waste delivery trips) only.

Land Use - Project site will be expanded from 150 acres to 400 acres; expansion of refuse area footprint = 250 acres

Construction Phase - Project anticipated to be operational in 2022; therefore, onsite heavy equipment was analyzed for a full year in 2022, operating 7 days a week

Off-road Equipment -

Off-road Equipment - Additional operational equip: 1 grinder (850 HP), 1 trommel screen (205 HP), 1 compost turner (255 HP), 1 wheeled loader, and 1 landfill tipper (other const equip)

Trips and VMT - Off-site trips calculated in operational emissions.

Grading - Expansion refuse area is 250 acres

Vehicle Trips - Adding 30 HHDT transfer trucks (60 trips/day) over 250 acres = 0.24 trips/acre. Operating Mon-Sat. One-way trip = 8.75 mi for C-W only (100% of the additional trips).

Consumer Products -

Area Coating - No coating

Energy Use -

Construction Off-road Equipment Mitigation - All additional equipment will have at least Tier 3 engines

Mobile Land Use Mitigation -

Fleet Mix - All additional vehicles are HHD transfer trucks

Table Name	Column Name	Default Value	New Value
tblAreaCoating	Area_Parking	653400	0
tblConstDustMitigation	WaterUnpavedRoadVehicleSpeed	0	15
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	NumberOfEquipmentMitigated	0.00	1.00
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstEquipMitigation	Tier	No Change	Tier 3
tblConstructionPhase	NumDays	180.00	365.00
tblConstructionPhase	NumDaysWeek	5.00	7.00
tblFleetMix	HHD	0.07	1.00
tblFleetMix	LDA	0.55	0.00
tblFleetMix	LDT1	0.04	0.00
tblFleetMix	LDT2	0.19	0.00
tblFleetMix	LHD1	0.02	0.00
tblFleetMix	LHD2	4.9700e-003	0.00

tblFleetMix	MCY	4.5470e-003	0.00
tblFleetMix	MDV	0.12	0.00
tblFleetMix	MH	9.6500e-004	0.00
tblFleetMix	MHD	0.02	0.00
tblFleetMix	OBUS	1.3970e-003	0.00
tblFleetMix	SBUS	9.3200e-004	0.00
tblFleetMix	UBUS	1.1600e-003	0.00
tblOffRoadEquipment	HorsePower	85.00	850.00
tblOffRoadEquipment	HorsePower	168.00	205.00
tblOffRoadEquipment	HorsePower	247.00	0.00
tblOffRoadEquipment	HorsePower	97.00	255.00
tblOffRoadEquipment	LoadFactor	0.40	0.59
tblOffRoadEquipment	LoadFactor	0.40	0.00
tblOffRoadEquipment	LoadFactor	0.37	0.55
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	3.00	0.00
tblOffRoadEquipment	OffRoadEquipmentUnitAmount	4.00	1.00
tblOffRoadEquipment	UsageHours	8.00	0.00
tblTripsAndVMT	WorkerTripNumber	13.00	0.00
tblVehicleTrips	CW_TL	16.60	8.75
tblVehicleTrips	CW_TTP	0.00	100.00
tblVehicleTrips	PR_TP	0.00	100.00
tblVehicleTrips	ST_TR	0.00	0.24
tblVehicleTrips	SU_TR	0.00	0.24
tblVehicleTrips	WD_TR	0.00	0.24

2.0 Emissions Summary

2.1 Overall Construction

Unmitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.2832	2.8412	2.0735	6.3500e-003	0.0000	0.1109	0.1109	0.0000	0.1020	0.1020	0.0000	558.0247	558.0247	0.1805	0.0000	562.5366
Maximum	**0.2832**	**2.8412**	**2.0735**	**6.3500e-003**	**0.0000**	**0.1109**	**0.1109**	**0.0000**	**0.1020**	**0.1020**	**0.0000**	**558.0247**	**558.0247**	**0.1805**	**0.0000**	**562.5366**

Mitigated Construction

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Year	tons/yr										MT/yr					
2022	0.1570	3.0357	3.6578	6.3500e-003	0.0000	0.1207	0.1207	0.0000	0.1207	0.1207	0.0000	558.0240	558.0240	0.1805	0.0000	562.5359
Maximum	**0.1570**	**3.0357**	**3.6578**	**6.3500e-003**	**0.0000**	**0.1207**	**0.1207**	**0.0000**	**0.1207**	**0.1207**	**0.0000**	**558.0240**	**558.0240**	**0.1805**	**0.0000**	**562.5359**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**44.56**	**-6.84**	**-76.41**	**0.00**	**0.00**	**-8.84**	**-8.84**	**0.00**	**-18.32**	**-18.32**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

Quarter	Start Date	End Date	Maximum Unmitigated ROG + NOX (tons/quarter)	Maximum Mitigated ROG + NOX (tons/quarter)
1	**1-1-2022**	**3-31-2022**	0.7704	0.7872
2	**4-1-2022**	**6-30-2022**	0.7790	0.7960
3	**7-1-2022**	**9-30-2022**	0.7875	0.8047
		Highest	0.7875	0.8047

2.2 Overall Operational

Unmitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7042	3.0000e-005	3.2000e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.2000e-003	6.2000e-003	2.0000e-005	0.0000	6.6100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0336	1.5728	0.2023	4.3200e-003	0.0823	2.7700e-003	0.0850	0.0226	2.6500e-003	0.0252	0.0000	415.9417	415.9417	0.0378	0.0000	416.8856
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.7379**	**1.5728**	**0.2055**	**4.3200e-003**	**0.0823**	**2.7800e-003**	**0.0850**	**0.0226**	**2.6600e-003**	**0.0252**	**0.0000**	**415.9479**	**415.9479**	**0.0378**	**0.0000**	**416.8922**

Mitigated Operational

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Area	0.7042	3.0000e-005	3.2000e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.2000e-003	6.2000e-003	2.0000e-005	0.0000	6.6100e-003
Energy	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Mobile	0.0336	1.5728	0.2023	4.3200e-003	0.0823	2.7700e-003	0.0850	0.0226	2.6500e-003	0.0252	0.0000	415.9417	415.9417	0.0378	0.0000	416.8856
Waste						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Water						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.7379**	**1.5728**	**0.2055**	**4.3200e-003**	**0.0823**	**2.7800e-003**	**0.0850**	**0.0226**	**2.6600e-003**	**0.0252**	**0.0000**	**415.9479**	**415.9479**	**0.0378**	**0.0000**	**416.8922**

	ROG	**NOx**	**CO**	**SO2**	**Fugitive PM10**	**Exhaust PM10**	**PM10 Total**	**Fugitive PM2.5**	**Exhaust PM2.5**	**PM2.5 Total**	**Bio- CO2**	**NBio-CO2**	**Total CO2**	**CH4**	**N20**	**CO2e**
Percent Reduction	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**	**0.00**

3.0 Construction Detail

Construction Phase

Phase Number	Phase Name	Phase Type	Start Date	End Date	Num Days Week	Num Days	Phase Description
1	Site Preparation	Site Preparation	1/1/2022	12/31/2022	7	365	Onsite operations

Acres of Grading (Site Preparation Phase): 0

Acres of Grading (Grading Phase): 0

Acres of Paving: 250

Residential Indoor: 0; Residential Outdoor: 0; Non-Residential Indoor: 0; Non-Residential Outdoor: 0; Striped Parking Area: 0

OffRoad Equipment

Phase Name	Offroad Equipment Type	Amount	Usage Hours	Horse Power	Load Factor
Site Preparation	Crushing/Proc. Equipment	1	8.00	850	0.78
Site Preparation	Other Construction Equipment	1	8.00	172	0.42
Site Preparation	Other Material Handling Equipment	1	8.00	205	0.59
Site Preparation	Rubber Tired Dozers	0	0.00	0	0.00
Site Preparation	Rubber Tired Loaders	1	8.00	203	0.36
Site Preparation	Tractors/Loaders/Backhoes	1	8.00	255	0.55

Trips and VMT

Phase Name	Offroad Equipment Count	Worker Trip Number	Vendor Trip Number	Hauling Trip Number	Worker Trip Length	Vendor Trip Length	Hauling Trip Length	Worker Vehicle Class	Vendor Vehicle Class	Hauling Vehicle Class
Site Preparation	5	0.00	0.00	0.00	14.70	6.90	20.00	LD_Mix	HDT_Mix	HHDT

3.1 Mitigation Measures Construction

Use Cleaner Engines for Construction Equipment

Water Exposed Area

Reduce Vehicle Speed on Unpaved Roads

3.2 Site Preparation - 2022

Unmitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.2832	2.8412	2.0735	6.3500e-003		0.1109	0.1109		0.1020	0.1020	0.0000	558.0247	558.0247	0.1805	0.0000	562.5366
Total	**0.2832**	**2.8412**	**2.0735**	**6.3500e-003**	**0.0000**	**0.1109**	**0.1109**	**0.0000**	**0.1020**	**0.1020**	**0.0000**	**558.0247**	**558.0247**	**0.1805**	**0.0000**	**562.5366**

Unmitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated Construction On-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Fugitive Dust					0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Off-Road	0.1570	3.0357	3.6578	6.3500e-003		0.1207	0.1207		0.1207	0.1207	0.0000	558.0240	558.0240	0.1805	0.0000	562.5359
Total	**0.1570**	**3.0357**	**3.6578**	**6.3500e-003**	**0.0000**	**0.1207**	**0.1207**	**0.0000**	**0.1207**	**0.1207**	**0.0000**	**558.0240**	**558.0240**	**0.1805**	**0.0000**	**562.5359**

Mitigated Construction Off-Site

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Hauling	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Vendor	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Worker	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

4.0 Operational Detail - Mobile

4.1 Mitigation Measures Mobile

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.0336	1.5728	0.2023	4.3200e-003	0.0823	2.7700e-003	0.0850	0.0226	2.6500e-003	0.0252	0.0000	415.9417	415.9417	0.0378	0.0000	416.8856
Unmitigated	0.0336	1.5728	0.2023	4.3200e-003	0.0823	2.7700e-003	0.0850	0.0226	2.6500e-003	0.0252	0.0000	415.9417	415.9417	0.0378	0.0000	416.8856

4.2 Trip Summary Information

	Average Daily Trip Rate			Unmitigated	Mitigated
Land Use	Weekday	Saturday	Sunday	Annual VMT	Annual VMT
Other Non-Asphalt Surfaces	60.00	60.00	60.00	191,100	191,100
Total	60.00	60.00	60.00	191,100	191,100

4.3 Trip Type Information

	Miles			Trip %			Trip Purpose %		
Land Use	H-W or C-W	H-S or C-C	H-O or C-NW	H-W or C-W	H-S or C-C	H-O or C-NW	Primary	Diverted	Pass-by
Other Non-Asphalt Surfaces	8.75	8.40	6.90	100.00	0.00	0.00	100	0	0

4.4 Fleet Mix

Land Use	LDA	LDT1	LDT2	MDV	LHD1	LHD2	MHD	HHD	OBUS	UBUS	MCY	SBUS	MH
Other Non-Asphalt Surfaces	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000	1.000000	0.000000	0.000000	0.000000	0.000000	0.000000

5.0 Energy Detail

Historical Energy Use: N

5.1 Mitigation Measures Energy

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Electricity Mitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Electricity Unmitigated						0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Mitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
NaturalGas Unmitigated	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

5.2 Energy by Land Use - NaturalGas

Unmitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	NaturalGas Use	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Land Use	kBTU/yr	tons/yr										MT/yr					
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000		0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**		**0.0000**	**0.0000**		**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**	**0.0000**

5.3 Energy by Land Use - Electricity

Unmitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Electricity Use	Total CO2	CH4	N2O	CO2e
Land Use	kWh/yr	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

6.0 Area Detail

6.1 Mitigation Measures Area

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
Category	tons/yr										MT/yr					
Mitigated	0.7042	3.0000e-005	3.2000e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.2000e-003	6.2000e-003	2.0000e-005	0.0000	6.6100e-003
Unmitigated	0.7042	3.0000e-005	3.2000e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.2000e-003	6.2000e-003	2.0000e-005	0.0000	6.6100e-003

6.2 Area by SubCategory

Unmitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-004	3.0000e-005	3.2000e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.2000e-003	6.2000e-003	2.0000e-005	0.0000	6.6100e-003
Total	**0.7043**	**3.0000e-005**	**3.2000e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**6.2000e-003**	**6.2000e-003**	**2.0000e-005**	**0.0000**	**6.6100e-003**

Mitigated

	ROG	NOx	CO	SO2	Fugitive PM10	Exhaust PM10	PM10 Total	Fugitive PM2.5	Exhaust PM2.5	PM2.5 Total	Bio- CO2	NBio- CO2	Total CO2	CH4	N2O	CO2e
SubCategory	tons/yr										MT/yr					
Architectural Coating	0.0000					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Consumer Products	0.7040					0.0000	0.0000		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Landscaping	3.0000e-004	3.0000e-005	3.2000e-003	0.0000		1.0000e-005	1.0000e-005		1.0000e-005	1.0000e-005	0.0000	6.2000e-003	6.2000e-003	2.0000e-005	0.0000	6.6100e-003
Total	**0.7043**	**3.0000e-005**	**3.2000e-003**	**0.0000**		**1.0000e-005**	**1.0000e-005**		**1.0000e-005**	**1.0000e-005**	**0.0000**	**6.2000e-003**	**6.2000e-003**	**2.0000e-005**	**0.0000**	**6.6100e-003**

7.0 Water Detail

7.1 Mitigation Measures Water

	Total CO2	CH4	N2O	CO2e
Category	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

7.2 Water by Land Use

Unmitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Indoor/Outdoor Use	Total CO2	CH4	N2O	CO2e
Land Use	Mgal	MT/yr			
Other Non-Asphalt Surfaces	0 / 0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

8.0 Waste Detail

8.1 Mitigation Measures Waste

Category/Year

	Total CO2	CH4	N2O	CO2e
	MT/yr			
Mitigated	0.0000	0.0000	0.0000	0.0000
Unmitigated	0.0000	0.0000	0.0000	0.0000

8.2 Waste by Land Use

Unmitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

Mitigated

	Waste Disposed	Total CO2	CH4	N2O	CO2e
Land Use	tons	MT/yr			
Other Non-Asphalt Surfaces	0	0.0000	0.0000	0.0000	0.0000
Total		**0.0000**	**0.0000**	**0.0000**	**0.0000**

9.0 Operational Offroad

Equipment Type	Number	Hours/Day	Days/Year	Horse Power	Load Factor	Fuel Type

10.0 Stationary Equipment

Fire Pumps and Emergency Generators

Equipment Type	Number	Hours/Day	Hours/Year	Horse Power	Load Factor	Fuel Type

Boilers

Equipment Type	Number	Heat Input/Day	Heat Input/Year	Boiler Rating	Fuel Type

User Defined Equipment

Equipment Type	Number

11.0 Vegetation

APPENDIX D

WARM MODEL PRINTOUTS

GHG Emissions Analysis -- Summary Report

Version 14

GHG Emissions Waste Management Analysis for BLIP
Prepared by: Ganddini Group
Project Period for this Analysis: 01/01/22 to 12/31/22

Note: If you wish to save these results, rename this file (e.g., WARM-MN1) and save it. Then the "Analysis Inputs" sheet of the "WARM" file will be blank when you are ready to make another model run.

GHG Emissions from Baseline Waste Management (MTCO$_2$E): 6,701.69

Material	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total MTCO$_2$E
Yard Trimmings	NA	73,000.00	-	-	-	(13,126.27)
Food Waste	NA	36,500.00	-	-	-	19,827.95
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						0
						0
						0
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GHG Emissions from Alternative Waste Management Scenario (MTCO$_2$E): (11,977.01)

Material	Tons Source Reduced	Tons Recycled	Tons Landfilled	Tons Combusted	Tons Composted	Tons Anaerobically Digested	Total MTCO$_2$E
Yard Trimmings	NA	NA	3,650.00	-	69,350.00	-	(10,803.05)
Food Waste	-	NA	7,300.00	-	29,200.00	-	(1,173.96)
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Change (Alt - Base) MTCO$_2$E
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Total Change in GHG Emissions (MTCO$_2$E): (18,678.70)

Note: a negative value (i.e., a value in parentheses) indicates an emission reduction; a positive value indicates an emission increase.

This is equivalent to...

Removing annual emissions from	**3,932**	Passenger Vehicles
Conserving	**2,101,800**	Gallons of Gasoline
Conserving	**778,279**	Cylinders of Propane Used for Home Barbeques
	0.00107%	Annual CO$_2$ emissions from the U.S. transportation sector
	0.00092%	Annual CO$_2$ emissions from the U.S. electricity sector

a) For explanation of methodology, see the EPA WARM Documentation:
Documentation Chapters for Greenhouse Gas Emission and Energy Factors Used in the Waste Reduction Model (WARM)
-- available on the Internet at https://www.epa.gov/warm/documentation-chapters-greenhouse-gas-emission-and-energy-factors-used-waste-reduction-model
b) Emissions estimates provided by this model are intended to support voluntary GHG measurement and reporting initiatives.

c) The GHG emissions results estimated in WARM indicate the full life-cycle benefits waste management alternatives. Due to the timing of the GHG emissions from the waste management pathways, (e.g., avoided landfilling and increased recycling), the actual GHG implications may accrue over the long-term. Therefore, one should not interpret the GHG emissions implications as occurring all in one year, but rather through time.

GANDDINI GROUP, INC.
550 Parkcenter Drive, Suite 202, Santa Ana, CA 92705
714.795.3100 | www.ganddini.com

Joint Project Review (JPR)

Regional
Conservation
Authority
Western Riverside County

3403 10th Street, Suite 320
Riverside, California 92501

P.O. Box 1667
Riverside, California 92502-1667

Phone: (951) 955-9700
Fax: (951) 955-8873
www.wrc-rca.org

January 30, 2019

Kinika Hesterly
Riverside County Department of Waste Resources
14310 Frederick St.
Moreno Valley, California 92553

Dear Kinika Hesterly:

Please find the following JPR attached:

JPR 18-08-24-01. Permittee: Riverside County Department of Waste Resources, Badlands Landfill Integrated Project. The JPR file attached includes the following:

- RCA JPR
- Exhibit A, Vicinity Map with MSHCP Schematic Cores and Linkages
- Exhibit B, Criteria Area Cells with Riverside County Vegetation and Project Location
- Exhibit C, Criteria Area Cells MSHCP Soils and Project Location
- Exhibit D, Conservation and Avoidance Areas
- Regional Map

Thank you,

Wendy Worthey

Wendy Worthey
Western Riverside County Regional Conservation Authority

cc:

Karin Cleary-Rose U.S. Fish and Wildlife Service 777 East Tahquitz Canyon Way, Suite 208 Palm Springs, California 92262	Joanna Gibson California Dept. of Fish and Wildlife 3602 Inland Empire Blvd. #C220 Ontario, California 91764

RCA Joint Project Review (JPR)
Public Project

JPR #: 18-08-24-01
Date: 01/30/19

Project Information

Permittee:	**Riverside County**
Case Information:	**Badlands Landfill Integrated Project**
Site Acreage:	**542.35 acre (78.5 acres within Cells)**
Portion of Site Proposed for MSHCP Conservation Area:	**0**

Criteria Consistency Review

Consistency Conclusion: The project is consistent with both the Criteria and Other Plan requirements.

Data:
Applicable Core/Linkage: Proposed Core 3
Area Plan: Reche Canyon/ Badlands

APN	Sub-Unit	Cell Group	Cell
413140034 413140033 413140036 413140024 413140023	SU3: Badlands North	T	743 831
413140025 422030011 422030014 422030015 422050014		N/A	Outside of Cells

Criteria and Project Information

Criteria Comments:

a. As stated in Section 3.2.3 of the MSHCP, “Proposed Core 3 (Badlands/Potrero) is located in the northeast region of the Plan Area. This Core consists mainly of private lands but also contains a few Public/Quasi-Public parcels including De Anza Cycle Park. The Core is connected to Proposed Linkage 12 (north San Timoteo Creek), Proposed Linkage 4 (Reche Canyon), Proposed Constrained Linkage 22 (east San Timoteo Creek), Existing Core H (Lake Perris), Existing Core K (San Jacinto Mountains), Proposed Linkage 11 (Soboba/Gilman Springs), and Proposed Constrained Linkage 21. The Core also functions as a Linkage, connecting the San Bernardino National Forest to the southwest with San Bernardino County and other conserved areas to the north of the Core. With a total acreage of approximately 24,920 acres, Proposed Core 3 is one of the largest MSHCP Core Areas. In addition, the Core is contiguous with Existing Core H (Lake Perris/Mystic Lake) and Existing Core K (San Jacinto Mountains), thus greatly enlarging the functional area of the Core. The Core has both a large proportion of its area unaffected by edge (approximately 23,420 acres of the total 24,940 acres) and is only partially constrained by existing agricultural use. Within the Core, important Live-In and movement Habitat is provided for Bell's sage sparrow, loggerhead shrike, cactus wren, Stephens' kangaroo rat, southern California rufous-crowned sparrow, and mountain lion, which have key populations in the Badlands. Management of edge conditions will be necessary in the Badlands to maintain high quality Habitat for these species in areas which may be affected by covered facilities including Lambs Canyon Road, San Timoteo Canyon Road, and Gilman Springs Road. Guidelines Pertaining to Urban/Wildlands Interface for the management of edge factors such as lighting, urban runoff, toxics, and domestic predators are presented in *Section 6.1* of this document."

b. A portion of the project site, 78.5 acres, is located within cells 743 and Cell 831 with are part of Cell Group T. As stated in Section 3.3.3 of the MSHCP, "Conservation within this Cell Group will contribute to assembly of Proposed Core 3. Conservation within this Cell Group will focus on chaparral, coastal sage scrub, grassland, Riversidean alluvial fan sage scrub and water habitat. Areas conserved within this Cell Group will be connected to chaparral, coastal sage scrub and grassland habitat proposed for conservation in Cell Group S to the west, to chaparral and grassland habitat proposed for conservation in Cell Group U to the east, to chaparral, coastal sage scrub, and Riversidean alluvial fan sage scrub habitat proposed for conservation in Cell 661 also to the east, and to grassland habitat adjacent to San Timoteo Creek proposed for conservation in Cell 298 and 385 and Cell Groups E, F, G, and H in the Pass Area Plan to the north. Conservation within this Cell Group will range from 80% to 90% of the Cell Group focusing in the central portion of the Cell Group."

c. Rough Step: The proposed project is within Rough Step Unit 2. Rough Step Unit 2 encompasses 177,606 acres along the northern border and within the northeastern corner of western Riverside County (see *Figure 4, Rough Step Unit #2*). This area includes the Badlands, Reche Canyon, San Timoteo Creek, and the San Jacinto Mountains. This area is bounded by Interstate 215 to the west, the San Jacinto River to the southwest, the San Jacinto Mountains to the southeast, and the San Bernardino Mountains to the northeast. There are over 61,020 acres within the Criteria Area in Rough Step Unit 2. Key vegetation communities within Rough Step Unit 2 include: coastal sage scrub; grasslands; riparian scrub, woodland, forest; Riversidean alluvial fan sage scrub; and woodlands and forests. Rough Step acreage goals are therefore provided for each of these habitat types. *Table 12, Rough Step Unit 2 Acreage Totals,* also includes acres conserved for habitats for which Rough Step acreage goals do not exist. Through 2015, a total of 16,705 acres of conservation has been acquired within this Rough Step Unit. In 2015, 140 acres were acquired in the following vegetation categories: 72 acres of chaparral, 34 acres of coastal sage scrub, 28 acres of agricultural land, 1 acre of developed or disturbed land, 1 acre of Riversidean alluvial fan sage scrub and 4 acres of woodlands and forests. Although all vegetation categories in this unit are in Rough Step, conservation efforts continue in order to build the reserve. All vegetation categories are "in" Rough Step for Rough Step 2. The proposed project will impact approximately 24.22 acres of chaparral, 18.09 acres of Riversidean sage scrub, and 0.97 acres of riparian scrub. Based on the above discussion the project does not conflict with Rough Step.

d. Project information was provided by the Permittee in the JPR application, including: General Biological Assessment and WRCMSHCP Compliance report (January 16, 2019), Determination of Biologically Equivalent or Superior Preservation for Impacts to Riverine/Riparian Habitat Associated with the Badlands Landfill Integrated Project (January 22, 2019) prepared by Harry Sandoval with Riverside County Habitat Conservation Agency (RCHCA), and Badlands Landfill Expansion Project Delineation of State and Federal Jurisdictional Waters (revised March 2018), prepared by Michael Baker International. The project site is located within the San Timoteo Badlands. Topography on the site is composed of steep hillsides and canyons. Vegetation on site is composed of Riversidean sage scrub and chaparral species, including toyon and sugar bush. Drainages in the project area are ephemeral in nature. There are some small patches of mulefat in the drainages in the southern portion of the project site. Soils within the project site are composed of Badlands and Metz loamy sand. The center portion of the project site is a 45-acre soil stockpile area that was permitted previously. The Riverside County Department of Waste Resources (RCHWR) has proposed a 542.35-acre expansion of the existing landfill. The expansion includes re-contouring of existing topography, lining and filling portions with acceptable refuse, and engineered earth fills. The eventual build out of the expansion area will include a refuse disposal area lined with an impervious liner and filled with solid waste. As lined areas are filled, they shall be covered by an engineered earthen cover. A leachate collection and recovery system, and landfill gas and condensate collection system will handle leachate, condensate, and gas movement throughout the solid waste fill area. Basins for final water filtration will be constructed at strategic points to reduce or eliminate sediment and other potential contaminants and release water back into natural drainages. Portions of the proposed expansion also includes soil stockpile areas. Stockpile areas will be used to store excavated material that shall eventually be used to create the engineered fill, or daily landfill cover over the future landfill areas. Along with the solid waste fill area, activities associated with the proposed expansion may include new water quality basins, additional diversion activities such as organics processing, household hazardous waste collection, and landfill infrastructure facilities.

e. Reserve Assembly: As discussed above, the project site is located in Cell Group T which will contribute to Proposed Core 3. Conservation in this Cell group in focused on 80% to 90% of the central portion of the cell group. The Badlands Landfill is located within the southeastern portion of Cell Group T and is not located in an area described for conservation. The majority of Cell Group T is composed of steep hillsides and ravines with little development pressure. Conservation goals for this Cell Group are expected to be met. No portion of the landfill or surrounding area is required for conservation, and this acreage is not necessary to achieve the goals and objectives in Cell Group T. Furthermore, expansion of the landfill will not result in fragmentation issues. Based on this discussion, development of the proposed project site is consistent with the Reserve Assembly goals of the MSHCP.

Other Plan Requirements

Data:

Section 6.1.2 – Was Riparian/Riverine/Vernal Pool Mapping or Information Provided?

Yes There are riparian/riverine areas on the project site. There are no vernal pools on the project site, and soils and topography are not suitable for fairy shrimp. There is no suitable riparian bird habitat on the project site.

Section 6.1.3 – Was Narrow Endemic Plant Species Survey Information Provided?

Yes. The project site is not located within a Narrow Endemic Plant Species Survey Area (NEPSSA).

Section 6.3.2 – Was Additional Survey Information Provided?

Yes. The project site is located within a Criteria Area Species Survey Area (CASSA) for Nevin's barberry, smooth tarplant, and round leaved filaree. The project site is located within an Additional Survey Needs and Procedures Area for burrowing owl.

Section 6.1.4 – Was Information Pertaining to Urban/Wildland Interface Guidelines Provided?

Yes. The property is located adjacent to Existing Core A. As such, the UWIG guidelines are applicable.

Comments on Other Plan Requirements:

a. **Section 6.1.2.** The project site was evaluated for riparian/riverine areas during jurisdiction delineation work on March 9, 10, 14, and 23, 2016 by Michael Baker International, and on May 22, 23, 2017 and February 26, 2018 by RCHCA Senior Ecological Resources Specialist, Harry Sandoval. The proposed project will impact 5.93 acres of MSHCP defined Riverine/Riparian habitat. 1.90 acres of the total 5.93 acres impacted are considered Riverine; the remaining 4.03 acres fit the definition of Riparian systems. Vegetation within the riparian potions of the project consists of California sagebrush, non-native grasses, and brittle bush. In addition, there are a few isolated cottonwood trees and arroyo willows in some areas. Impacts to Riparian/Riverine features will be mitigated at a 3:1 ratio. To offset permanent impacts to Riparian/Riverine resources, the RCDWR will partner RCHCA to develop an applicant-sponsored mitigation site on RCHCA land within the Lake Mathews/Estelle Mountain Reserve (LMR). Mitigation components, through approval from the Wildlife Agencies, will consist of:

   - The placement of a Conservation Easement or similar real estate property instrument over the proposed mitigation land in LMR. If a Conservation Easement is preferred by the Wildlife Agencies, it will be held by a qualified third party entity, such as RCRCD.

- Specifics on the initial restoration and long-term monitoring will be developed and included within a Habitat Mitigation Monitoring Plan (HMMP), during the permitting process for impacts to jurisdictional waters. The HMMP is also subject to review and approval by the Wildlife Agencies and RCA.
- Applicant-sponsored restoration/improvements to the riverine/riparian drainages located within northwestern potion of the LMR (funded by RCHWR). Restoration activities would consist of non-native vegetation removal, restoration of hydrology, and supplemental native species planting. Restoration activities will occur on no less than 17.79 acres of LMR. Restoration activities would be completed by a qualified entity such as RCRCD.
- A long-term management and monitoring endowment, funded by RCDWR, to be held by RCHCA or a third party if a Conservation Easement is preferred by the Wildlife Agencies.

The area proposed for mitigation within the LMR has historically been used for agricultural purposes, and the natural drainage system has been altered by man-made berms, culverts, and roadways. The proposed mitigation strategy would increase the functions and values of these riparian/riverine areas by restoring hydrology, removing non-natives, and re-establishing native vegetation.

If the RCDWR and RCHCA are not successful in developing the LMR mitigation site, then RCDWR shall purchase credits from a mitigation bank or In-Lieu Fee program that is approved by the RCA, California Department of Fish and Wildlife (CDFW), U.S. Fish and Wildlife Service (USFWS), and United States Army Corp of Engineers (USACE). The amount, and type of credits purchased for project impacts shall provide biologically equivalent or superior preservation to current conditions of the Riparian/Riverine resources being impacted.

Fairy Shrimp: The project site lacks the appropriate soil and vegetation for vernal pools. No clay soils or heavy soils were mapped, and no ponding or depression that would hold water for an extended period of time were detected on site. Due to the lack of suitable vernal pool and/or fairy shrimp habitat, focused surveys for vernal pools were not conducted for this project.

Riparian Birds: There is no suitable habitat present of the site for riparian birds; therefore no focused surveys were conducted.

The project demonstrates compliance with Section 6.1.2 of the MSHCP.

b. **Section 6.1.3**: The project site is not in located in the NEPSSA survey area

The project demonstrates compliance with Section 6.1.3 of the MSHCP.

c. **Section 6.3.2**: The project site is located within a CASSA survey area for Nevin’s barberry, smooth tarplant, and round leaved filaree. The project site lacks the cismontane woodlands or grassland, and clay soils associated with round-leaved filaree. Focused surveys for round-leaved filaree were not conducted due to a lack of suitable habitat. The project area lacks alkali and clay soils, and appropriate elevation, associated with smooth tarplant; therefore, focused surveys for smooth tarplant were not conducted. The project site contains suitable habitat for Nevin’s barberry. A focused survey for Nevin’s

Barberry was conducted on October 1, 2018. Meandering transects were walked through the survey area in an attempt to locate individuals. Nevin's Barberry was not detected during focused survey and is considered absent from the site.

The project site is also located within an Additional Survey Needs and Procedures Area for burrowing owl. Step I habitat suitability surveys (Burrowing owl Survey Instructions 2006) for burrow owl were conducted on May 22-23, 2017 and February 26, 2018. The project site is composed of steep hillsides and thick vegetation. All small mammal burrows found on site were less than 4 centimeters in size and would not provide habitat for burrowing owl. Due to the lack of suitable burrowing owl habitat, no further surveys are warranted.

The project demonstrates consistency with Section 6.3.2 of the MSHCP

d. **Section 6.1.4**: To preserve the integrity of areas adjacent to the Project site which are proposed Conservation Areas, the guidelines contained in Section 6.1.4 related to controlling adverse effects for development adjacent to the MSHCP Conservation Area should be considered by the Permittee in their actions relative to the Project. Specifically, the Permittee should include as Project conditions of approval, the following measures:

   i. Incorporate measures to control the quantity and quality of runoff from the site entering the MSHCP Conservation Area. In particular, measures shall be put in place to avoid discharge of untreated surface runoff from developed and paved areas into MSHCP Conservation Areas. A storm water system will be designed (via development of a water quality basin) to prevent the release of toxins, chemicals, petroleum products, exotic plant materials, or other elements that might degrade or harm downstream biological resources or ecosystems. Regular maintenance will occur to ensure effective operation of runoff control systems.

   ii. Land uses proposed in proximity to the MSHCP Conservation Area that use chemicals or generate bioproducts, such as manure, that are potentially toxic or may adversely affect wildlife species, Habitat, or water quality shall incorporate measures to ensure that application of such chemicals does not result in discharge to the MSHCP Conservation Area. The greatest risk is from landscaping fertilization overspray and runoff.

   iii. **Night lighting shall be directed away from the MSHCP Conservation Area and the avoided area on site to protect species from direct night lighting**. Shielding shall be incorporated in project designs to ensure ambient lighting in the MSHCP Conservation Area is not increased.

   iv. Proposed noise-generating land uses affecting the MSHCP Conservation Area, including designated avoidance areas, shall incorporate setbacks, berms, or walls to minimize the effects of noise on MSHCP Conservation Area resources pursuant to applicable rules, regulations, and guidelines related to land use noise standards. Any equipment used during initial development and during normal landfill operations shall be maintained in good working conditions with proper noise-reducing equipment installed.

v. **Avoid use of invasive, non-native plant species listed in Table 6-2 of the MSHCP in approving landscape plans for the portions of the project that are adjacent to the MSHCP Conservation Area, including avoidance areas.** Considerations in reviewing the applicability of this list shall include proximity of planting areas to the MSHCP Conservation Areas and designated avoidance areas, species considered in the planting plans, resources being protected within the MSHCP Conservation Area and their relative sensitivity to invasion, and barriers to plant and seed dispersal, such as walls, topography, and other features. The proposed project is not proposing any landscape plans. Only native seed mixes that are approved by a qualified biologist shall be used within the proposed expansion area.

vi. Proposed land uses adjacent to the MSHCP Conservation Area shall incorporate barriers, where appropriate, in individual project designs to minimize unauthorized public access, domestic animal predation, illegal trespass, or dumping into existing and future MSHCP Conservation Areas. Such barriers may include native landscaping, rocks/boulders, fencing, walls, signage, and/or other appropriate mechanisms.

vii. Manufactured slopes associated with proposed site development shall not extend into the MSHCP Conservation Area.

viii. Weed abatement and fuel modification activities are not permitted in the Conservation Area, including designated avoidance areas.

Based on the information provided in the *Report*, the Project demonstrates consistency with Section 6.1.4 of the MSHCP.

e. **MSHCP Volume I, Appendix C**: The following best management practices (BMPs), as applicable, shall be implemented for the duration of construction:

i. A condition shall be placed on grading permits requiring a qualified biologist to conduct a training session for project personnel prior to grading. The training shall include a description of the species of concern and its habitats, the general provisions of the Endangered Species Act (Act) and the MSHCP, the need to adhere to the provisions of the Act and the MSHCP, the penalties associated with violating the provisions of the Act, the general measures that are being implemented to conserve the species of concern as they relate to the project, and the access routes to and project site boundaries within which the project activities must be accomplished.

ii. Water pollution and erosion control plans shall be developed and implemented in accordance with RWQCB requirements.

iii. The footprint of disturbance shall be minimized to the maximum extent feasible. Access to sites shall be via pre-existing access routes to the greatest extent possible.

iv. The upstream and downstream limits of projects disturbance plus lateral limits of disturbance on either side of the stream shall be clearly defined and marked in the field and reviewed by the biologist prior to initiation of work.

v. Projects should be designed to avoid the placement of equipment and personnel within the stream channel or on sand and gravel bars, banks, and adjacent upland habitats used by target species of concern.

vi. Projects that cannot be conducted without placing equipment or personnel in sensitive habitats should be timed to avoid the breeding season of riparian identified in MSHCP Global Species Objective No. 7.

vii. When stream flows must be diverted, the diversions shall be conducted using sandbags or other methods requiring minimal instream impacts. Silt fencing of other sediment trapping materials shall be installed at the downstream end of construction activity to minimize the transport of sediments off site. Settling ponds where sediment is collected shall be cleaned out in a manner that prevents the sediment from reentering the stream. Care shall be exercised when removing silt fences, as feasible, to prevent debris or sediment from returning to the stream.

viii. Equipment storage, fueling, and staging areas shall be located on upland sites with minimal risks of direct drainage into riparian areas or other sensitive habitats. These designated areas shall be located in such a manner as to prevent any runoff from entering sensitive habitat. Necessary precautions shall be taken to prevent the release of cement or other toxic substances into surface waters. Project related spills of hazardous materials shall be reported to appropriate entities including but not limited to applicable jurisdictional city, FWS, and CDFG, RWQCB and shall be cleaned up immediately and contaminated soils removed to approved disposal areas.

ix. Erodible fill material shall not be deposited into water courses. Brush, loose soils, or other similar debris material shall not be stockpiled within the stream channel or on its banks.

x. The qualified project biologist shall monitor construction activities for the duration of the project to ensure that practicable measures are being employed to avoid incidental disturbance of habitat and species of concern outside the project footprint.

xi. The removal of native vegetation shall be avoided and minimized to the maximum extent practicable. Temporary impacts shall be returned to pre-existing contours and revegetated with appropriate native species.

xii. Exotic species that prey upon or displace target species of concern should be permanently removed from the site to the extent feasible.

xiii. To avoid attracting predators of the species of concern, the project site shall be kept as clean of debris as possible. All food related trash items shall be enclosed in sealed containers and regularly removed from the site(s).

xiv. Construction employees shall strictly limit their activities, vehicles, equipment, and construction materials to the proposed project footprint and designated staging areas and routes of travel. The construction area(s) shall be the minimal area necessary to complete the project and shall be specified in the construction plans. Construction limits will be fenced with orange snow screen.

Exclusion fencing should be maintained until the completion of all construction activities. Employees shall be instructed that their activities are restricted to the construction areas.

xv. The Permittee shall have the right to access and inspect any sites of approved projects including any restoration/enhancement area for compliance with project approval conditions, including these BMPs.

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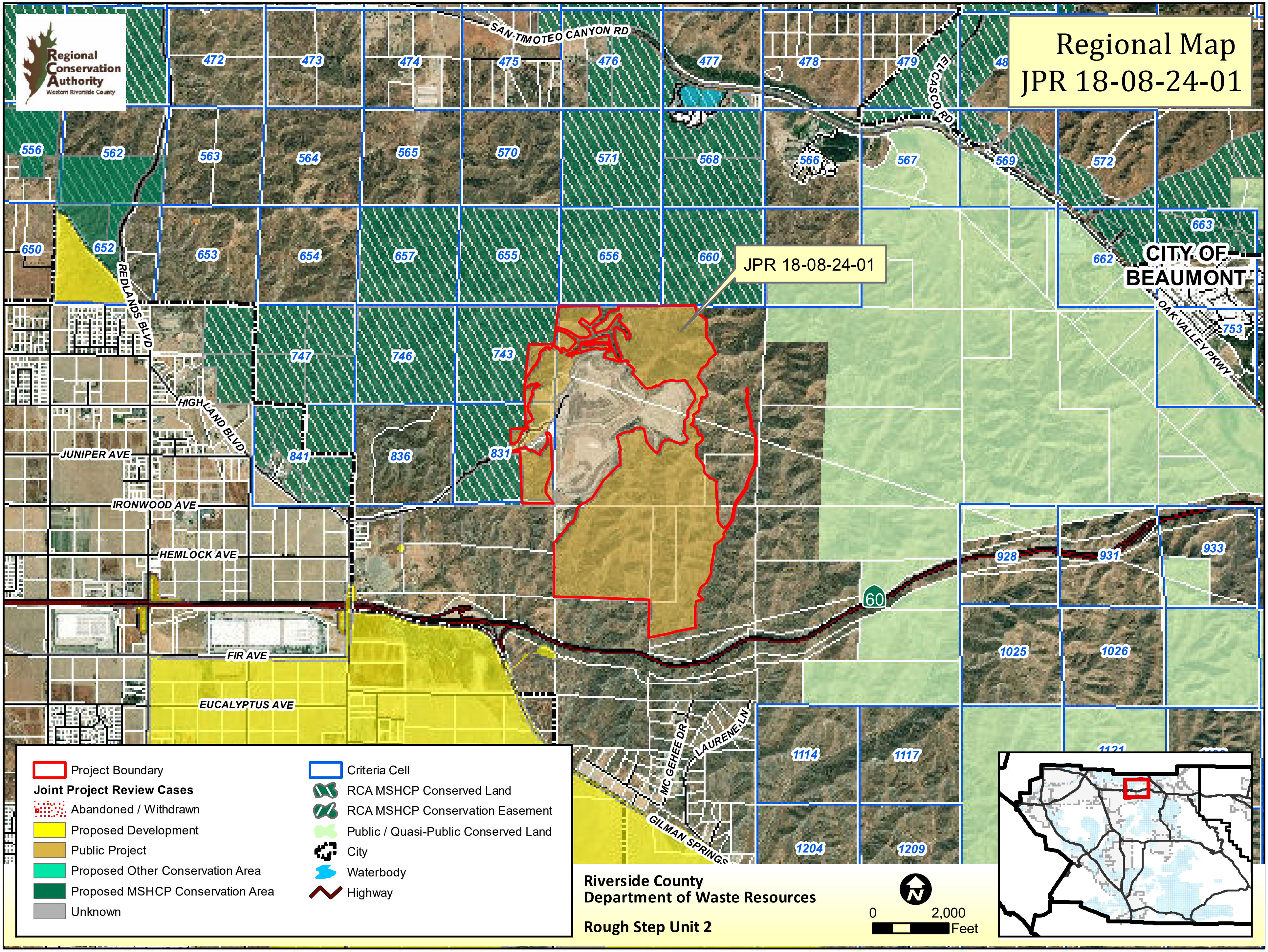
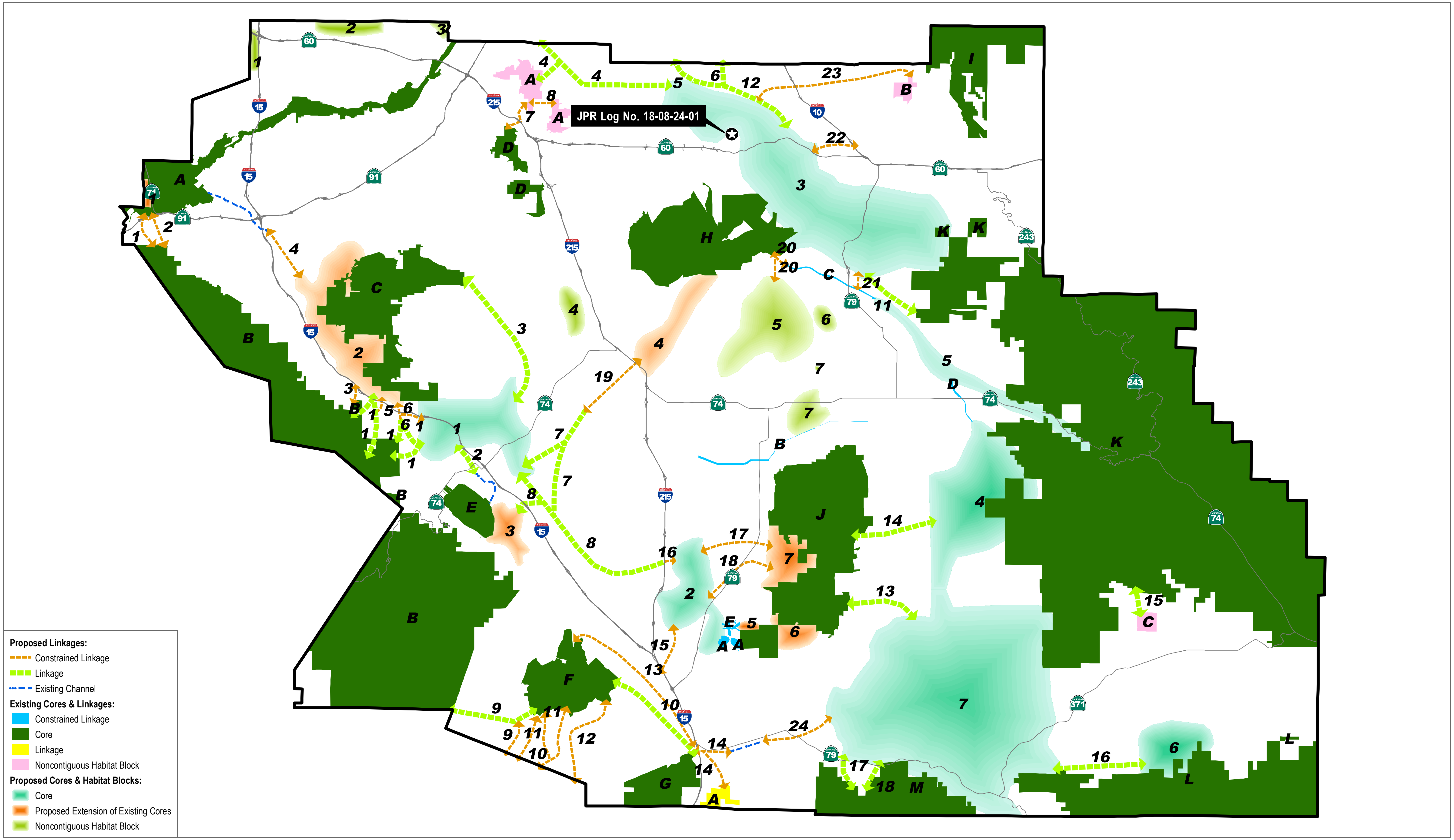


Regional Map
JPR 18-08-24-01

Riverside County
Department of Waste Resources

Rough Step Unit 2



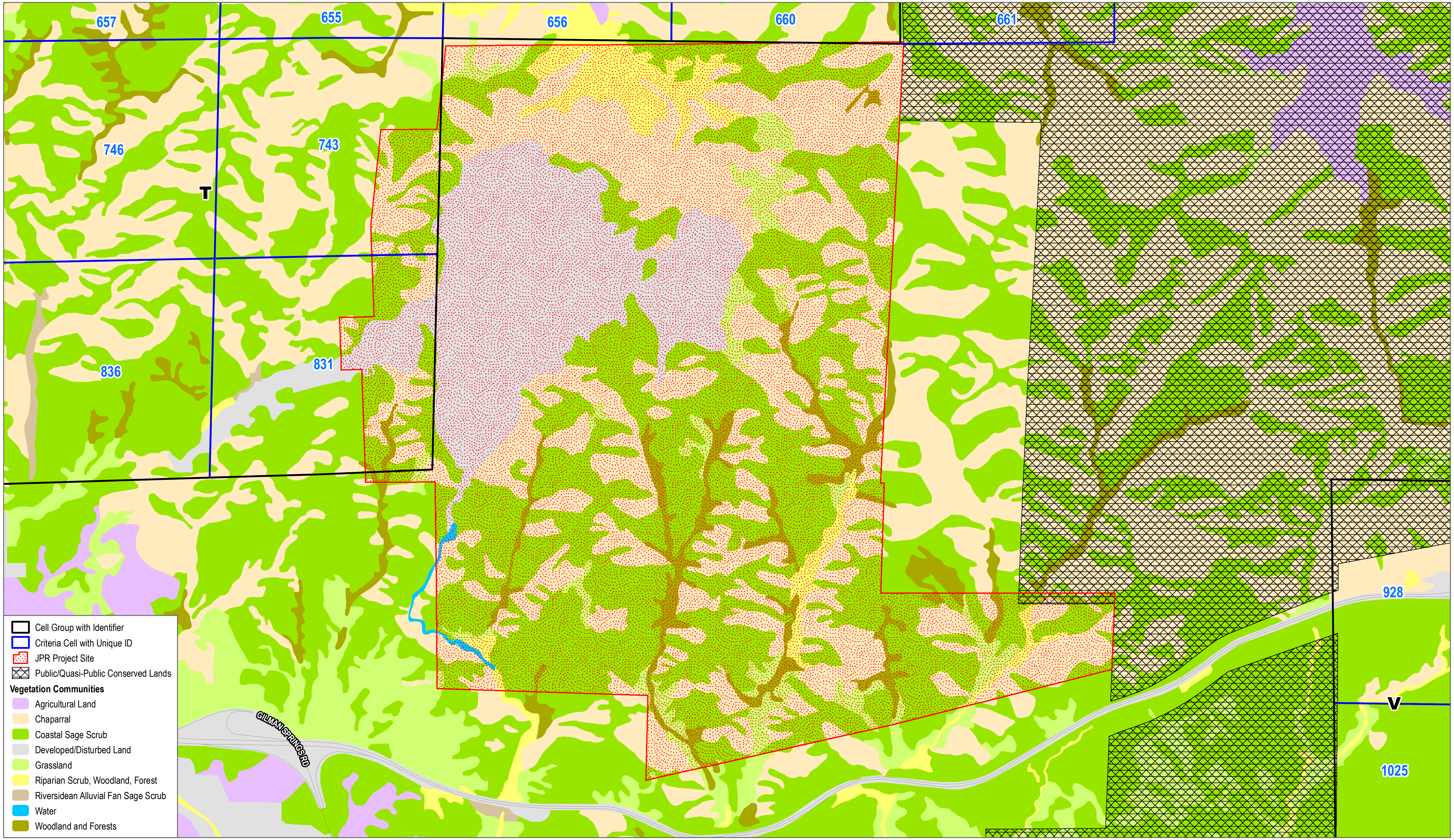
SOURCE: Western Riverside County Regional Conservation Authority 2018; County of Riverside 2018

DUDEK

0 2.5 5 Miles

EXHIBIT A

JPR Log No. 18-08-24-01 - Vicinity Map with MSHCP Schematic Cores and Linkages



SOURCE: Riverside MSHCP 2012 Vegetation; County of Riverside 2018

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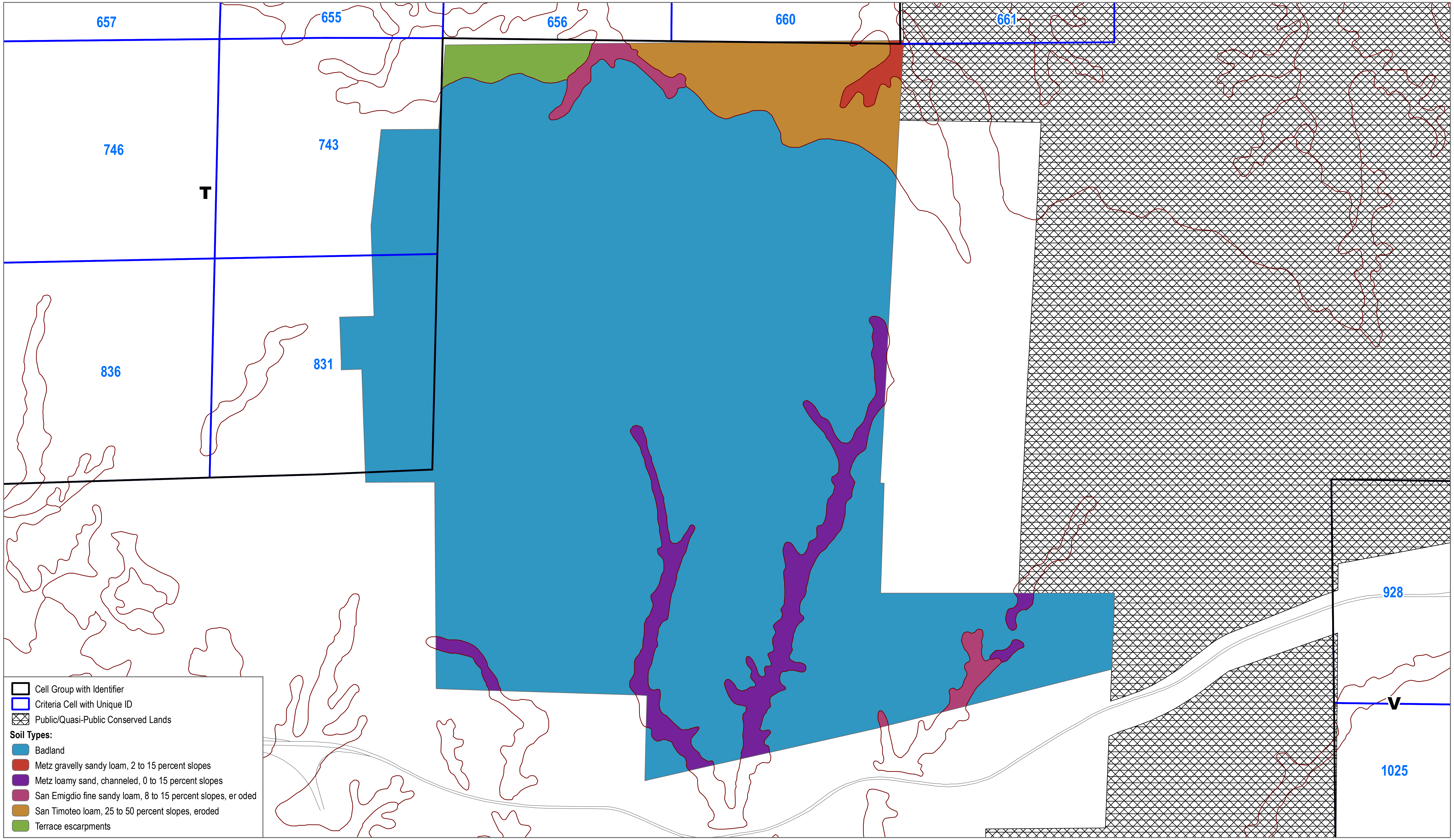
0 500 1,000 Feet

EXHIBIT B

JPR Log No. 18-08-24-01 - Criteria Area Cells with Riverside County Vegetation and Project Location



SOURCE: USDA/NRCS Soils 2017; County of Riverside 2018

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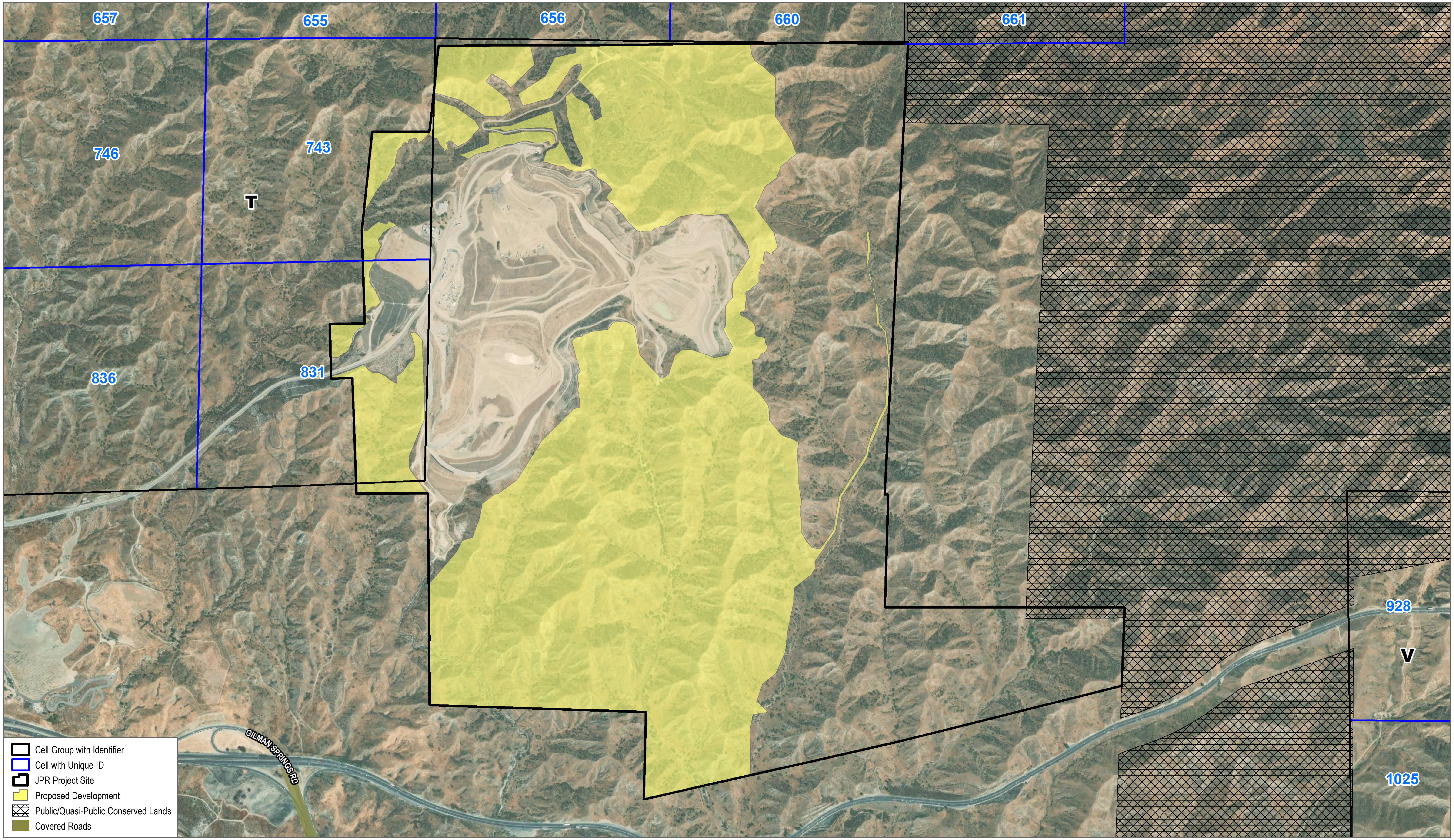
EXHIBIT C

JPR Log No. 18-08-24-01 - Criteria Area Cells with MSHCP Soils and Project Location



SOURCE: County of Riverside 2018; Bing Maps 2018

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EXHIBIT D

JPR Log No. 18-08-24-01 - Conservation and Avoidance Areas

Determination of Biologically Equivalent or Superior Preservation (DBESP)

DETERMINATION OF BIOLOGICALLY EQUIVALENT OR SUPERIOR PRESERVATION FOR IMPACTS TO RIVERINE/RIPARIAN HABITAT ASSOCIATED WITH THE BADLANDS LANDFILL INTEGRATED PROJECT

FOR IMPACTS TO APPROXIMATELY 5.93 ACRES WITHIN THE EXISTING BOUNDARIES OF THE BADLANDS LANDFILL

The Badlands Landfill is located at 31125 Ironwood Avenue, in an unincorporated area of Riverside County, east of the City of Moreno Valley
APN: 413-140-023, et al.
Section 32, Township 2 South, Range 2 West, of the El Casco 7.5 Minute Series U.S. Geological Survey (USGS) Topographic Quadrangle

Prepared July 30, 2018
Revised
December 18, 2018,
January 22, 2019 and
March 29, 2019 by:

Harry Sandoval
Senior Ecological Resources Specialist
Riverside County Habitat Conservation Agency
(951) 206-3260
hsandoval@wrcog.us

Prepared for:

Riverside County Department of Waste Resources

RCHCA
RIVERSIDE COUNTY HABITAT CONSERVATION AGENCY

INTRODUCTION:

This report has been written in compliance with Section 6.1.2 of the Western Riverside County Multiple Species Habitat Conservation Plan (WRCMSHCP), which requires that if avoidance of Riverine/Riparian habitat is not feasible, a determination of biologically equivalent or superior preservation (DBESP) be completed and approved to ensure replacement of any lost functions and values of habitat as it relates to species covered by the WRCMSHCP. The proposed expansion of the Badlands Landfill will disturb portions of various drainages within the boundaries of the Badlands Landfill. Grading activities, the installation of a composite landfill liner and development of landfill infrastructure will result in the permanent impacts to various drainages. An initial assessment of Riverine/Riparian resources was completed in the "General Biological Assessment and WRCMSHCP Compliance" document " prepared by the Riverside County Habitat Conservation Agency (RCHCA) on June 13, 2018. A jurisdictional delineation was also completed to identify and map wetland and non-wetland waters under the U.S. Army Corps of Engineers (USACE) jurisdiction pursuant to Section 404 of the Clean Water Act (33 U.S.C 1344) and wetland and streambed habitats pursuant to Sections 1600 through 1616 of the California Department of Fish and Wildlife (CDFW) Code.

The Riverside County Department of Waste Resources (RCDWR) requested the RCHCA to prepare this DBESP to address impacts to Riverine/Riparian resources as defined under Section 6.1.2 of the WRCMSHCP.

This DBESP shall include an analysis of effects on species listed under 6.1.2 of the WRCMSHCP, referred to in this document as "riparian planning species" or "planning species."

RATIONALE FOR DBESP:

The WRCMSHCP allows for impacts to Riverine/Riparian habitat and resources as defined under Section 6.1.2 of the Plan if these impacts are deemed unavoidable via the DBESP. The proposed landfill expansion will provide long-term disposal capacity which is necessary to accommodate growth in the region. The expansion will also facilitate increased waste diversion through activities such as on-site recycling programs and composting. Expansion of the Badlands Landfill will result in impacts to Riverine/Riparian habitat. Failing to carry out the proposed landfill expansion project would limit landfill capacity thereby limiting the growth potential in the region and potentially causing a significant regional health and safety issue.

PROJECT SCOPE & LOCATION:

The RCDWR has proposed an approximately 543 acre phased expansion[1] of the existing Badlands Landfill. The expansion will be carried out in multiple phases throughout an extended period of time. The proposed landfill expansion would alter site conditions by removing vegetation, re-contouring existing topography and eventually lining and filling portions with acceptable refuse and engineered earth fills. The eventual build out of the expansion area will include a refuse disposal area lined with an impervious liner and filled with solid waste. As lined areas are filled, they shall be covered by an engineered earthen cover. A leachate collection and recovery system, and landfill gas and condensate collection system will handle leachate, condensate, and gas movement throughout the solid waste fill area. Basins for final water filtration will be constructed at strategic points to reduce or eliminate sediment and other potential contaminants and release water back into natural drainages. Portions of the proposed expansion also includes soil stockpile areas. Stockpile areas will be used to store excavated material that shall eventually be used to create the engineered fill, or daily landfill cover over the future landfill areas. Along with the solid waste fill area, activities associated with the proposed expansion may include new water quality basins, additional diversion activities such as organics processing, household hazardous waste collection, and landfill infrastructure facilities.

The proposed project site is located entirely within the boundaries of the Badlands Landfill. The majority of development will be comprised of the expanded refuse disposal area and will occur in the eastern portion of the existing landfill's boundaries. The Badlands Landfill is located just north of California State Route 60 within an unincorporated portion of Riverside County northeast of the city of Moreno Valley. The proposed expansion area includes the following Riverside County Assessor's Parcel Numbers (APN): 413-140-023, 413-140-024, 413-140-025, 413-140-030, 413-140-033, 413-140-034, 413-140-036, 422-030-011, 422-030-014, 422-030-015, and 422-050-014. The expansion area may also be described as being within the El Casco 7.5-minute quadrangle map in Section 32 of Township 2 South, Range 2 West. Aerial photographs of the expansion area are included in Appendix A.

METHODOLOGY:

Prior to commencement of field work, all previously prepared biological assessments, jurisdictional delineations, and focused surveys along with aerial photographs and topographic maps of the general area were reviewed. Site visits were conducted on May 22, 23, 2017, February 26, 2018 and October 1, 2018 by RCHCA Senior Ecological Resource Specialist Harry Sandoval to inventory natural resources present within the proposed development area.

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[1] Total Project area based on shapefiles is 542.35 acres.

During the inventory of natural resources all features that qualified as Riverine/Riparian were mapped and measured. Mobile devices running ESRI applications were utilized to map features in the study area. Natural features were classified as Riverine/Riparian if they met the following definition.

Section 6.1.2 of the WRCMSHCP defines Riverine/Riparian Areas as *"lands which contain habitat dominated by trees, shrubs, persistent emergents or emergent mosses, which occur close to or which depend upon soil moisture from a nearby fresh water source, or areas with fresh water flow during all or a portion of the year."* This definition includes unvegetated ephemeral streams which are common in the generally arid region of Southern California if it can be demonstrated through observation that annual flows occur within the feature. This definition also considers the limits of moisture dependent or riparian vegetation and closely coincides with the limits of CDFW jurisdiction.

SITE CONDITIONS:

The project area is situated within the San Timoteo Badlands. The Badlands are characterized by very steep and rugged terrain. The majority of the proposed project area that has remained undeveloped contains typical Badlands topography. The far eastern portion of the development area contains very steep mostly un-vegetated slopes. Vegetation on the slopes is limited mostly to sugar bush (*Rhus ovata*) shrubs and toyon (*Heteromeles arbutifolia*). The northeastern portion of the study area has portions that have more gentle topography due to past development activities. A large off-road vehicle park was once situated within the northeast portion of the project site. Off-road trails and roads leading to the trail still exist and at least one unimproved road is still utilized by RCDWR staff for landfill operation purposes. Areas that remained undisturbed around the off-road park do contain Riversidean sage scrub (RSS).

The center portion of the proposed development area is comprised of a 45 acre soil borrow area that was analyzed and permitted previously. Development within the western portion of the landfill boundaries is proposed along Ironwood Avenue which is the sole road providing access to the landfill. Ironwood Avenue receives a steady stream of traffic consisting of large commercial and light duty trucks. Proposed development will specifically occur within narrow strips of land on both sides of Ironwood Avenue. The western shoulder along Ironwood Avenue contains small patches of RSS, however Russian thistle (*Salsola tragus*) is the dominant species. Further west of Ironwood Avenue is an area that is currently used as a soil stockpile area. Most of the land along the east side of Ironwood Avenue has been previously disturbed by the installation of landfill infrastructure including a storm water drainage system and roads. Vegetation that has re-sprouted within previously disturbed areas along the east side of Ironwood Avenue includes California brittlebush (*Encelia californica*), Russian thistle, and black mustard (*Brassica nigra*).

Drainages within the development can be generalized as being ephemeral in nature, narrow and sparsely vegetated. The most dominant species found within drainages throughout the proposed development site and the surrounding area is Russian thistle. Areas of drainages with no or low concentrations of Russian thistle are vegetated mostly by California brittlebush, California sagebrush (*Artemisia californica)* and stinknet *(oncosiphon piluliferum)*. Tree tobacco (*Nicotiana glauca*) is found sparsely within lower elevation drainages. Individual Mexican elderberry (*Sambucus mexicanus*) trees are found in moderate concentrations along the banks of drainages. Small, isolated patches of mulefat (*Baccharis salicifolia*) can be found mostly within drainages in the southern portion of the proposed development area. A few Freemont's cottonwood (*Populous fremontii*) trees were observed along drainages in the proposed development area.

Riparian areas within the proposed development areas are not suitable for the Least Bell's Vireo (*Vireo bellii pusillus*), Southwestern willow flycatcher (*Empidonax traillii*), or the Western yellow-billed cuckoo (*Coccyzus americanus*). The small isolated patches of mulefat scrub that exist within the proposed development area lack a dense and stratified canopy that is associated with Least Bell's vireo and Southwestern willow flycatcher. The drainages within the proposed project site lack riparian woodlands, dense stands of willows or boggy areas vegetated by willows (*Salix spp.)* and alders (*Alnus spp*.). Lacking wide dense riparian woodlands and densely foliated deciduous trees and shrubs the proposed project site does not contain suitable habitat for the Western yellow-billed cuckoo.

No other riparian planning species included in section 6.1.2 of the WRCMSHCP were found to occur or have the potential to occur within the project boundary.

Upland areas surrounding drainages were observed to be usually very steep and lacking vegetation. The few uplands areas around drainages that are flat are primarily vegetated by Stinknet, exotic grasses and Russian thistle.

Soils within the survey area were observed to be mostly sandy and loamy. An analysis of United States Geological Survey (USGS) soil maps for the study area found that soils are mapped as Badlands and Metz loamy sand. According to USGS soil series descriptions, Badlands soils do contain some clay in their composition; however, this series of soil is associated with steep slopes that shed water and erode quickly. Metz loamy sand consists mostly of alluvial material and is considered somewhat excessively drained.

No depressional features that could retain water for a substantial amount of time were identified during field surveys. The proposed development area does not contain features that can support vernal pools or vernal pool species.

PROJECT EFFECTS ON WRCMSHCP CONSERVATION AREAS AND LINKAGES:

The proposed project falls within the WRCMSHCP area; therefore, the project must demonstrate consistency with the WRCMSHCP. An analysis carried out in a Geographic Information System (GIS) shows that WRCMSHCP Criteria Cells 655, 656, 660, 661, 743 and 831 border the Badlands Landfill property limits to the north and west. The Riverside County Integrated Project (RCIP) Conservation Summary Report Generator shows that a few acres within the northern portion of the landfill property are within criteria cells. The western limits of the Badlands Landfill fall within Criteria Cells 743 and 831. Some development impacts within Criteria Cells 743 and 831 were previously assessed as part of a previous project. The previous project was subject to the Joint Project Review (JPR) process with the Western Riverside County Conservation Agency (RCA). JPR number 10-07-13-01 was completed on July 27, 2010. In the completed JPR the RCA concurred that no Conservation was required on the property. Additional expansion activities are proposed within Criteria Cells 743 and 831. Due to the changes proposed since the 2010 JPR, the RCDWR requests that the previous JPR be re-opened for this proposed project. Cells 743 and 831 are a part of WRCMSHCP Cell Group T. Conservation within Cell Group T contributes to assembly of Proposed Core 3. Cell Criteria calls for conservation of 80% to 90% of the central portion of the cell group. The Badlands Landfill is located within the southeastern portion of Cell Group T and therefore no portion of the landfill is required to achieve conservation objectives within Cell Group T.

According to the RCA MSHCP Information App the northeast corner of the Badlands Landfill falls slightly within Criteria Cells 660 and 661. A calculation carried out in a Geographic Information System (GIS) found that 0.83 acres of the landfill fall within Criteria Cell 660, and 0.04 acres of the landfill fall within Criteria Cell 661. Close examination in GIS shows that the landfill parcel lines and the Criteria Cells may have been intended to run parallel to each other however a shift within available published parcel line data may have occurred. No impacts are planned within portions of the Badlands Landfill that are within Criteria Cells 660 and 661. Criteria Cell 660 is a part of Cell Group T within the Reche Canyon/Badlands Area Plan. Conservation within Cell Group T within contributes to assembly of Proposed Core 3. Cell Criteria calls for conservation of 80% to 90% of the central portion of the cell group. Cell 660 falls within the eastern portion of the cell group. A significant portion of Criteria Cell 660 was intended to be conserved. With the exception of the 0.83 acres of landfill property in the south, Cell 660 has been completely conserved and is classified as MSHCP Conserved lands according to the RCA MSHCP Information App. Criteria Cell 661 is not a part of a cell group and calls for conservation within 45 to 55 percent of the northern portion of the cell. The portion of landfill property mapped within Cell 661 falls within the southwest corner of the Cell. The landfill land within Cell 661 is not required to achieve WRCMSHCP Conservation Objectives within the Reche Canyon/Badlands Area Plan. Because the landfill property within Cell 660 is contiguous with the land in Cell 661 and lies within the southernmost portion of Cell 660 it is unlikely to contribute much value to the MSHCP Conserved lands to the north or the overall conservation objectives of the

Reche Canyon/Badlands Area Plan. While no impacts are planned within portions of the Badlands Landfill that are bound by the limits of Criteria Cells 660 and 661, the Badlands Property line will be clearly delineated prior to construction activities along the northern border by a licensed surveyor to further ensure that any impacts remain within the landfill property.

The expansion of the Badlands Landfill does qualify as a Covered Activity as defined by Section 7.3.8 of the WRCMSHCP. As a Covered Activity the proposed expansion is not subject to WRCMSHCP Criteria. To demonstrate consistency with the WRCMSHCP, JPR 10-07-13-01 shall be re-opened to provide resource agencies the opportunity to review new impacts and their potential edge effects. The proposed project is required to be consistent with Sections 6.1.2, 6.1.3, 6.1.4 and 6.3.2 of the WRCMSHCP.

The eventual build out of the proposed project shall not impact the ability of the WRCMSHCP to meet conservation objectives within the surrounding project areas. The proposed project is not located within a linkage area and does not contain any land described for conservation within the WRCMSHCP Cell Criteria.

IMPACTS TO RIVERINE/RIPARIAN AREAS:

The RCDWR has thoroughly analyzed the topography, hydrology and biological resources present within the proposed development area. Review of past and current biological data along with consultation with the investigating biologist has resulted in various design changes to the proposed project in order to reduce the impacts to sensitive biological resources including features defined as Riverine/Riparian in the WRCMSHCP. Due to the scale and nature of the project, impacts to Riverine/Riparian habitat are unavoidable. Impacts shall occur at different times during the phased development of the proposed project. The majority of the associated impacts will be a result of the grading, contouring and lining of future refuse disposal areas. The development of landfill infrastructure such as roads and water treatment facilities shall account for the balance of impacts.

All drainage courses, which possess bed and bank features and have downstream connectivity to Waters of the US, are USACE, CDFW and RWQCB jurisdictional and also meet the definition of Riverine/Riparian habitat under the WRCMSHCP. The proposed project will impact 5.93 acres of WRCMSHCP defined Riverine/Riparian habitat. 1.90 acres of the total 5.93 acres impacted are considered Riverine, the remaining 4.03 acres fit the definition of Riparian systems. The proposed project will result in the following jurisdictional impacts: 1.15 acres of non-wetland waters under the jurisdiction of the USACE and RWQCB, and 5.93 acres of streambed under the jurisdiction of the CDFW. The project site does not contain any wetlands as defined by the USACE.

Table 1. Jurisdictional Areas[2],[3]

Corps and Regional Board (non-wetland)		**CDFW**			**Western Riverside MSHCP Riverine/Riparian**	
Acreage	**Linear Feet**	**Streambed**		**Associated Riparian**	**Acreage**	**Linear Feet**
		Acreage	**Linear Feet**	**Acreage**		
1.15	25,736	1.94	40,705	4.03	5.93	40,705

The proposed project shall not have any impacts on Riverine/Riparian habitat downstream or any conservation lands surrounding the proposed project site. All drainages that are proposed for disturbance shall be engineered to flow offsite in a pre-project state. Water management facilities integrated into the proposed project shall

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[2] The JD prepared for the Project (Michael Baker International, 2018) included a 218 acre County owned parcel immediately adjacent to the eastern boundary of the Badlands Landfill property. The 218 acre parcel is no longer a part of the Project; as such, the acreages listed in Table 1 of this DBESP vary from the totals identified in the JD prepared by Michael Baker International (2018). Specifically, portions of Feature 5, and all of Features 6, 7, 8, and 9 (identified in the M. Baker JD) are not within the Project limits.

[3] Jurisdictional areas identified in this DBESP include Features 1-5, and 10, as well as additional riparian habitat (sugarbush scrub dependent upon drainage flows) associated with Features 3 and 4. GIS shapefiles included as part of the JPR submittal account for the jurisdictional areas listed in this DBESP.

ensure that water flows from the site in pre-project frequencies, volumes and velocities. Water management features will also ensure the quality of water that is released from the site. Erosion and sedimentation shall be strictly controlled and will not impact surrounding habitat.

Onsite mitigation at the landfill was considered and its potential evaluated. The topography and remoteness of the lands would make it extremely difficult and financially unfeasible to attempt any restoration or enhancement projects in remaining undeveloped drainages within the Badlands Landfill property limits. As no Section 6.1.2 planning species were observed and no suitable habitat for those species is present within the site, it is unlikely that on-site mitigation would have has as much benefit to riparian planning species as the selected mitigation strategy.

PROPOSED MITIGATION:

The ultimate goal of this project is to expand landfill capacity thereby accommodating the growth and public safety of Riverside County and surrounding jurisdictions. Failure to expand the Badlands landfill may ultimately result in the stifling of economic growth within the region and may potentially create a significant regional human health issue. The RCDWR has considered design alternatives and also avoided as much Riverine/Riparian habitat as feasible. To offset permanent impacts to 5.93 acres of Riverine/Riparian resources, the RCDWR is partnering with the RCHCA to develop a mitigation site within the Lake Mathews/Estelle Mountain Reserve (LMR). Overall there are approximately 29 acres of jurisdictional drainages that have been surveyed and are available for RCDWR to utilize as mitigation for this Project, as well as future projects, as needed.

Through consultation and approval from the Wildlife Agencies, a real property instrument (Conservation Easement (CE), Restrictive covenant, or other instrument) may be placed over the riverine/riparian habitat within the LMR[4]. Specifically, RCDWR will fund restoration/improvements to riverine/riparian drainages located within the northwestern portion of the LMR. A qualified entity will perform the initial restoration, and long term monitoring will be completed by a third party, likely the Riverside-Corona Regional Conservation District (RCRCD)[5]. RCDWR funding will address both the initial restoration and long term maintenance and monitoring in perpetuity.

Specifics on the initial restoration and long term monitoring will be developed during preparation of the Habitat Mitigation Monitoring Plan (HMMP) during the permitting process for impacts to jurisdictional waters, which is subject to review and approval by the Wildlife Agencies. RCDWR will provide the RCA with copy of the approved HMMP, once available.

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[4] The final determination regarding the real property mechanism required for establishment of the mitigation area within the LMR is subject to review and approval with RCHCA and the Wildlife agencies.

[5] If a CE is required, then a qualified third party would hold the CE (likely RCRCD). Specifics regarding the 3rd party CE holder will be finalized at a later time during establishment of a CE, if needed**.**

The RCDWR shall provide funding for a minimum of 17.79 acres within the LMR to compensate for the loss of Riparian/Riverine habitat associated with the proposed Project. The RCDWR will mitigate Riverine and Riparian impacts at a 3:1 ratio. Riparian/Riverine habitat within the LMR lies within WRCMSHP plan area and is a part of the Santa Ana River watershed. Mitigation activities contemplated for the conserved/restricted Riparian/Riverine habitat include the restoration of hydrology (re-establishment), invasive species removal and supplemental planting (enhancement) along with the creation of wetland habitat (habitat creation). Note that the RCDWR shall have a total of approximately 29 acres of Riparian/Riverine habitat available for mitigation however this project will only be responsible for 17.79 acres of mitigation land. Riparian/Riverine habitat within the Lake Mathews/Estelle Mountain reserve is surrounded and buffered by lands permanently conserved for the endangered Stephen's Kangaroo Rat (*Dipodomys stephensi*).

Table 2. Mitigation Ratios

Habitat Type	Acreage	Mitigation Ratio	Total Mitigation
Riparian	4.03	3:1	12.09
Riverine	1.90	3:1	5.7

Riparian/Riverine habitat and the species associated with Riparian/Riverine habitat are not protected by the Stephen's Kangaroo Rat Habitat Conservation Plan (SKRHCP) or the permits associated with the SKRHCP. Per Riverside County ordinance 663.5, fees collected for the SKRHCP are only to be utilized for SKR habitat therefore Riparian/Riverine habitat within the LMR do not greatly benefit from the protection afforded to SKR habitat. The RCHCA has occasionally been able to maintain some of the Riparian habitat present through the use of one time grants or volunteer efforts.

The placement of a conservation easement or other similar real property instrument over Riparian/Riverine habitat within the LMR shall provide biologically equivalent or superior preservation. The biological functions and values of the Riparian/Riverine features within the LMR vary greatly in quality. Prior to the establishment of the LMR the area was utilized as a large scale agricultural operation. In some cases surface flows were re-directed underground through the use of vertical drains. Various drainages were impacted by large earthen dams that were built to create pools that could be used to store water for crop irrigation. A large network of roads installed for agricultural operations impacted drainages by removing riparian vegetation and installing culverts which altered natural flows. The biological functions and values of many Riparian/Riverine features within the proposed mitigation area were greatly diminished and in some cases completely eliminated.

The mitigation strategy proposed by this project shall restore and improve the biological functions and values of Riparian/Riverine habitat not only within the boundaries of the LMR but also within features to the west and south. Drainages in the LMR drain directly into the Temescal Creek and Olson Creek which are both vital tributaries to the Santa Ana River. Under current conditions natural regimes including water flows, water velocity, nutrient retention, flood storage, sediment and toxicant trapping are not functioning as they had under native conditions. Drainages within the western portion of the LMR do contain higher biological functions and values than those in the east. The better biological conditions present in the western drains can be attributed to the steep terrain which made it difficult to impact these drainages.

Habitat enhancement activities will include the removal of non-native species, supplemental planting and seeding where necessary. Re-establishment of habitat shall restore hydrology to features that were greatly impacted by agricultural operations. The restoration of hydrology will be carried out by a combination of vertical drain removal, culvert removals and the removal of earthen dams. Habitat creation will be carried out in areas that were established as stock ponds for the previous agricultural operations. Habitat creation will likely include the restoration of natural hydrology along with planting and seeding.

With the consistent maintenance that this mitigation package will provide' the area will have a great potential to provide quality habitat for various Riparian/Riverine species listed in Section 6.1.2 of the WRCMSHCP.

Specifics regarding mitigation activities shall be developed during the establishment of the LMR mitigation site, as well as identified in the Project specific HMMP, which both are subject to review and approval by the Wildlife agencies. Table 3 provides an overview of all available enhancement activities and the attached Exhibit G shows where the proposed activities will take place.

Table 3. Lake Mathews Reserve Mitigation Activities

Proposed Mitigation	Total Available Acres
Habitat Enhancement	22.18
Habitat Re-Establishment	6.39
Habitat Creation	0.74

Table 4. Mitigation Activity types for the proposed project.[6]

Proposed Mitigation	Mitigation Acres
Habitat Enhancement	10.66
Habitat Re-Establishment	6.39
Habitat Creation	0.74
Total	**17.79**

If the RCDWR and RCHCA are not successful in developing the LMR mitigation site, then RCDWR shall purchase credits from a mitigation bank or In-Lieu Fee program that is approved by the RCA, the U.S. Fish and Wildlife Service (USFWS), USACE, and the CDFW. Purchase of credits shall meet the minimum 3:1 ratio for Riverine/Riparian impacts.

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[6] Mitigation activity acre composition may change depending on conditions at time of permitting and approval of HMMP. Overall mitigation acres (17.79) associated with the proposed project will remain consistent.

CONCLUSION:

Due to the considerable size and nature of the proposed project, impacts to Riverine/Riparian habitat are unavoidable. The RCDWR studied various alternatives and has modified plans to minimize the impacts to Riverine/Riparian habitat and associated species. The proposed project is a vital piece of public infrastructure that shall be required in order sustain the growth of Riverside County and the surrounding areas which this landfill serves. Failure to carry out the improvements may in the future cause significant regional public health and economic issues.

The RCDWR proposes to fund initial restoration/lift and long-term protection and monitoring of riverine/riparian habitat within the LMR mitigation site, as mitigation for permanent impacts within the Badlands Landfill property. Due to limitations caused by the topography and remoteness of the drainages within the Badlands Landfill property it was deemed infeasible to carry out onsite mitigation. Without the ability to completely avoid impacts to Riverine/Riparian habitat and with integrated minimization measures employed, the RCDWR has concluded that conserving and enhancing Riparian/Riverine habitat within Riverside County is the best mitigation alternative available for the proposed expansion of the Badlands Landfill. The proposed mitigation will greatly improve the biological functions and values of the subject features and also Riverine/Riparian habitat extending beyond the reserve's boundaries.

With the proposed mitigation the project is deemed to be biologically equivalent or superior. Acceptance and employment of the proposed mitigation shall provide this project with compliance with Section 6.1.2 of the WRCMSHCP.

CERTIFICATION:

I hereby certify that the statements furnished above and in the attached exhibits present the information required for this biological evaluation and the statements provided are true and correct to the best of my knowledge and belief.

DATE: 3/29/2019 SIGNED: Harry Sandoval

REFERENCES:

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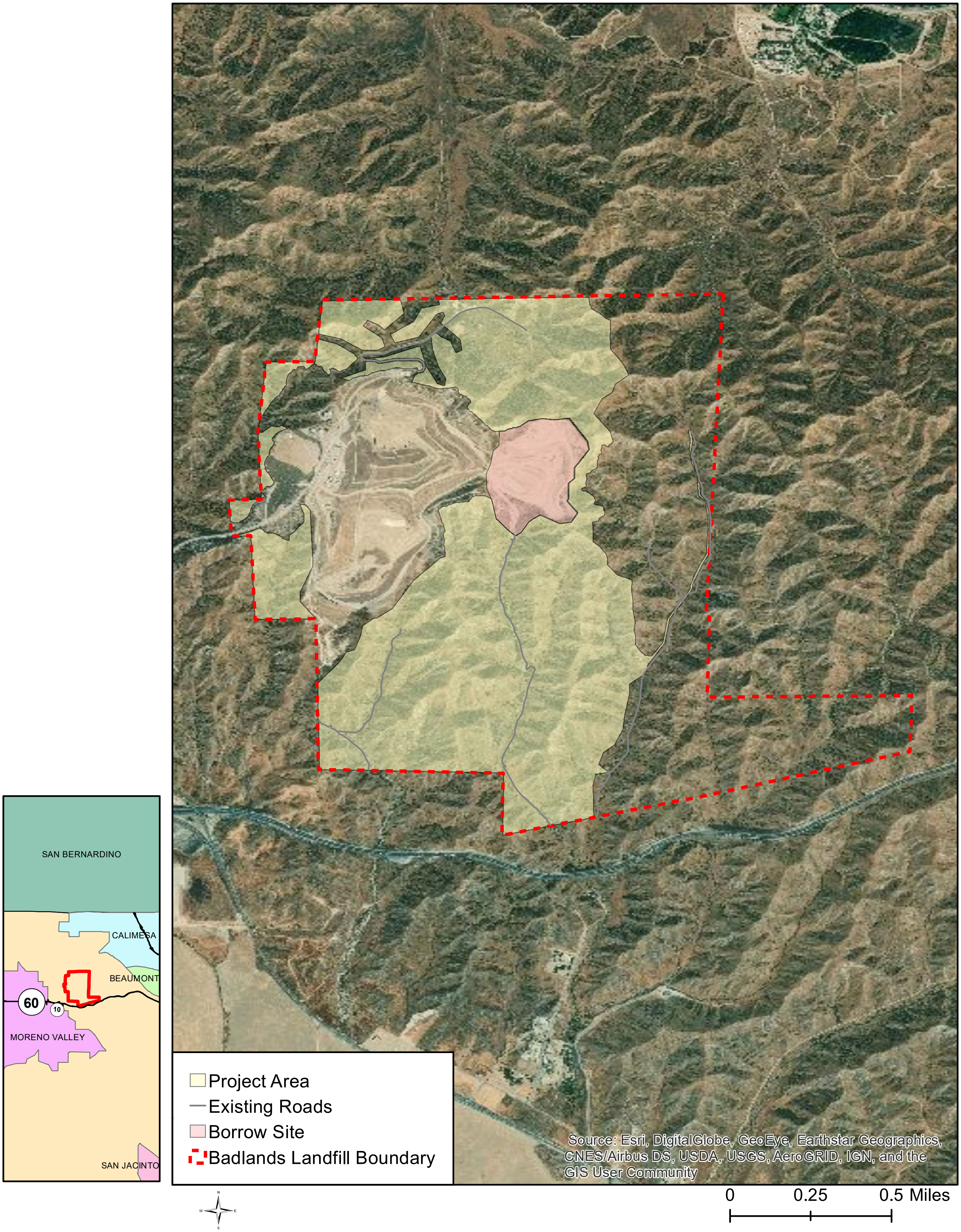
U.S. Department of the Interior, Geological Survey. 1997. El Casco, Riverside County, CA. 7.5 minute USGS Quadrangle Map.

Appendix A - Maps

Exhibit A: Badlands Landfill

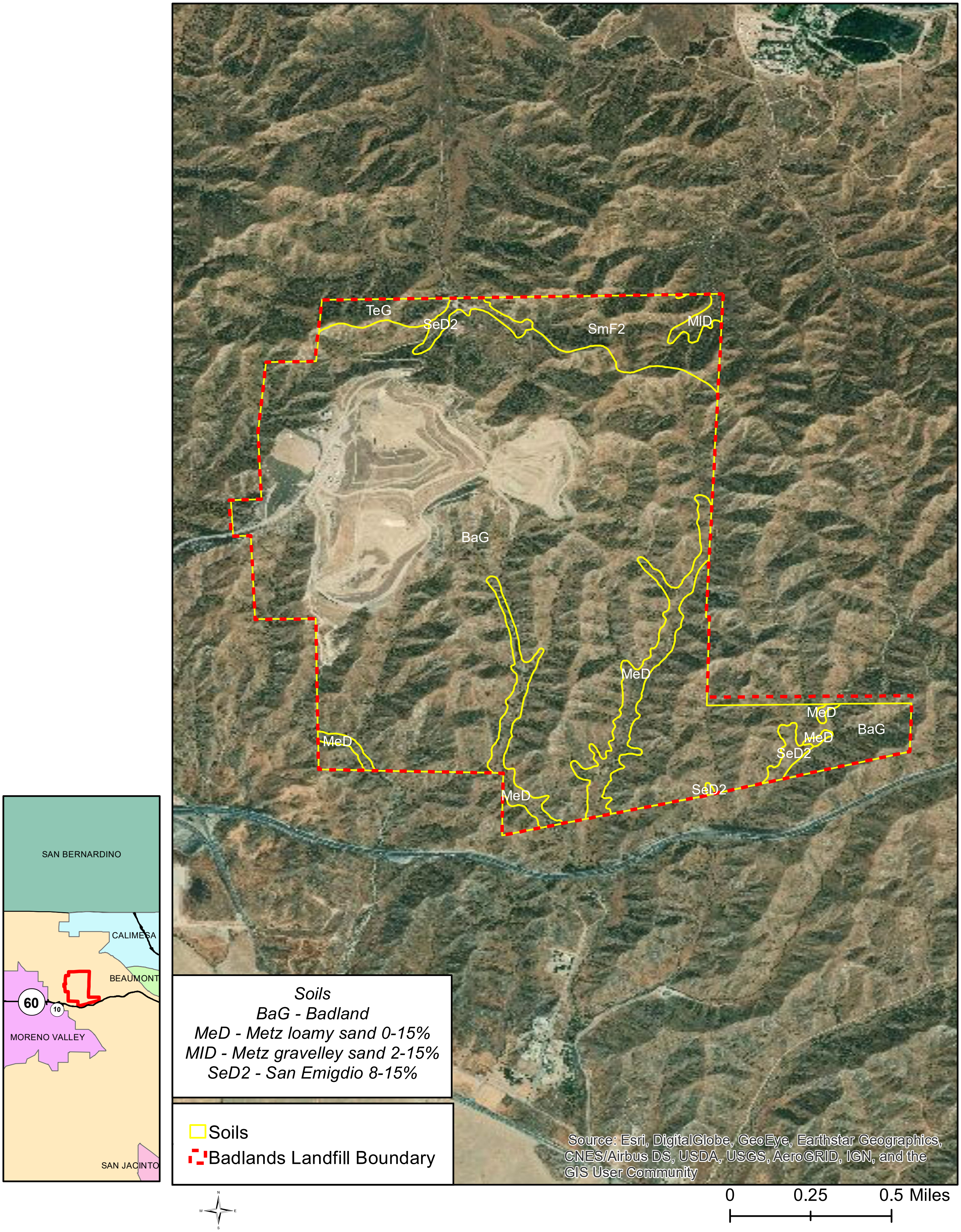
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit B: Project Limits



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit C: Soils

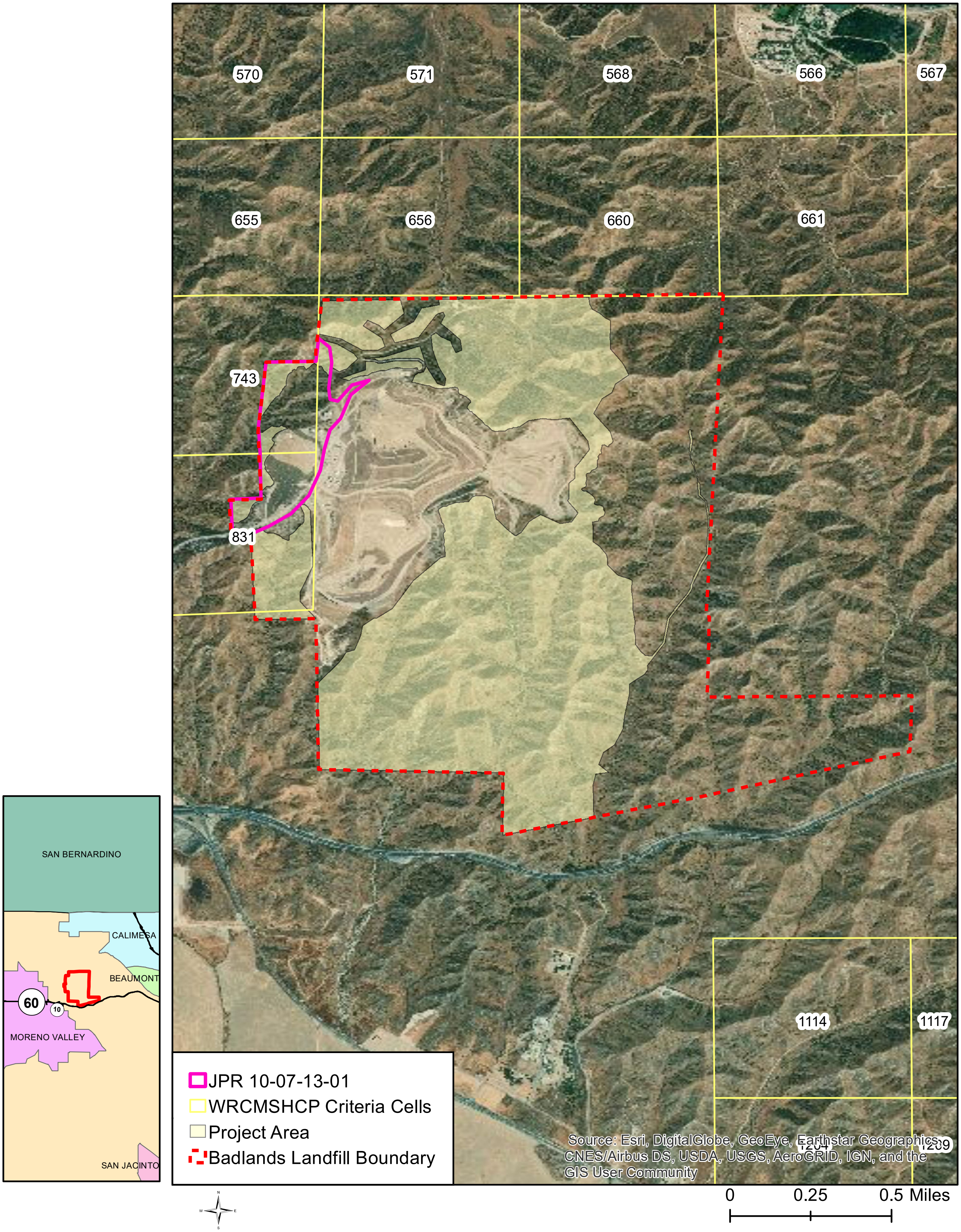


Soils
BaG - Badland
MeD - Metz loamy sand 0-15%
MID - Metz gravelley sand 2-15%
SeD2 - San Emigdio 8-15%

☐ Soils
⬚ Badlands Landfill Boundary

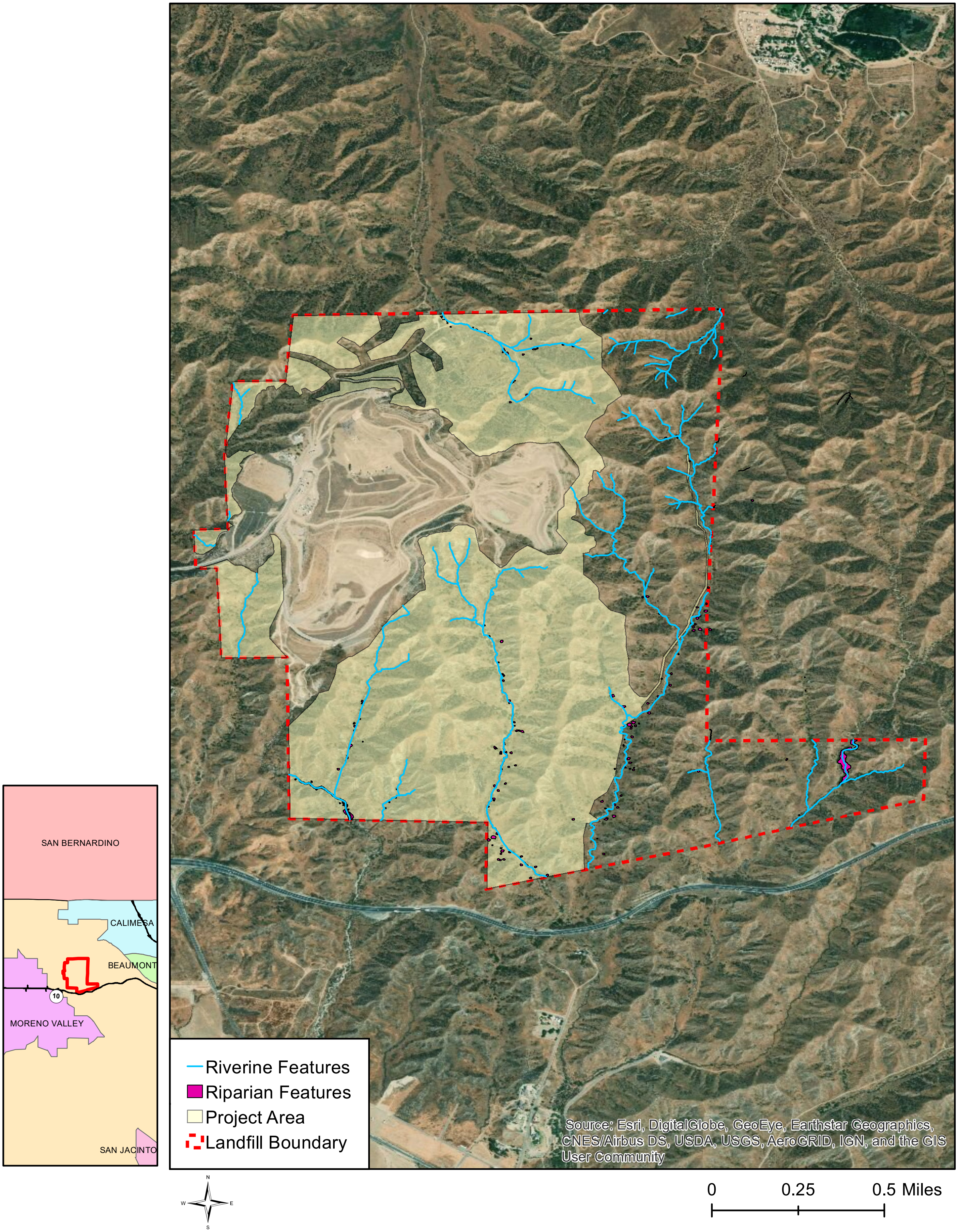
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit D: WRCMSHCP Criteria Cells



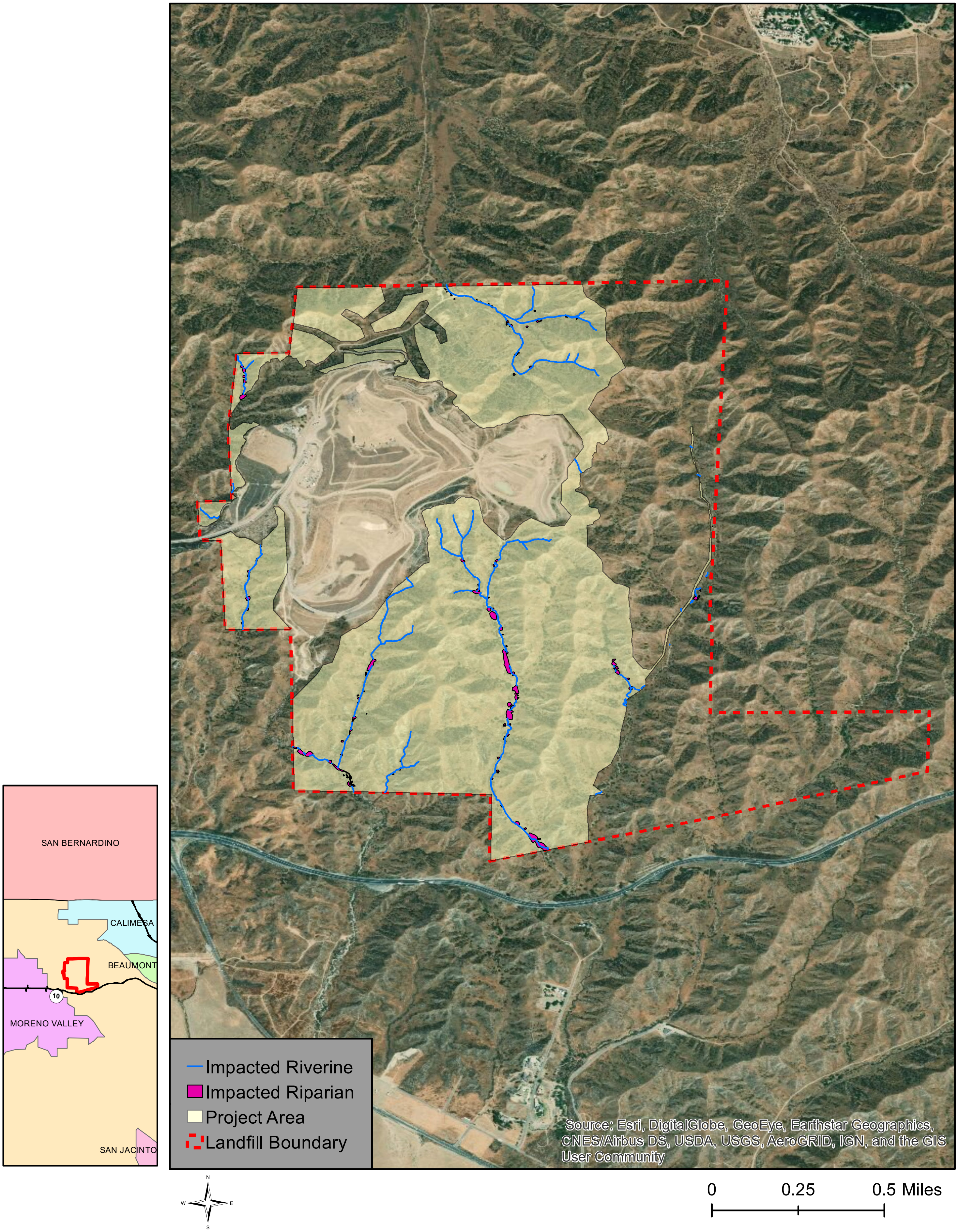
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit E: Riparian/Riverine Features



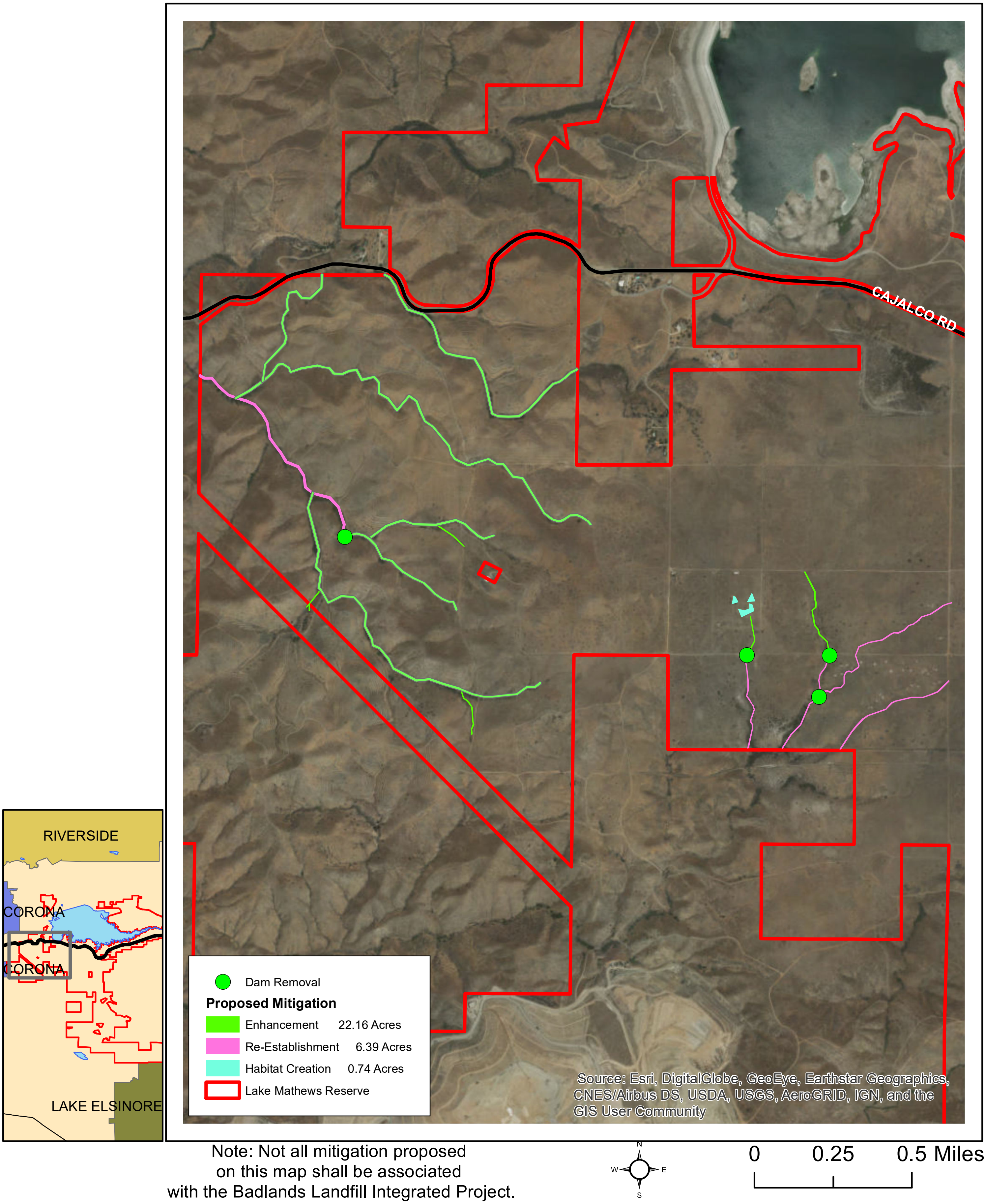
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit F: Riparian/Riverine Impacts



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit G: Proposed Mitigation Activities



Note: Not all mitigation proposed
on this map shall be associated
with the Badlands Landfill Integrated Project.

Appendix B – Site Photos


Typical ephemeral drainage within central portion of proposed project area.


Upland vegetation growing within drainage in northern portion of project area.

Dense sugarbush and toyon shrubs along with elderberry growing within and around drainage in southwest portion of proposed project area.

Drainage dominated by California sagebrush and surrounded by toyon and elderberry.

Drainage within central portion of proposed development area.

Drainage with steep slopes vegetated by toyon.

View of drainage at Lake Mathews Reserve whose flow was directed underground.

Vertical drain used to divert natural flow underground. (Lake Mathews Reserve)

Large earthen dam (left) constructed to hold water and culvert in original drainage.

Hesterly, Kinika

From:	Thiede, James <james_thiede@fws.gov>
Sent:	Tuesday, April 2, 2019 5:52 PM
To:	Hesterly, Kinika
Cc:	Beck, Carly@Wildlife; Ross, Ryan; Heather.Pert; Gibson, Joanna@Wildlife; Karin Cleary-Rose; Campbell, Tricia; Dionne, Elizabeth; wworthey@dudek.com; Marissa.Caringella@wildlife.ca.gov
Subject:	Re: [EXTERNAL] RE: [EXTERNAL MAIL] RE: JPR 18-08-24-01 Badlands Landfill

TAILS #19B0117-19CPA0148

Dear Ms. Hesterly,

The California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service (collectively, the Wildlife Agencies) have reviewed the
Determination of Biologically Equivalent or Superior Preservation (DBESP) for Riverside County Department of Waste Resources' (RCDWR) "Badlands Landfill Integrated Project" located in MSHCP Criteria Cells 743 and 831 in the County of Riverside.

After reviewing the revised DBESP received on April 01, 2019 (cover date of March 29, 2019) which includes the newly added Table 4, the Wildlife Agencies concur that the revised DBESP provides offsite mitigation for the Project's anticipated impacts to MSHCP riparian/riverine resources that would meet the MSHCP's required standard of "biologically equivalent or superior to a complete preservation alternative".

The Wildlife Agencies have no further comments to submit to RCDWR on the DBESP. This concludes our review of the DBESP.

The Project is now consistent with Section 6.1.2 of the MSHCP.

Sincerely,

On Mon, Apr 1, 2019 at 11:25 AM Hesterly, Kinika <khesterl@rivco.org> wrote:

> Hi James and Carly,

General Biological Assessment

GENERAL BIOLOGICAL ASSESSMENT AND WRCMSHCP COMPLIANCE

For

Badlands Landfill Integrated Project

The Badlands Landfill is located at 31125 Ironwood Avenue, in an unincorporated area of Riverside County, east of the City of Moreno Valley
APN: 413-140-023, et al.
Section 32, Township 2 South, Range 2 West, of the El Casco 7.5 Minute Series U.S. Geological Survey (USGS) Topographic Quadrangle

Survey Dates: May 22, 2017, May 23, 2017, February 26, 2018, and October 1, 2018

Prepared: June 13, 2018
Revised: December 18, 2018 and
January 16, 2019 by:

Harry Sandoval
Riverside County Habitat Conservation Agency
(951) 206-3260

RCHCA
RIVERSIDE COUNTY HABITAT CONSERVATION AGENCY

INTRODUCTION:

The following report provides details regarding compliance with the Western Riverside County Multiple Species Habitat Conservation Plan (WRCMSHCP) and an account of general biological conditions present along with an analysis of potentially sensitive natural resources located within the proposed Badlands Landfill Integrated Project (BLIP). This assessment has been prepared for the Riverside County Department of Waste Resources (RCDWR) for the purpose of establishing baseline biological information of the proposed BLIP area referred to hereafter as the "expansion area." The biological assessment of the area included a literature review, site visits, and analysis of maps and information provided by the RCDWR.

LOCATION:

The Badlands Landfill is located in an unincorporated area of the County of Riverside, east of the City of Moreno Valley. A site map is included as Appendix A. The area analyzed in this study is an approximately 533 acre portion of the Badlands Landfill property. The proposed expansion area includes the following Riverside County Assessor's Parcel Numbers (APN): 413-140-023, 413-140-024, 413-140-025, 413-140-030, 413-140-033, 413-140-034, 413-140-036, 422-030-011, 422-030-014, 422-030-015, and 422-050-014. The expansion area may also be described as being within the El Casco 7.5-minute quadrangle map in Section 32 of Township 2 South, Range 2 West. Aerial photographs of the expansion area are included in Appendix A. A portion of the expansion area falls within WRCMSHCP Criteria Cells 743 and 831. A Criteria Cell analysis is included within this report.

PURPOSE/PROJECT SCOPE:

The RCDWR requested a General Biological survey of all natural resources in order to identify any sensitive areas or species that may be present within and surrounding the proposed expansion area. The purpose of this report is to provide a biological analysis of all sensitive biological resources present within the area and provide a general overview of biological functions and values of the study area. This report shall also provide an analysis of compliance with pertinent sections of the WRCMHSCP.

The Badlands Landfill is an active sanitary landfill operated by the RCDWR. The study area surrounds most of the active landfill. The majority of the proposed expansion shall occur within the eastern portion of the Badlands Landfill property. The study area is bordered mostly by land that has remained relatively undisturbed. Some development associated with the existing landfill and some past recreational development has occurred within and surrounding the proposed expansion area.

In order to meet future refuse disposal needs within the region, the RCDWR is planning an expansion to complement the current landfill operations. Like other such projects, the proposed landfill expansion would alter site conditions by removing vegetation, re-contouring existing topography and eventually lining and filling portions with acceptable refuse and engineered earth fills. The eventual build out of the expansion area will include a refuse disposal area lined with an impervious liner and filled with solid waste. As lined areas are filled, they shall be covered by an engineered earthen cover. A leachate collection and recovery system will handle any liquid movement throughout the solid waste fill area. Basins for final water filtration will be constructed at strategic points to reduce sediment and other potential contaminants and release water back into natural drainages. A portion of the proposed expansion also includes stockpile areas. Stockpile areas will be used to store excavated material that shall eventually be used to create the engineered fill over the future landfill areas. Along with the solid waste fill area, activities associated with the proposed expansion may include new water quality basins, additional diversion activities such as organics processing, household hazardous waste collection, and landfill infrastructure facilities.

Overall the expansion project will permanently develop approximately 543 acres[1] of land. Out of the entire area that shall be developed 78.5 acres are within WRCMSHCP Criteria Cells. A previous Joint Project Review by the Western Riverside County Regional Conservation Agency (RCA) analyzed approximately 48 acres of the 78.5 that shall be impacted by the currently proposed project. Table 1 below provides a breakdown of impacts to vegetation types for the entire project.

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[1] Total Project area based on shapefiles is 542.35 acres.

Table 2 below provides a breakdown of impacts to vegetation types located within WRCMSHCP Criteria Cells.

All impacts associated with the proposed project shall occur within the boundaries of land controlled by the RCDWR and shall not go beyond those boundaries. Any future projects proposed outside of the boundaries presented as "Proposed Project Area" on the exhibits attached to this document shall be subject to further analysis.

Table 1. Overall Project Impacts by Vegetation Type

Vegetation Type	**Impacted Acres**
Chaparral	228.5
Developed/Disturbed	25.1
Non Native/Ruderal	187.67
Riversidian Sage Scrub	18.6
Sugarbush Scrub	76.7
Riparian/Riverine	5.93

Table 2. Impacts within WRCMSHCP Criteria Cells by Vegetation Type

Vegetation Type	**Impacted Acres**
Chaparral	10.19
Developed/Disturbed	43.04
Non Native/Ruderal	13.14
Riversidian Sage Scrub	0.72
Sugarbush Scrub	10.85
Riparian/Riverine	0.63

METHODOLOGY:

Prior to the site assessment, the investigating biologist conducted a review of all existing biological documents previously prepared for the study area and the California Natural Diversity Database (CNDDB) for sensitive species observed in the vicinity. Aerial imagery and maps provided by RCDWR were also reviewed. As previously discussed, a portion of the landfill property lies within WRCMSHCP Criteria Cells. As a signatory to the WRCMSHCP, the RCDWR is required to comply with conservation requirements. The WRCMSHCP Report Generator was also queried in order to determine if the plan required any special species surveys in the area.

The site was surveyed by Harry Sandoval on May 22, 2017, May 23, 2017, February 26, 2018 and October 1, 2018. All accessible portions of the proposed project site, including adjacent areas, were closely examined for potentially sensitive biological resources.

As much of this site as possible was walked in order to complete a thorough analysis of current conditions. Portions of the site are very steep and inaccessible. Great effort was made to view areas that were inaccessible from the closest and best vantage point available. Binoculars with 10X40 power lenses were utilized to analyze resources that were not easily accessible.

SITE CONDITIONS:

The study area is situated in the San Timoteo Badlands. The area within and immediately surrounding the study site can be characterized by very steep and rugged terrain. The majority of the proposed expansion site has remained undeveloped. Evidence of past disturbances can be found throughout the expansion area and include off road vehicle trails and scattered debris. A series of unimproved roads exist within the southern portion of the Landfill boundaries. The roads are in various forms of repair with some being overgrown with vegetation and other modest condition do to the use by off highway vehicles. The proposed project will utilize some of the existing roads to gain access into portions of the project area particularly in the eastern portion of the Project site. Within the eastern canyons of the Project site, existing access roads (jeep trails) typically follow the drainage/riverine resources. The proposed impact areas are shown on Project exhibits and within the shape files. Most of the Project's proposed disturbance within this area was shifted approximately 15-20 feet west of the drainage features to avoid impacts. Areas where the proposed access road would result in impacts were included in the impact acreage for the Project. For areas where the proposed impacts are within close proximity to, but not impacting a riverine resource, standard measures will be deployed to protect the resource- delineated and marked with stakes, fencing, or other appropriate identifying markers. Other typical BMPs will be deployed as needed (standard construction BMPs).

The northern-most portion of the proposed expansion site was previously utilized as an off road motorcycle park. Historical grading associated with motorcycle trails and improvised roads still exist within the vicinity of the motorcycle park. Along with historical disturbances, the RCDWR maintains a road leading to the motorcycle park area in order to maintain access to a monitoring well that is located in the area.

An approximately 45 acre portion of the expansion area has already been disturbed and is currently functioning as a borrow area for current landfill operations. The borrow area was evaluated for biological resources in the past and was not examined as a part of this analysis. The 45 acre borrow area is located in the center of the proposed expansion project and can be identified as the "Existing Borrow Area" in the attached exhibits.

Included in this analysis is an area along Ironwood Avenue, which is the main landfill access road. Biological resource information was collected for this area. The area immediately east of Ironwood Avenue is extremely steep and populated by sugar bush scrub and Riversidean sage scrub species. The western portion of the slope along Ironwood Avenue has been partially graded to accommodate site drainage. The eastern slope along this area was subject to a habitat restoration project which established sugar bush scrub along the slopes. A portion of the area west of Ironwood Avenue was previously graded and re-contoured. Riversidean sage scrub exists in areas that were not graded. A significant amount of Russian thistle (*Salsola tragus)* can be found along both sides of Ironwood Avenue.

The higher elevation areas within the larger eastern portion of the study area are sparsely vegetated by sugar bush (*Rhus ovata*) and toyon (*Heteromeles arbutifolia*) shrubs and non-native grasses. Flatter portions within the lower elevation areas in the survey limits consist of mostly non-native grasslands and small patches of Riversidean sage scrub. Sugar bush was observed to be the dominant native species within lower elevation slopes. Non-native grasses along with Russian thistle and stinknet (*Oncosiphon piluliferum*) are found in vast quantities throughout the proposed expansion area. A complete species compendium can be found in Appendix C. Russian thistle is the most dominant species found within the survey area.

The proposed expansion area contains various ephemeral drainages that qualify as Riparian/Riverine features according to Section 6.1.2 of the WRCMSHCP. The ephemeral drainages present within the project site mostly lack riparian vegetation; however, some riparian vegetation associated with the ephemeral drainages is found in small amounts in lower elevation areas. Brittlebush (*Encelia farinosa*), California Sagebrush (*Artemisia californica*) and tree tobacco (*Nicotina glauca*) are the most common species found within ephemeral drainages. According to the jurisdictional delineation and observations made in the field, the site does not contain any areas that may be considered wetlands. No features were found within the proposed expansion area that could potentially pond water. Existing water filtration basins that can retain water for an extended period of time are found within current landfill operation areas and may be expanded or removed for the proposed expansion.

Table 3. Jurisdictional Areas[2],[3]

Corps and Regional Board (non-wetland)		**CDFW**			**Western Riverside MSHCP Riverine/Riparian**	
Acreage	**Linear Feet**	**Streambed**		**Associated Riparian**	**Acreage**	**Linear Feet**
		Acreage	**Linear Feet**	**Acreage**		
1.15	25,736	1.90	23,433	4.03	5.93	40,705

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[2] The JD prepared for the Project (Michael Baker International, 2018) included a 218 acre County owned parcel immediately adjacent to the eastern boundary of the Badlands Landfill property. The 218 acre parcel is no longer a part of the Project; as such, the acreages listed in Table 2 vary from the totals identified in the JD prepared by Michael Baker International (2018). Specifically, portions of Feature 5, and all of Features 6, 7, 8, and 9 (identified in the M. Baker JD) are not within the Project limits.

[3] Jurisdictional areas identified in this General Biological Assessment include Features 1-5, and 10, as well as additional riparian habitat (sugarbush scrub dependent upon drainage flows) associated with Features 3 and 4. GIS shapefiles included as part of the submittal documents for the Project account for the jurisdictional areas listed herein.

Soils within the survey area were observed to be mostly sandy and loamy. An analysis of United States Geological Survey (USGS) soil maps for the study area found that soils are mapped as Badlands and Metz loamy sand. According to USGS soil series descriptions, Badlands soils do contain some clay in their composition; however, this series of soil is associated with steep slopes that shed water and erode quickly. Metz loamy sand consists mostly of alluvial material and is considered somewhat excessively drained.

WRCMSHCP CONSISTENCY:

The proposed project falls within the WRCMSHCP area; therefore, the project must demonstrate consistency with the WRCMSHCP. An analysis carried out in a Geographic Information System (GIS) shows that WRCMSHCP Criteria Cells 655, 656, 660, 661, 743 and 831 border the Badlands Landfill property limits to the north and west. The Riverside County Integrated Project (RCIP) Conservation Summary Report Generator shows that a few acres within the northern portion of the landfill property are within criteria cells. The western limits of the Badlands Landfill fall within Criteria Cells 743 and 831. Some development impacts within Criteria Cells 743 and 831 were previously assessed as part of a previous project. The previous project was subject to the Joint Project Review (JPR) process with the Western Riverside County Conservation Agency (RCA). JPR number 10-07-13-01 was completed on July 27, 2010[4]. In the completed JPR, the RCA concurred that no Conservation was required on the property. Additional expansion activities are proposed within Criteria Cells 743 and 831.

Due to the changes proposed since the 2010 JPR, the RCDWR requests that the previous JPR be re-opened for this proposed project. Cells 743 and 831 are a part of WRCMSHCP Cell Group T. Conservation within Cell Group T contributes to assembly of Proposed Core 3. Cell Criteria calls for conservation of 80 to 90 percent of the central portion of the cell group. The

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[4] RCDWR originally proposed to enhance 0.81 acres at the closed Pedley Landfill as mitigation for the previous project expansion at the Badlands Landfill. Before enhancement/restoration activities could begin, the conditions at the Pedley site changed (damaged/destroyed) due to significant storms and flooding of the Santa Ana River. RCDWR consulted with CDFW and obtained permission to instead purchase 0.81 acres of riparian habitat mitigation credits through the Riverside-Corona Resource Conservation District (RCRCD). The credits were purchased in May 2013.

Badlands Landfill is located within the southeastern portion of Cell Group T and therefore no portion of the landfill is required to achieve conservation objectives within Cell Group T.

According to the RCA MSHCP Information App, the northeast corner of the Badlands Landfill falls slightly within Criteria Cells 660 and 661. A calculation carried out in a Geographic Information System (GIS) found that 0.83 acres of the landfill fall within Criteria Cell 660, and 0.04 acres of the landfill fall within Criteria Cell 661. Close examination in GIS shows that the landfill parcel lines and the Criteria Cells may have been intended to run parallel to each other, however a shift within available published parcel line data may have occurred. While no impacts are planned within portions of the Badlands Landfill that are bound by the limits of Criteria Cells 660 and 661, the Badlands Property line will be clearly delineated prior to construction activities along the northern border by a licensed surveyor to further ensure that any impacts remain within the landfill property.

Criteria Cell 660 is a part of Cell Group T within the Reche Canyon/Badlands Area Plan. Conservation within Cell Group T contributes to assembly of Proposed Core 3. Cell Criteria calls for conservation of 80 to 90 percent of the central portion of the cell group. Cell 660 falls within the eastern portion of the cell group. A significant portion of Criteria Cell 660 was intended to be conserved. With the exception of the 0.83 acres of landfill property in the south, Cell 660 has been completely conserved and is classified as MSHCP Conserved lands according to the RCA MSHCP Information App. Criteria Cell 661 is not a part of a cell group and calls for conservation within 45 to 55 percent of the northern portion of the cell. The portion of landfill property mapped within Cell 661 falls within the southwest corner of the Cell. The landfill's land within Cell 661 is not required to achieve WRCMSHCP Conservation Objectives within the Reche Canyon/Badlands Area Plan. Because the landfill property within Cell 660 is contiguous with the land in Cell 661 and lies within the southernmost portion of Cell 660, it is unlikely to contribute much value to the MSHCP Conserved lands to the north or the overall conservation objectives of the Reche Canyon/Badlands Area Plan.

The expansion of the Badlands Landfill does qualify as a Covered Activity as defined by Section 7.3.8 of the WRCMSHCP. As a Covered Activity, the proposed expansion is not subject to WRCMSHCP Criteria. To demonstrate consistency with the WRCMSHCP, JPR 10-07-13-01 shall be re-opened to provide resource agencies the opportunity to review new impacts and their potential edge effects. The proposed project is still required to be consistent with Sections 6.1.2, 6.1.3, 6.1.4 and 6.3.2 of the WRCMSHCP. The following is an analysis of project compliance with each pertinent section of the WRCMSHCP.

Section 6.1.2 Riparian/Riverine Areas:

As was described in the site conditions section, the proposed expansion area contains several ephemeral drainages that qualify as Riparian/Riverine features according to Section 6.1.2 of the WRCMSHCP. A total of eight drainages shall be impacted according to the current proposed expansion designs. Disturbances to the eight drainages that must be impacted will result in 5.93 acres of permanent impacts. Of those 5.93 acres, 1.90 are considered Riverine and 4.03 are considered Riparian. No temporary impacts are anticipated as a part of the proposed project. Drainages and proposed impacts may be seen on maps within Appendix A.

Vegetation within the riparian portions of the ephemeral drainages consist mostly of California Sagebrush, non-native invasive grasses and brittlebush. Isolated cottonwood (*Populous fremontii*) trees and Arroyo willow (*Salix lasiolepis*) occur in some areas. Areas with riparian vegetation identified during the survey lacked dense and stratified cover that is associated with WRCMSHCP Riparian bird species Least Bell’s vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii exitmus*). The survey area does not contain wide riparian woodlands that are required by the western yellow-billed cuckoo (*Coccyzus americanus occidentalis*).

Due to the topography and the well-drained nature of the soils in the area, water typically flows through the study area very quickly during storm events. No depressional areas or other features that could pond water were observed during the site survey. No vernal pools or vegetation associated with vernal pools was observed during the survey. The survey site lacks any suitable habitat for any fairy shrimp. No cracked clays or vernal pool indicator species were observed within the survey area.

Because the proposed project shall impact Riparian/Riverine resources, mitigation for the proposed impacts must be offered in a Determination of Biologically Equivalent or Superior Preservation (DBESP). With the acceptance of the proposed mitigation by the California Department of Fish and Wildlife (CDFW) and the U.S. Fish and Wildlife Service (USFWS), the project will be deemed to be in compliance with Section 6.1.2 of the WRCMSHCP.

Section 6.1.3 Protection of Narrow Endemic Plant Species

No narrow endemic plant species surveys are required for this site in accordance with Section 6.1.3 of the WRCMSHCP. No narrow endemic plants were observed during the general biological assessment of the proposed expansion area. This analysis shall satisfy section 6.1.3 of the WRCMSHCP.

Section 6.1.4 Urban/Wildlands Interface Guidelines

The proposed expansion area is adjacent to conserved lands and WRCMSHCP Criteria Cells; therefore, the project design must incorporate Urban/Wildland Interface Guidelines (UWIG) as presented in Section 6.1.4 of the WRCMSHCP. The Badlands Landfill is bordered to the north and west by lands that have been preserved by the WRCMSHCP for reserve assembly. Directly to the east of the proposed disturbance area are lands which are considered Public Quasi Public lands. Lands bordering the Badlands Landfill to the north, east, and west possess significant biological value. The following discussion demonstrates how project design will incorporate WRCMSHCP UWIG in order to limit potential edge effects created by landfill development and operations.

Drainage – The final design of the expansion area shall incorporate measures required by the National Pollutant Discharge Elimination System, the Regional Water Quality Control Board, and other landfill permitting entities to manage runoff and any leachate produced by the landfill. No untreated surface water shall be directed to or discharged into adjacent conservation areas. All water discharged from the landfill will be subjected to a complex treatment system before it is directed into natural drainages. An elaborate water filtration system that utilizes detention basins is required for landfill operations and shall aid in treating waters that flow from the site. Following project completion, all waters departing the landfill shall be substantially equivalent in quality, quantity and velocity to pre-project waters.

Toxics – Utilizing the same systems that are described in the drainage section above, the landfill will not discharge any toxics or pollutants including solid wastes into any surrounding areas. In addition to the water filtration systems that shall be put in place to ensure water quality, the landfill will also closely monitor ground water to check for any potential contamination to surrounding areas. The final project design shall incorporate National Pollutant Discharge Elimination System Construction Guidelines as presented in section 7.5.3 of the WRCMSHCP.

Lighting – While night lighting is not anticipated to occur regularly, it shall not be prohibited due to maintenance and other activities that may need to occur beyond daylight hours. All lighting utilized during nighttime will be directed away from conservation or wildland areas. Landfill staff shall receive proper training which shall include methods for avoiding light pollution into surrounding natural areas (directional placement and shielding).

Noise – Current landfill operations utilize heavy equipment during daily landfill operations. The amount of noise generated by the proposed expansion should be equal to sound levels currently experienced. Any equipment used during initial development and during normal landfill operations shall be maintained in good working conditions with proper noise-reducing equipment installed. A substantial buffer area shall remain between the active landfill site and most surrounding properties.

Invasives – The proposed project shall not require nor is proposing any landscape plans. On certain occasions, seeding of areas is required for stabilization purposes. As is the current practice, only native seed mixes that are approved by a qualified biologist shall be used within the proposed expansion area.

This analysis shall satisfy Section 6.1.4 of the WRCMSHCP.

Section 6.3.2 Additional Survey Needs

The proposed project site falls within the WRCMSHCP Criteria Area Species Survey Area (CASSA) for burrowing owl (*Athene cunicularia*) and three plants species.

A habitat assessment for burrowing owl was conducted during the site surveys. During the biological survey, it was observed that fossorial mammal activity was low in the area. Burrows typically found in the area are too small and are atypical of what a burrowing owl would use. Burrows observed generally ranged in size between four and eight centimeters. Burrowing owls are known to prefer large open expanses with flat or gentle terrain. The rugged topography of the expansion area and surrounding lands likely preclude establishment by burrowing owls. The area with the greatest potential for burrowing owls lies within the far north portion of the survey area. The northern most portion of the survey area contains the gentlest topography, however this area also contains the densest vegetation cover. The vegetation cover found in the northern area can be classified as chaparral in the low elevations with sugar bush scrub on the steeper slopes. The cover provided within the northern most part of the study area is not conducive for burrowing owl occupation. No burrowing owls, sign of burrowing owls or features that could support burrowing owls were observed during biological surveys. Due to a lack of appropriate conditions and nesting areas, focused surveys are not recommended for the proposed expansion area.

The RCA MSHCP Information App reports that a small portion of the landfill falls within the CASSA survey area for Nevin’s Barberry (*Barberis nevinii*), smooth tarplant (*Centromadia pungens*) and round-leaved filaree (*California macrophylla*). The majority of the landfill property that falls within the survey area for the three plant species listed above was previously surveyed during studies for a previous expansion that was covered by JPR 10-07-13-01. Focused surveys for Nevin’s Barberry and round-leaved filaree were negative. Areas that were not covered by JPR 10-07-13-01 and are not already developed were evaluated for their potential to support the three Criteria Area Species

Focused surveys for round-leaved filaree were not conducted due to a lack of suitable habitat. According to the WRCMSHCP “Round-leaved filaree is restricted to open cismontane woodland and valley and foothill grassland habitats on very friable clay soils” (Dudek 2003). The CASSA survey areas lacks cismontane woodlands or grasslands that are typically associated with this species. CASSA area within the Landfill boundaries also lack clay soils which are required for round-leaved filaree.

No focused surveys were carried out for smooth tarplant due to a lack of suitable habitat. The study site is composed mostly of steep slopes that lack alkali and clay soils which are preferred by the smooth tarplant. The proposed development area also lacks any alkali vernal pools which the smooth tarplant is usually associated with in Riverside County (Dudek 2003). The altitude of the site was also considered when determining the potential for the presence of smooth tarplant. The survey area is situated at an altitude ranging between 2100 and 2400 feet of elevation. Smooth tarplant is known to occur between 300 and 1640 feet of elevation.

Suitable habitat for Nevin’s Barberry does occur on site therefore focused surveys were carried out for the species. Meandering transects were walked through the survey area in an attempt to locate any individuals. Surveys were not carried out during the traditional blooming season for the species however Nevin’s Barberry is a perennial species whose foliage is diagnostic and easily identifiable feature throughout the year. Nevin’s Barberry was not observed during the general biological survey or the focused survey carried out on October 1, 2018. Nevin’s Barberry is not present within the study area.

NON WRMSHCP COVERED SPECIES

In order to determine if the project may potentially impact special status species that may not be covered by the WRCMSHCP, a report for the area was generated from the California Natural Diversity Database (CNDDB). CNDDB data along with observations made in field were used to evaluate the potential for any special status species in the survey area. The CNDDB query produced a list of 21 species that have a special status and have been identified within the vicinity of the proposed expansion area. Of the 21 species that were identified, only five are not covered by the WRCMSHCP. The Crotch Bumble bee (Bombus crotchii) has been excluded from the following discussion as the species does not currently have either a federal or state special designation. Table 3 provides results of the CNDDB query.

Table 3.

Scientific Name	**Common Name**	**Federal Status**	**State Status**	**Rare Plant Rank**	**WRCMSHCP Covered**
Dipodomys stephensi	Stephens' kangaroo rat	FE	T	-	Yes
Calochortus plummerae	Plummer's mariposa-lily	-	-	4.2	Yes
Aspidoscelis hyperythra	orange-throated whiptail	-	WL	-	Yes
Chaetodipus fallax fallax	northwestern San Diego pocket mouse	-	SSC	-	No
Crotalus ruber	red-diamond rattlesnake	-	SSC	-	Yes
Aimophila ruficeps canescens	southern California rufous-crowned sparrow	-	WL	-	Yes
Onychomys torridus ramona	southern grasshopper mouse	-	SSC	-	No
Dipodomys merriami parvus	San Bernardino kangaroo rat	FE	SSC	-	Yes
Symphyotrichum defoliatum	San Bernardino aster	-	-	1B.2	No
Phrynosoma blainvillii	coast horned lizard	-	SSC	-	Yes
Aquila chrysaetos	golden eagle	-	FP, WL		Yes
Lepidium virginicum var. robinsonii	Robinson's pepper-grass	-	-	4.3	No
Vireo bellii pusillus	least Bell's vireo	FE	E	-	Yes
Bombus crotchii	Crotch bumble bee	-	-	-	No
Agelaius tricolor	tricolored blackbird	-	SSC	-	Yes
Centromadia pungens ssp. laevis	smooth tarplant	-	-	1B.1	Yes
Emys marmorata	western pond turtle	-	SSC	-	Yes
Spea hammondii	western spadefoot	-	SSC	-	Yes
Icteria virens	yellow-breasted chat	-	SSC	-	Yes
Setophaga petechia	yellow warbler	-	SSC	-	Yes
Elanus leucurus	white-tailed kite	-	FP	-	Yes

Federal Status
FE – Federally Endangered

State Status
E – Endangered
FP – Fully Protected
SSC – Species of Special Concern
T – Threatened
WL – Watch List

Rare Plants (CNPS)
1B1 – Rare, Threatened in California and Elsewhere. Seriously Threatened in CA.
1B.2 – Rare, Threatened in California and Elsewhere. Moderately Threatened in CA
4.2 – Plants of Limited Distribution (Watch List). Moderately Threatened in CA.
4.3 – Plants of Limited Distribution (Watch List). Not very Threatened in CA.

Species that are identified as "Covered" under the WRCMSHCP in Table 1 do not require any additional actions as take is granted for these species through participation in the WRCMSHCP. Possible consultation with the CDFW may be required in order to determine avoidance and minimization of impact strategies and any potential mitigation that may be required for species not covered by the WRCMSHCP and which are found to be present within the proposed disturbance area. The following analysis includes observations made during field surveys or a description of conditions in relation to the four special status species in Table 1 not covered by the WRCMSHCP.

Northwestern San Diego pocket mouse – The Northwestern San Diego pocket mouse (SDPM) is a common species typically found in sandy herbaceous areas with rocky outcroppings. The SDPM is listed as a CDFW Species of Special Concern (SSC). A CNDDB record describes a large quantity of SDPM found within the southern section of the study area and to the west of the Badlands Landfill Property during a 1992 survey of the area. The trapping areas where SDPM were trapped in 1992 contains similar habitat and conditions to those which are present within the lower elevation areas of the study area. No SDPM were observed during field surveys.

Southern Grasshopper Mouse – The Southern Grasshopper Mouse (SGM) is a common small rodent found mostly in arid scrublands with low to moderate shrub cover. The SGM is listed as a SSC by the CDFW. A single male SGM was collected approximately 2.5 miles southwest of the study site in the year 1938. Lower elevation areas typically along the bases of slopes contain habitat that may have the potential to support SGM within the proposed disturbance area. No SGM were observed during the biological survey.

San Bernardino Aster – San Bernardino Aster (SBA) is a rare plant that has been issued a rank of 1B.2 by the California Native Plant Society (CNPS). A 1B.2 ranking signifies that a plant is rare or threatened in California and elsewhere within the plant's range and is moderately threatened in California. SBA is primarily associated with wetland habitats but may also occur in grasslands, meadows, near ditches, springs, and streams. The proposed expansion area does not contain any wetlands; however, marginal habitat for the SBA is present within the study area in the form of ephemeral drainages and grasslands. Potential SBA habitat present within the Landfill's boundaries is of low quality due to the presence of well-drained soils and high levels of invasive species. The CNDDB record for SBA includes an observation made approximately 1.7 miles north of the study site within the San Timoteo Creek in the year 1951. No SBA were observed during the biological survey.

Robinson’s Pepper-grass – Robinson’s Pepper-grass (RPG) has a ranking of 4.3 according to the CNPS. A ranking of 4.3 indicates that a plant has limited distribution and is not very threatened in CA. The CNDDB entry for this species states that RPG was observed in 2001 within scarce patches along an ephemeral drainage and adjacent slopes. A concentrated effort was made to identify areas containing RPG during recent surveys, however no patches or individuals were identified.

The four special status species not covered by the WRCMSHCP and described above were not observed during the biological surveys carried out in 2017 and 2018. Previous biological surveys within portions of the proposed disturbance area did not identify the species in question. Focused surveys previously conducted by PCR in 2008 did not identify sensitive plants in the area including Robinson’s Pepper grass. In order to avoid direct impact to any of the four sensitive species described, it is recommended that a qualified biologist survey all proposed development areas prior to any ground disturbance. Prior to any ground disturbance activities, a qualified biologist should prepare appropriate mitigation or impact minimization plans in case one or more of the special status species are identified. The four species identified as sensitive and not covered by the WRCMSHCP are not listed as endangered or threatened by the U.S. Fish and Wildlife Service or the CDFW. Because the four species lack formal protection, the RCDWR will have to consult with the CDFW prior to implementing any mitigation measures should any of the species be identified.

WATER RESOURCES:

This proposed project shall impact water resources in the form of ephemeral drainages that exist within the proposed impact area. Some drainages shall be filled for the deposition of landfill materials while some drainages shall be impacted by the installation of basins that shall be employed for water quality. Details regarding impacts to drainages may be found in the WRCMSHCP compliance section of this document. Some of the drainages that shall be impacted may be classified as Waters of the U.S. and/or Waters of the State of California. The site does not contain any features that would qualify as wetlands. The site does not support any state or federally listed threatened or endangered aquatic species.

CONCLUSION:

In order to provide a vital service for the residents of Riverside County and the surrounding areas, the Badlands Landfill will have to expand its current refuse disposal areas. The proposed expansion project shall be designed and operated in a manner that conforms to WRCMSHCP guidelines and other regulatory bodies to minimize potential environmental and biological impacts.

The proposed BLIP shall be in compliance with the WRCMSHCP with completion of the DBESP process. The site has the potential to support species of special concern to the State of California that are not covered by the WRCMSHCP. While SSCs were not observed during the surveys, it is recommended that a qualified biologist survey all proposed development areas prior to any ground disturbance, and if warranted through positive surveys (species observed), consultation with the CDFW may be required to determine if avoidance and minimization measures or mitigation for potential impacts may be required.

RECOMMENDED BIOLOGICAL MITIGATION MEASURES:

MM-1 A qualified biologist shall be retained to act as a biological monitor during initial project implementation. The biological monitor shall review all proposed plans and provide directions to avoid or minimize impacts to sensitive biological resources. The biological monitor shall routinely monitor construction activities to ensure compliance with any regulations relating to the protection of wildlife or sensitive habitats.

MM-2 Should any habitat need to be cleared or disturbed during the traditional bird nesting season of February 1 – August 31, a qualified biologist shall conduct nesting bird clearance surveys no more than 3 days prior to the start of ground disturbance. The clearance surveys should cover the entire disturbance area as well as a 500 foot buffer area. If any nesting activity is detected during the surveys, the qualified biologist shall establish and oversee implementation of avoidance and impact minimization measures.

MM-3 The biological monitor shall monitor the project site prior to ground disturbance and during construction activities for the presence of the Northwestern San Diego Pocket Mouse, Southern Grasshopper Mouse, Robinson's Pepper-grass and San Bernardino Aster. The biological monitor shall carry out necessary impact avoidance and minimization activities to avoid take of the species until a Habitat Mitigation and Monitoring Plan (HMMP) can be produced and approved by the appropriate natural resource agencies.

MM-4 Prior to any ground disturbance activities, all Riverine/Riparian features within the vicinity of proposed construction activities which are not identified for disturbance shall be clearly identified and delineated by using methods which may include staking/tape, temporary fencing, signage, or other appropriate measures/methods as determined by the RCDWR in consultation with the biological monitor.

CERTIFICATION:

I hereby certify that the statements furnished above and in the attached exhibits present the information required for this biological evaluation and the statements provided are true and correct to the best of my knowledge and belief.

DATE: 01/16/2019 SIGNED: Harry Sandoval

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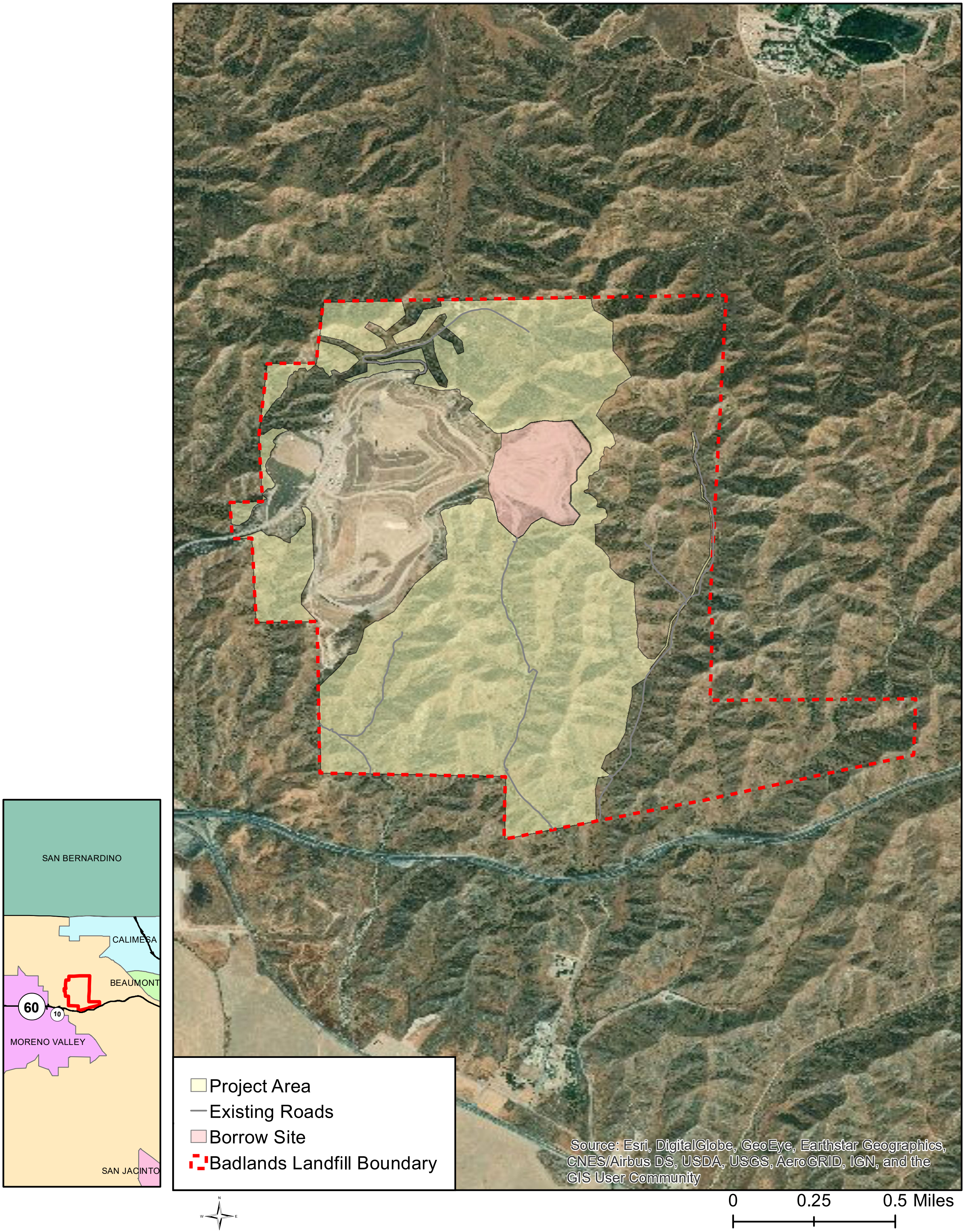
Western Riverside County Conservation Agency. RCA MSHCP Information APP.

APPENDIX A – Maps

Exhibit A: Badlands Landfill

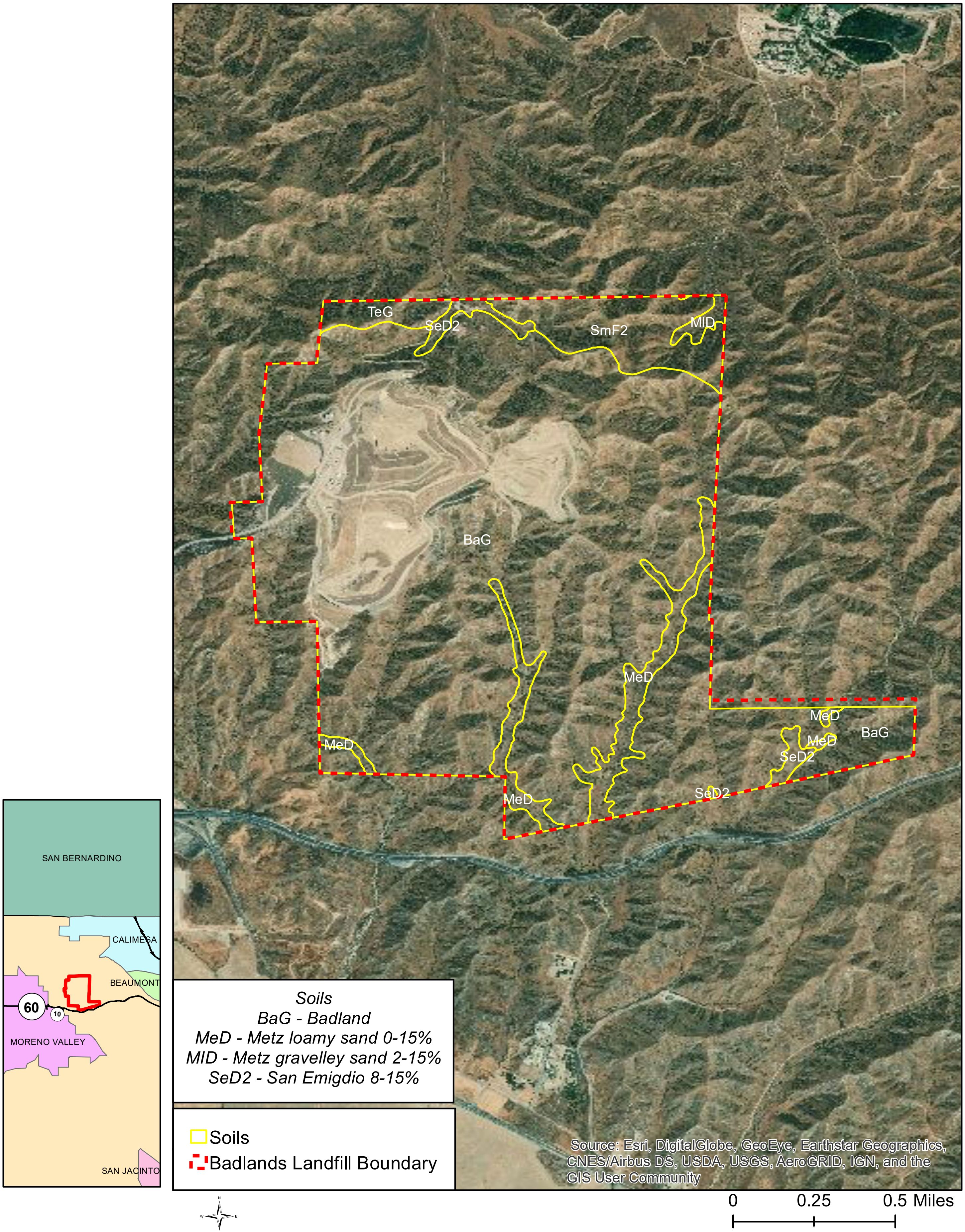
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit B: Project Limits



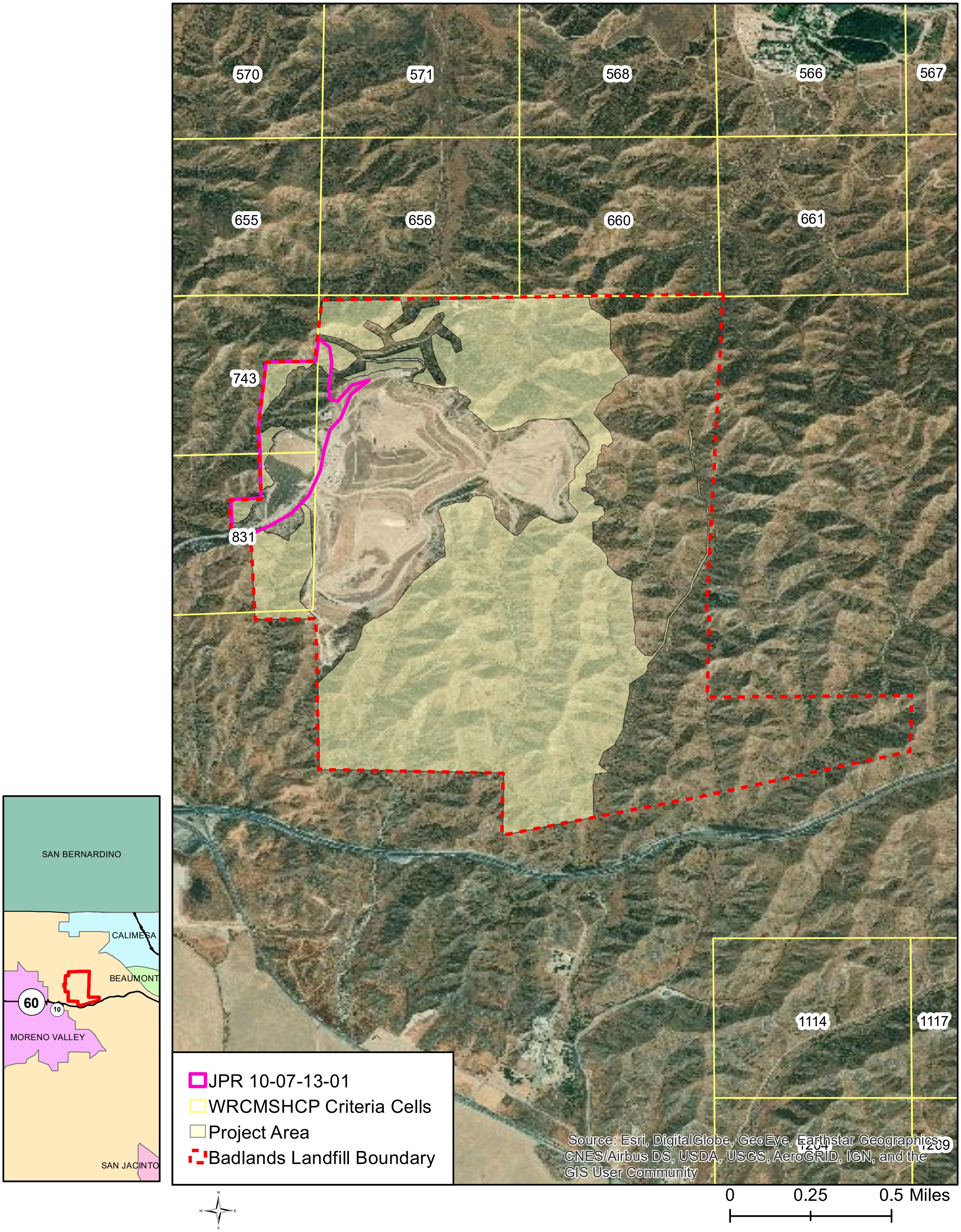
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit C: Soils



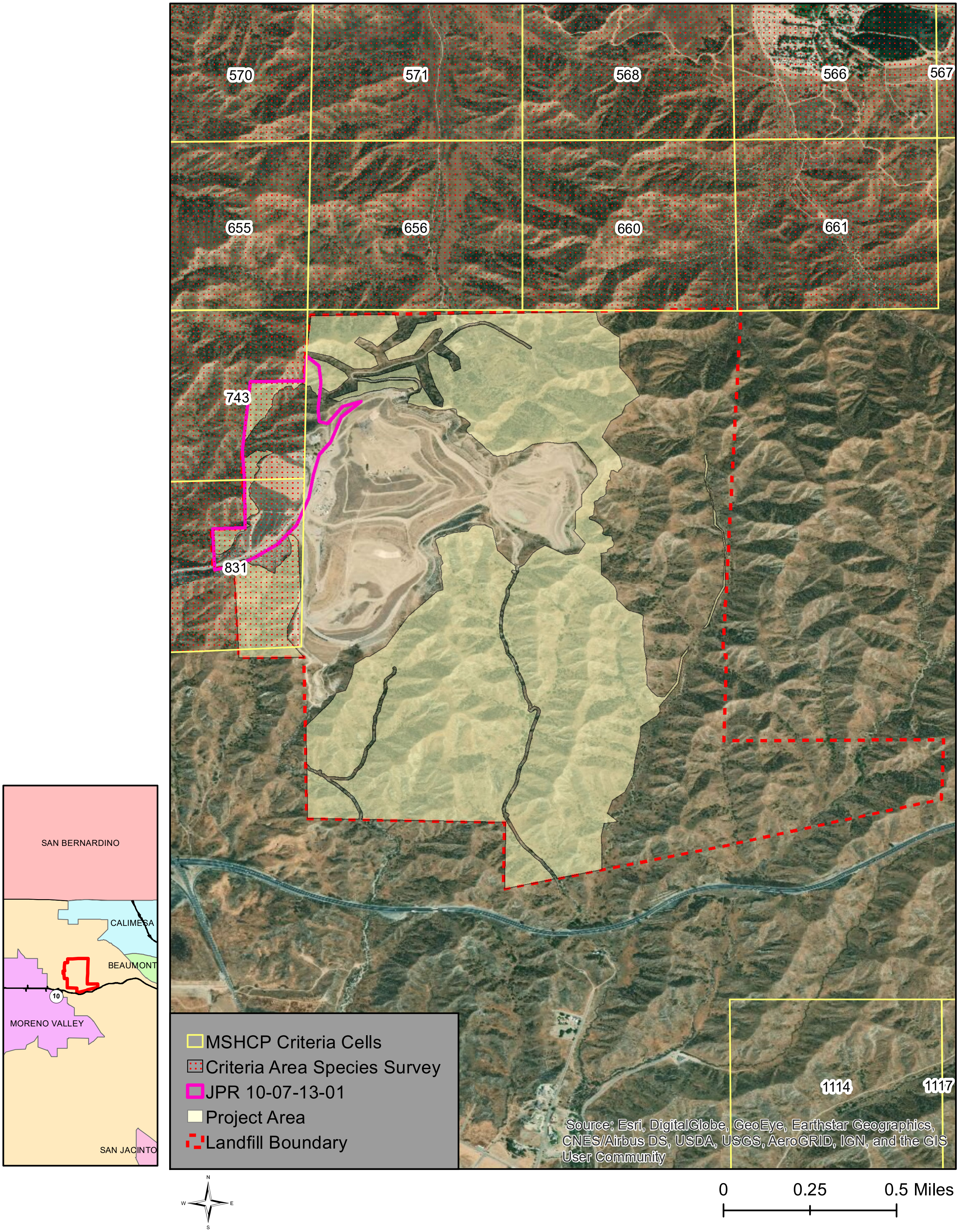
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit D: WRCMSHCP Criteria Cells



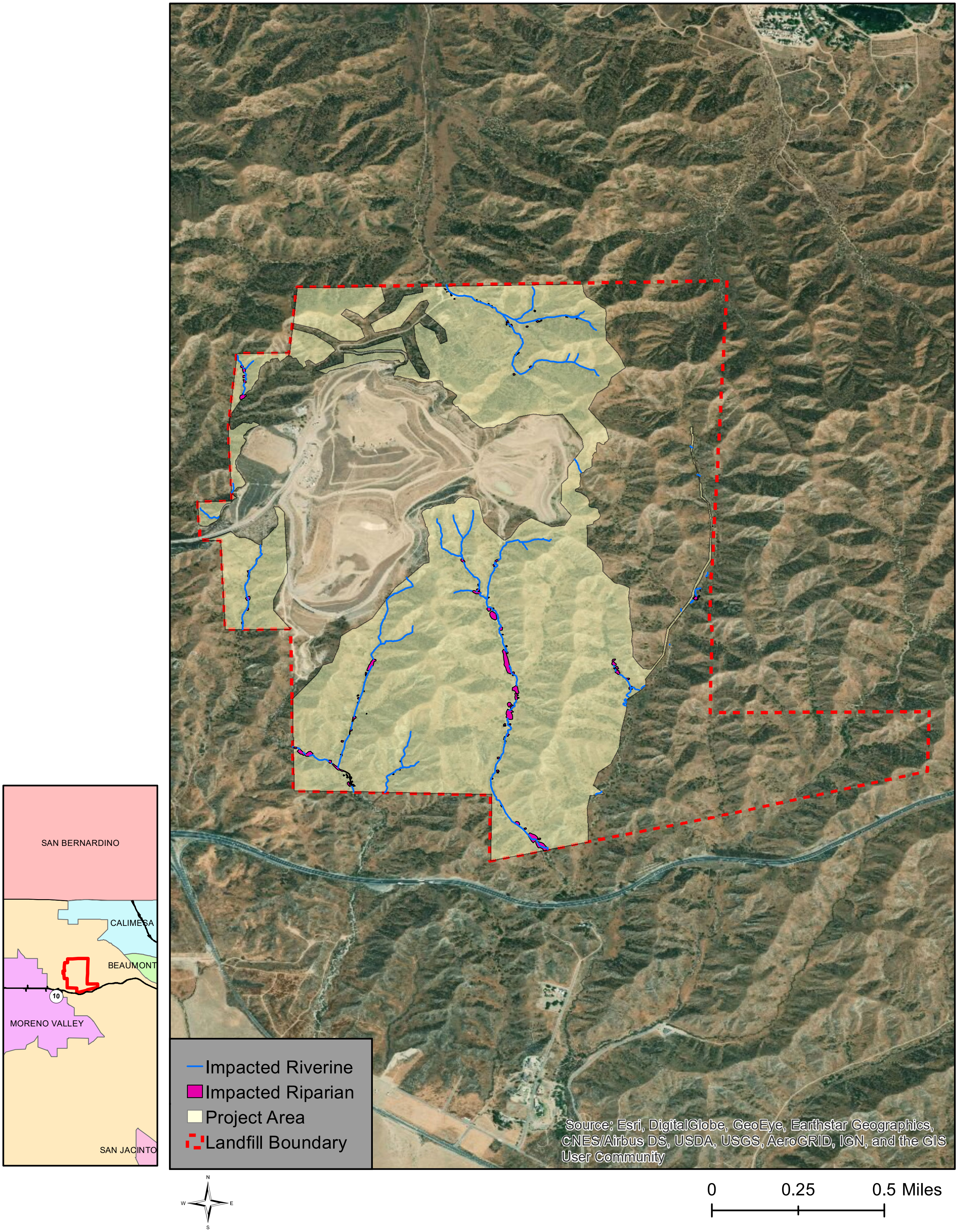
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit E: WRCMSHCP Criteria Area Species Survey Area



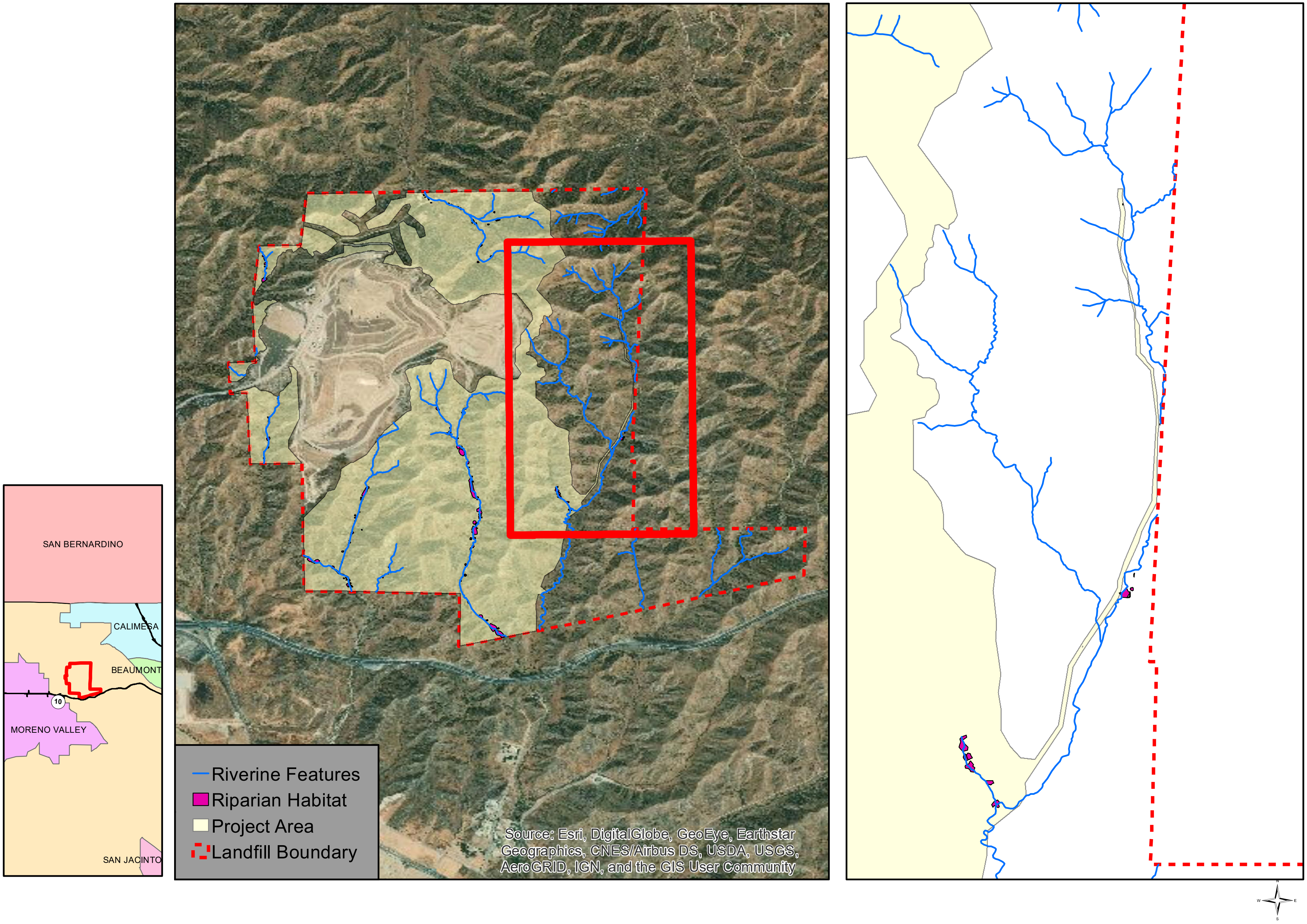
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit F: Riparian/Riverine Impacts



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Exhibit G: Riverine Impact Detail



Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Appendix B – Site Photos

Typical slope within southern survey area.

Slope with ephemeral drainage.

View to southeast from northern disturbance limit

View to south from above disturbance area.

Existing stockpile area not covered in report.

View of southern disturbance area from existing borrow area.

Steep topography within proposed expansion area.

Sugar bush scrub along eastern phasing slope.

Typical western facing slope within southern portion of survey area.

Typical topography within southern portion of survey area.

Vegetation within northern portion of survey area.

Main drainage within proposed disturbance area. Photo taken in northern portion.

Main drainage within disturbance area. Photo taken in southern portion.

Area exhibiting small mammal burrows on vertical slope.

Typical fossorial mammal burrows found throughout survey area.

View to east of Nevin's Barberry survey area.

Abandoned off road motorcycle park.

View of RCA conserved lands along northeast landfill boundary.

View to south from Ironwood Avenue.

Lands west and below of Ironwood Avenue.

Eastern shoulder of Ironwood Avenue.

Appendix C – Species Compendium

PLANTS

Adenostoma fasciculatum	chamise
Acmispon glaber	deerweed
Ambrosia acanthicarpa	annual burrweed
Amsinckia menziesii	small flowered fiddleneck
Artemisia californica	California sagebrush
Atriplex canescens	four wing saltbush
Avena barbata	slender oat
Baccharis pilularis	coyote bush
Baccharis salcifolia	mulefat
Brassica nigra	black mustard
Bromus diandra	ripgut brome
Bromus madritensis	foxtail chess
Ceanothus megacarpus	big pod ceanothus
Centaurea melitensis	Maltese star thistle
Claytonia perfoliata	miner’s lettuce
Dudleya lanceolate	Southern California dudleya
Encelia farinose	brittlebush
Erigonium fasciculatum	California buckwheat
Heteromeles arbutifolia	toyon
Hirschfeldia incana	short pod mustard
Lactuca serriola	prickly lettuce
Lupinus bicolor	bicolored lupine
Marrubium vulgare	horehound
Nicotina glauca	tree tobacco
Oncosiphon piluliferum	stinknet
Phacelia distans	common phacelia
Pinus sabiniana	grey pine
Salsola tragus	Russian thistle
Salvia apiana	white sage
Salvia mellifera	black sage
Schismus barbatus	Mediterranean grass
Sisymbrium irio	London rocket
Quercus berberidifolia	inland scrub oak
Rhus ovata	sugar bush
Rhamnus crocea	redberry buckthorn
Rhamnus illicifolia	hollyleaf redberry
Rhus ovata	sugar bush
Toxicodendron diversilobum	poison oak
Yucca schidigera	Mojave yucca

ANIMALS

Birds

Buteo jamaicensis	red-tailed hawk
Callipepla californica	California quail
Calypte anna	Anna’s hummingbird
Carpodacus mexicanus	house finch
Chamaea fasciata	wrentit
Corvus brachyrhychos	American crow
Corvus corax	common raven
Geococcyx californianus	greater roadrunner
Larus agentatus	herring gull
Larus californicus	California gull
Melospiza melodia	song sparrow
Melozone crissalis	California towhee
Mimus polyglottos	northern mockingbird
Phainopepla nitens	phainopepla
Picoides nuttallii	Nuttall’s woodpecker
Pipilo maculatus	California towhee
Psaltiparus minimus	American bustit
Salpincetes obsoletus	rock wren
Spinus melodia	lesser goldfinch
Troglodytes aedon	house wren

Mammals

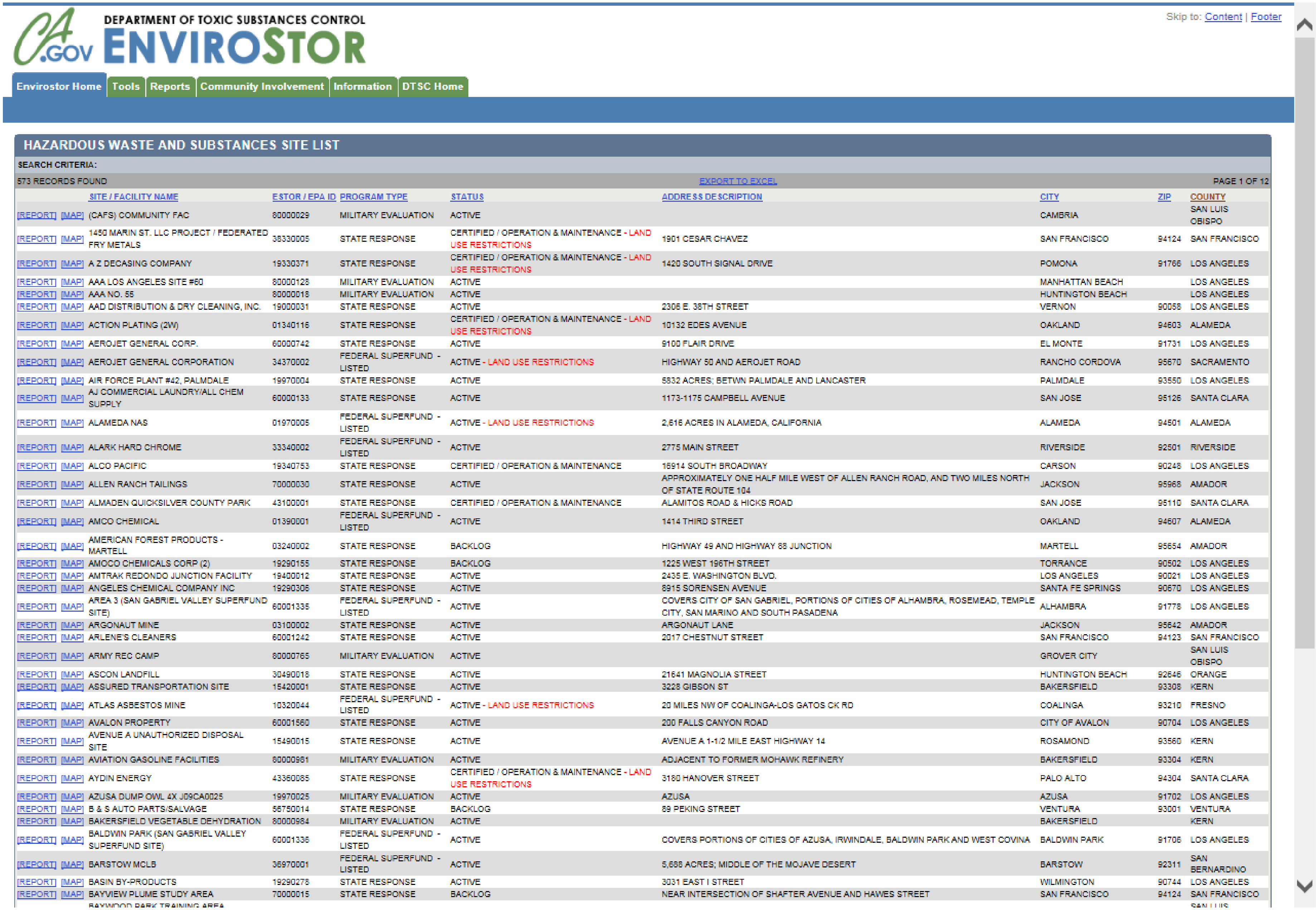
Canis latrans	coyote
Lepus californicus	black-tailed jackrabbit
Lynx rufus	bobcat
Otospermophilus beecheyi	California ground squirrel
Thomomys bottae	Botta’s pocket gopher

Reptiles

Crotalus oreganus	Southern pacific rattlesnake
Crotalus ruber	red diamond rattlesnake
Elgaria multicarinsta	alligator lizard
Pituophis catenifer	gophersnake
Sceloporus occidentalis	western fence lizard
Uta stansburiana	common side-blotched lizard

General Plan, GIS, and Other Sources

http://www.envirostor.dtsc.ca.gov/public/search.asp?cmd=search&reporttype=CORTESE&site_type=CSITES,OPEN,FUDS,CLOSE&status=ACT,BKLG,COM&reporttitle=HAZARDOUS+WASTE+AND+SUBSTANCES+SITE+LIST



HAZARDOUS WASTE AND SUBSTANCES SITE LIST

SEARCH CRITERIA:

573 RECORDS FOUND EXPORT TO EXCEL PAGE 1 OF 12

	SITE / FACILITY NAME	ESTOR / EPA ID	PROGRAM TYPE	STATUS	ADDRESS DESCRIPTION	CITY	ZIP	COUNTY
[REPORT] [MAP]	(CAFS) COMMUNITY FAC	80000029	MILITARY EVALUATION	ACTIVE		CAMBRIA		SAN LUIS OBISPO
[REPORT] [MAP]	1450 MARIN ST. LLC PROJECT / FEDERATED FRY METALS	38330005	STATE RESPONSE	CERTIFIED / OPERATION & MAINTENANCE - LAND USE RESTRICTIONS	1901 CESAR CHAVEZ	SAN FRANCISCO	94124	SAN FRANCISCO
[REPORT] [MAP]	A Z DECASING COMPANY	19330371	STATE RESPONSE	CERTIFIED / OPERATION & MAINTENANCE - LAND USE RESTRICTIONS	1420 SOUTH SIGNAL DRIVE	POMONA	91766	LOS ANGELES
[REPORT] [MAP]	AAA LOS ANGELES SITE #60	80000128	MILITARY EVALUATION	ACTIVE		MANHATTAN BEACH		LOS ANGELES
[REPORT] [MAP]	AAA NO. 55	80000018	MILITARY EVALUATION	ACTIVE		HUNTINGTON BEACH		LOS ANGELES
[REPORT] [MAP]	AAD DISTRIBUTION & DRY CLEANING, INC.	19000031	STATE RESPONSE	ACTIVE	2306 E. 38TH STREET	VERNON	90058	LOS ANGELES
[REPORT] [MAP]	ACTION PLATING (2W)	01340116	STATE RESPONSE	CERTIFIED / OPERATION & MAINTENANCE - LAND USE RESTRICTIONS	10132 EDES AVENUE	OAKLAND	94603	ALAMEDA
[REPORT] [MAP]	AEROJET GENERAL CORP.	60000742	STATE RESPONSE	ACTIVE	9100 FLAIR DRIVE	EL MONTE	91731	LOS ANGELES
[REPORT] [MAP]	AEROJET GENERAL CORPORATION	34370002	FEDERAL SUPERFUND - LISTED	ACTIVE - LAND USE RESTRICTIONS	HIGHWAY 50 AND AEROJET ROAD	RANCHO CORDOVA	95670	SACRAMENTO
[REPORT] [MAP]	AIR FORCE PLANT #42, PALMDALE	19970004	STATE RESPONSE	ACTIVE	5832 ACRES; BETWN PALMDALE AND LANCASTER	PALMDALE	93550	LOS ANGELES
[REPORT] [MAP]	AJ COMMERCIAL LAUNDRY/ALL CHEM SUPPLY	60000133	STATE RESPONSE	ACTIVE	1173-1175 CAMPBELL AVENUE	SAN JOSE	95126	SANTA CLARA
[REPORT] [MAP]	ALAMEDA NAS	01970005	FEDERAL SUPERFUND - LISTED	ACTIVE - LAND USE RESTRICTIONS	2,616 ACRES IN ALAMEDA, CALIFORNIA	ALAMEDA	94501	ALAMEDA
[REPORT] [MAP]	ALARK HARD CHROME	33340002	FEDERAL SUPERFUND - LISTED	ACTIVE	2775 MAIN STREET	RIVERSIDE	92501	RIVERSIDE
[REPORT] [MAP]	ALCO PACIFIC	19340753	STATE RESPONSE	CERTIFIED / OPERATION & MAINTENANCE	16914 SOUTH BROADWAY	CARSON	90248	LOS ANGELES
[REPORT] [MAP]	ALLEN RANCH TAILINGS	70000030	STATE RESPONSE	ACTIVE	APPROXIMATELY ONE HALF MILE WEST OF ALLEN RANCH ROAD, AND TWO MILES NORTH OF STATE ROUTE 104	JACKSON	95968	AMADOR
[REPORT] [MAP]	ALMADEN QUICKSILVER COUNTY PARK	43100001	STATE RESPONSE	CERTIFIED / OPERATION & MAINTENANCE	ALAMITOS ROAD & HICKS ROAD	SAN JOSE	95110	SANTA CLARA
[REPORT] [MAP]	AMCO CHEMICAL	01390001	FEDERAL SUPERFUND - LISTED	ACTIVE	1414 THIRD STREET	OAKLAND	94607	ALAMEDA
[REPORT] [MAP]	AMERICAN FOREST PRODUCTS - MARTELL	03240002	STATE RESPONSE	BACKLOG	HIGHWAY 49 AND HIGHWAY 88 JUNCTION	MARTELL	95654	AMADOR
[REPORT] [MAP]	AMOCO CHEMICALS CORP (2)	19290155	STATE RESPONSE	BACKLOG	1225 WEST 196TH STREET	TORRANCE	90502	LOS ANGELES
[REPORT] [MAP]	AMTRAK REDONDO JUNCTION FACILITY	19400012	STATE RESPONSE	ACTIVE	2435 E. WASHINGTON BLVD.	LOS ANGELES	90021	LOS ANGELES
[REPORT] [MAP]	ANGELES CHEMICAL COMPANY INC	19290306	STATE RESPONSE	ACTIVE	8915 SORENSEN AVENUE	SANTA FE SPRINGS	90670	LOS ANGELES
[REPORT] [MAP]	AREA 3 (SAN GABRIEL VALLEY SUPERFUND SITE)	60001335	FEDERAL SUPERFUND - LISTED	ACTIVE	COVERS CITY OF SAN GABRIEL, PORTIONS OF CITIES OF ALHAMBRA, ROSEMEAD, TEMPLE CITY, SAN MARINO AND SOUTH PASADENA	ALHAMBRA	91778	LOS ANGELES
[REPORT] [MAP]	ARGONAUT MINE	03100002	STATE RESPONSE	ACTIVE	ARGONAUT LANE	JACKSON	95642	AMADOR
[REPORT] [MAP]	ARLENE'S CLEANERS	60001242	STATE RESPONSE	ACTIVE	2017 CHESTNUT STREET	SAN FRANCISCO	94123	SAN FRANCISCO
[REPORT] [MAP]	ARMY REC CAMP	80000765	MILITARY EVALUATION	ACTIVE		GROVER CITY		SAN LUIS OBISPO
[REPORT] [MAP]	ASCON LANDFILL	30490018	STATE RESPONSE	ACTIVE	21641 MAGNOLIA STREET	HUNTINGTON BEACH	92646	ORANGE
[REPORT] [MAP]	ASSURED TRANSPORTATION SITE	15420001	STATE RESPONSE	ACTIVE	3228 GIBSON ST	BAKERSFIELD	93308	KERN
[REPORT] [MAP]	ATLAS ASBESTOS MINE	10320044	FEDERAL SUPERFUND - LISTED	ACTIVE - LAND USE RESTRICTIONS	20 MILES NW OF COALINGA-LOS GATOS CK RD	COALINGA	93210	FRESNO
[REPORT] [MAP]	AVALON PROPERTY	60001560	STATE RESPONSE	ACTIVE	200 FALLS CANYON ROAD	CITY OF AVALON	90704	LOS ANGELES
[REPORT] [MAP]	AVENUE A UNAUTHORIZED DISPOSAL SITE	15490015	STATE RESPONSE	ACTIVE	AVENUE A 1-1/2 MILE EAST HIGHWAY 14	ROSAMOND	93560	KERN
[REPORT] [MAP]	AVIATION GASOLINE FACILITIES	80000961	MILITARY EVALUATION	ACTIVE	ADJACENT TO FORMER MOHAWK REFINERY	BAKERSFIELD	93304	KERN
[REPORT] [MAP]	AYDIN ENERGY	43360085	STATE RESPONSE	CERTIFIED / OPERATION & MAINTENANCE - LAND USE RESTRICTIONS	3180 HANOVER STREET	PALO ALTO	94304	SANTA CLARA
[REPORT] [MAP]	AZUSA DUMP OWL 4X J09CA0025	19970025	MILITARY EVALUATION	ACTIVE	AZUSA	AZUSA	91702	LOS ANGELES
[REPORT] [MAP]	B & S AUTO PARTS/SALVAGE	56750014	STATE RESPONSE	BACKLOG	89 PEKING STREET	VENTURA	93001	VENTURA
[REPORT] [MAP]	BAKERSFIELD VEGETABLE DEHYDRATION	80000984	MILITARY EVALUATION	ACTIVE		BAKERSFIELD		KERN
[REPORT] [MAP]	BALDWIN PARK (SAN GABRIEL VALLEY SUPERFUND SITE)	60001336	FEDERAL SUPERFUND - LISTED	ACTIVE	COVERS PORTIONS OF CITIES OF AZUSA, IRWINDALE, BALDWIN PARK AND WEST COVINA	BALDWIN PARK	91706	LOS ANGELES
[REPORT] [MAP]	BARSTOW MCLB	36970001	FEDERAL SUPERFUND - LISTED	ACTIVE	5,688 ACRES; MIDDLE OF THE MOJAVE DESERT	BARSTOW	92311	SAN BERNARDINO
[REPORT] [MAP]	BASIN BY-PRODUCTS	19290278	STATE RESPONSE	ACTIVE	3031 EAST I STREET	WILMINGTON	90744	LOS ANGELES
[REPORT] [MAP]	BAYVIEW PLUME STUDY AREA	70000015	STATE RESPONSE	BACKLOG	NEAR INTERSECTION OF SHAFTER AVENUE AND HAWES STREET	SAN FRANCISCO	94124	SAN FRANCISCO
	BAYWOOD PARK TRAINING AREA							SAN LUIS

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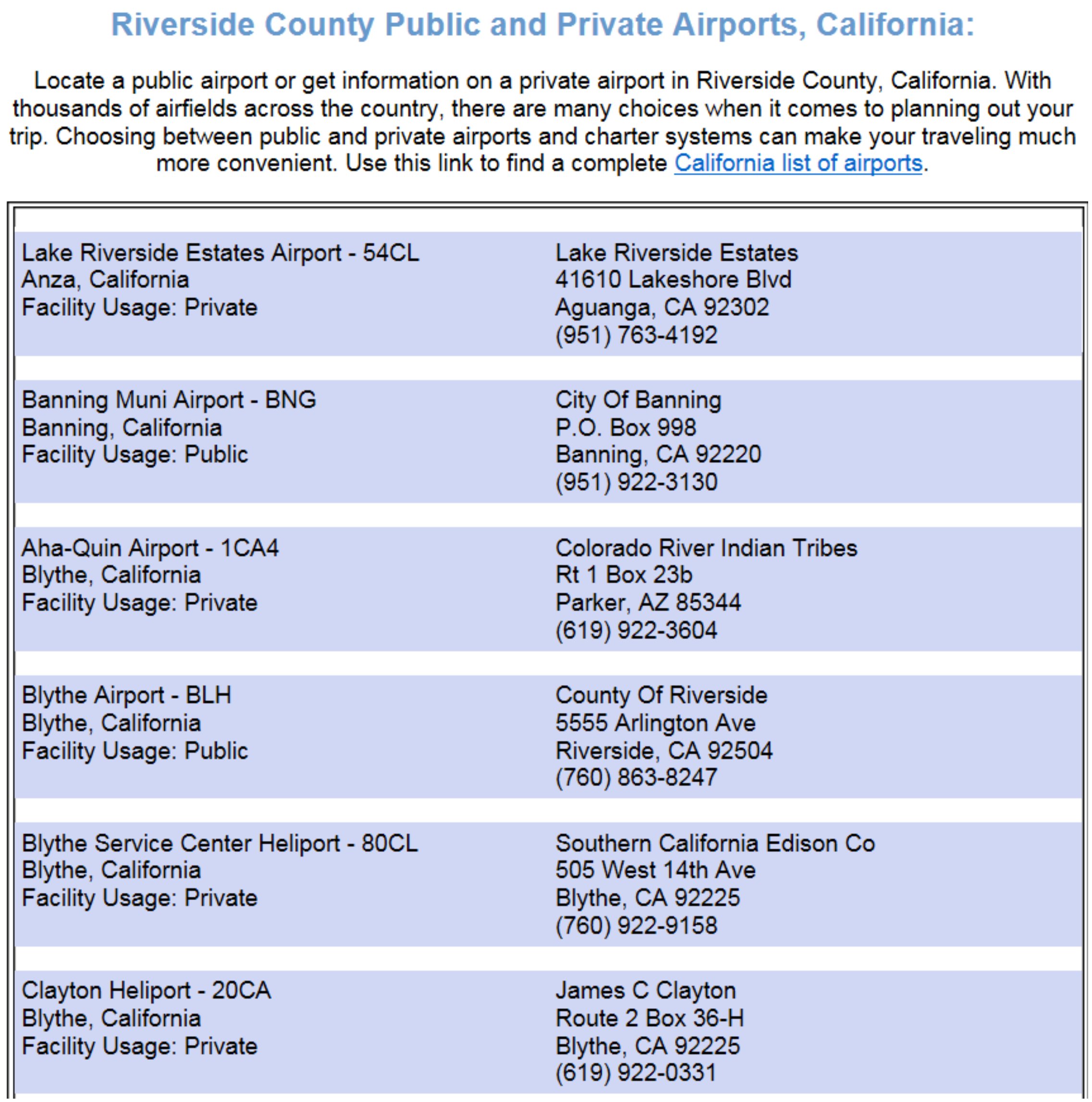
http://www.tollfreeairline.com/california/riverside.htm



Riverside County Public and Private Airports, California:

Locate a public airport or get information on a private airport in Riverside County, California. With thousands of airfields across the country, there are many choices when it comes to planning out your trip. Choosing between public and private airports and charter systems can make your traveling much more convenient. Use this link to find a complete California list of airports.

Lake Riverside Estates Airport - 54CL Anza, California Facility Usage: Private	Lake Riverside Estates 41610 Lakeshore Blvd Aguanga, CA 92302 (951) 763-4192
Banning Muni Airport - BNG Banning, California Facility Usage: Public	City Of Banning P.O. Box 998 Banning, CA 92220 (951) 922-3130
Aha-Quin Airport - 1CA4 Blythe, California Facility Usage: Private	Colorado River Indian Tribes Rt 1 Box 23b Parker, AZ 85344 (619) 922-3604
Blythe Airport - BLH Blythe, California Facility Usage: Public	County Of Riverside 5555 Arlington Ave Riverside, CA 92504 (760) 863-8247
Blythe Service Center Heliport - 80CL Blythe, California Facility Usage: Private	Southern California Edison Co 505 West 14th Ave Blythe, CA 92225 (760) 922-9158
Clayton Heliport - 20CA Blythe, California Facility Usage: Private	James C Clayton Route 2 Box 36-H Blythe, CA 92225 (619) 922-0331

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http://www.rcaluc.org

RIVERSIDE COUNTY
AIRPORT LAND USE COMMISSION

Quick Links

2015 ALUC Submission Schedule

Current Fee Schedule (See page 3 of form)

2013-2014 March Air Reserve Base

Click here to view draft documents. NEW

2011 Amendment to 2007 French Valley Airport

Click here to view draft documents.

2010 Perris Valley Airport

Click here to review draft documents

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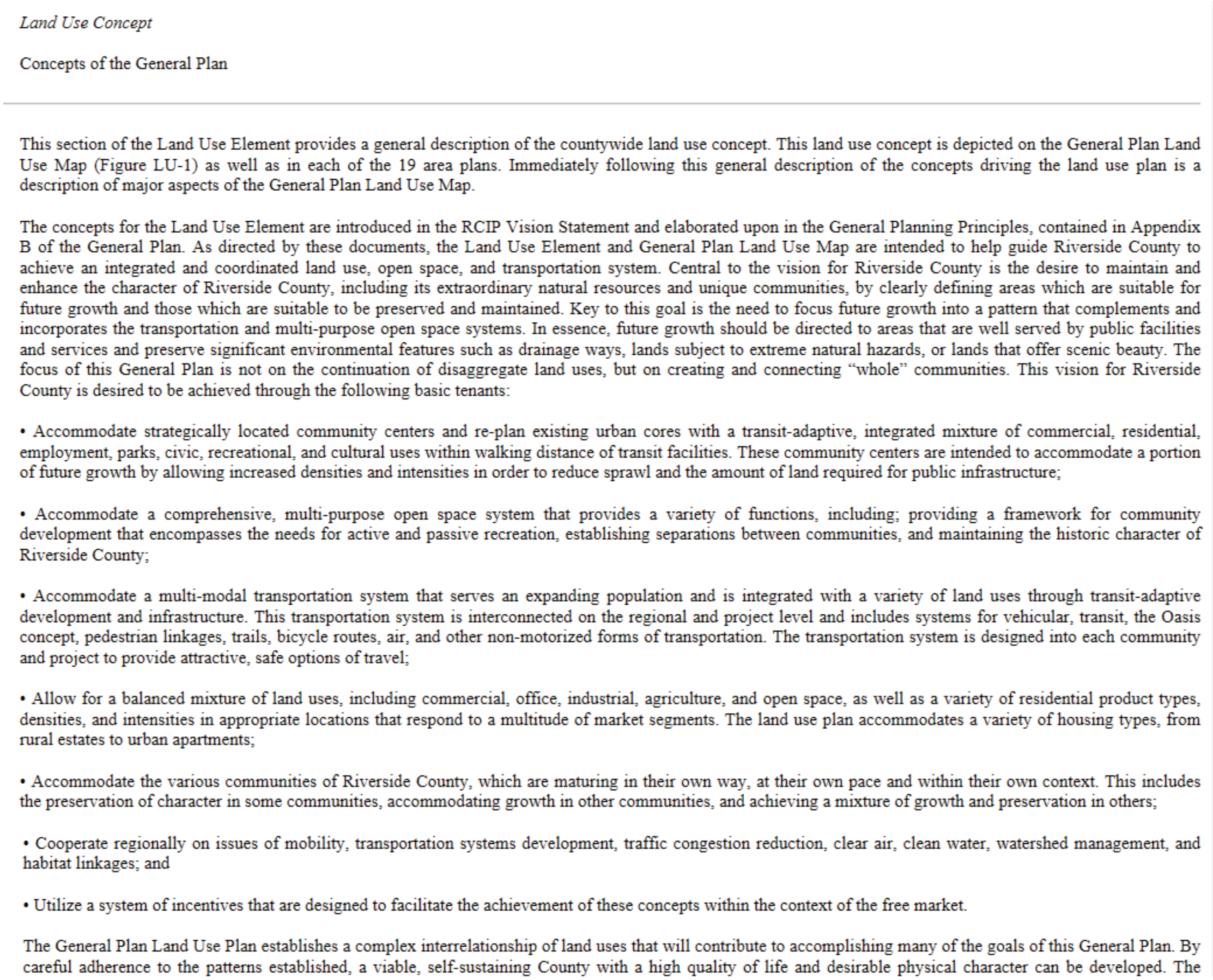
Riverside County General Plan

http://planning.rctlma.org/Portals/0/genplan/content/gp/chapter03.html#TOC1_3



Land Use Concept

Concepts of the General Plan

This section of the Land Use Element provides a general description of the countywide land use concept. This land use concept is depicted on the General Plan Land Use Map (Figure LU-1) as well as in each of the 19 area plans. Immediately following this general description of the concepts driving the land use plan is a description of major aspects of the General Plan Land Use Map.

The concepts for the Land Use Element are introduced in the RCIP Vision Statement and elaborated upon in the General Planning Principles, contained in Appendix B of the General Plan. As directed by these documents, the Land Use Element and General Plan Land Use Map are intended to help guide Riverside County to achieve an integrated and coordinated land use, open space, and transportation system. Central to the vision for Riverside County is the desire to maintain and enhance the character of Riverside County, including its extraordinary natural resources and unique communities, by clearly defining areas which are suitable for future growth and those which are suitable to be preserved and maintained. Key to this goal is the need to focus future growth into a pattern that complements and incorporates the transportation and multi-purpose open space systems. In essence, future growth should be directed to areas that are well served by public facilities and services and preserve significant environmental features such as drainage ways, lands subject to extreme natural hazards, or lands that offer scenic beauty. The focus of this General Plan is not on the continuation of disaggregate land uses, but on creating and connecting “whole” communities. This vision for Riverside County is desired to be achieved through the following basic tenants:

- Accommodate strategically located community centers and re-plan existing urban cores with a transit-adaptive, integrated mixture of commercial, residential, employment, parks, civic, recreational, and cultural uses within walking distance of transit facilities. These community centers are intended to accommodate a portion of future growth by allowing increased densities and intensities in order to reduce sprawl and the amount of land required for public infrastructure;

- Accommodate a comprehensive, multi-purpose open space system that provides a variety of functions, including; providing a framework for community development that encompasses the needs for active and passive recreation, establishing separations between communities, and maintaining the historic character of Riverside County;

- Accommodate a multi-modal transportation system that serves an expanding population and is integrated with a variety of land uses through transit-adaptive development and infrastructure. This transportation system is interconnected on the regional and project level and includes systems for vehicular, transit, the Oasis concept, pedestrian linkages, trails, bicycle routes, air, and other non-motorized forms of transportation. The transportation system is designed into each community and project to provide attractive, safe options of travel;

- Allow for a balanced mixture of land uses, including commercial, office, industrial, agriculture, and open space, as well as a variety of residential product types, densities, and intensities in appropriate locations that respond to a multitude of market segments. The land use plan accommodates a variety of housing types, from rural estates to urban apartments;

- Accommodate the various communities of Riverside County, which are maturing in their own way, at their own pace and within their own context. This includes the preservation of character in some communities, accommodating growth in other communities, and achieving a mixture of growth and preservation in others;

- Cooperate regionally on issues of mobility, transportation systems development, traffic congestion reduction, clear air, clean water, watershed management, and habitat linkages; and

- Utilize a system of incentives that are designed to facilitate the achievement of these concepts within the context of the free market.

The General Plan Land Use Plan establishes a complex interrelationship of land uses that will contribute to accomplishing many of the goals of this General Plan. By careful adherence to the patterns established, a viable, self-sustaining County with a high quality of life and desirable physical character can be developed. The

Countywide Integrated Waste Management Plan (CIWMP)
http://www.rivcowm.org/opencms/ab939/pdf/55402-Riverside-CIWMP-Final-Draft-Sept1996.pdf

COUNTYWIDE INTEGRATED WASTE MANAGEMENT PLAN

EXECUTIVE SUMMARY

Introduction

The Countywide Integrated Waste Management Plan (CIWMP) has been prepared in accordance with the California Integrated Waste Management Act of 1989 (Statutes of 1989, Chapter 1095 [AB939[1]]). AB 939 redefined solid waste management in terms of both objectives and planning responsibilities for local jurisdictions and the state. AB 939 was adopted in an effort to reduce the volume and toxicity of solid waste that is landfilled and incinerated by requiring local governments to prepare and implement plans to improve the management of waste resources.

AB 939 requires each of the cities and unincorporated portions of counties throughout the state to divert a minimum of 25% of the solid waste landfilled by 1995 and 50% by the year 2000. To attain these goals for reductions in disposal, AB 939 established a planning hierarchy utilizing new integrated solid waste management practices. In order of priority, these practices are:

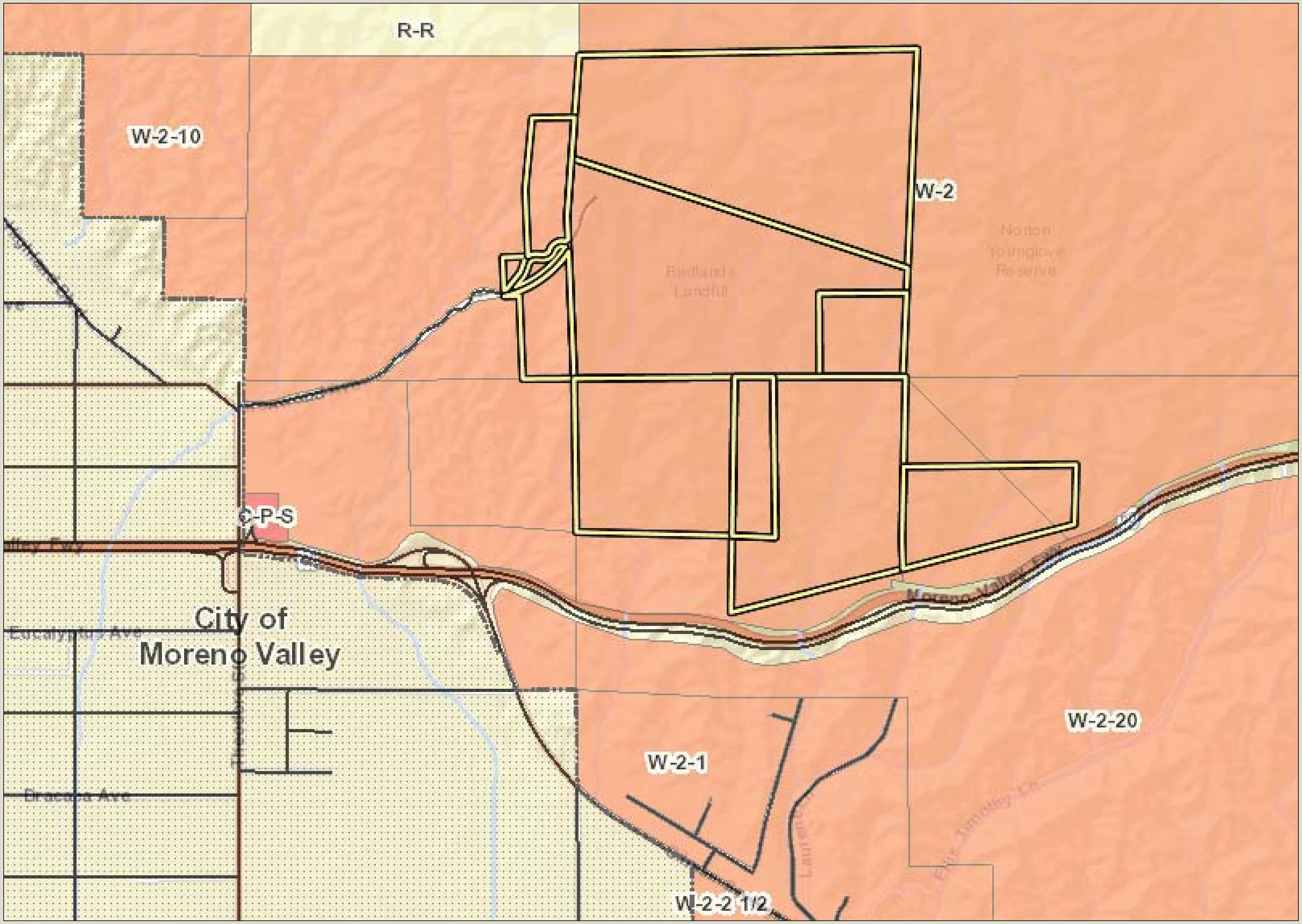
1. Source Reduction (Waste Prevention)
2. Recycling and Composting
3. Environmentally Safe Landfill Disposal and Transformation

In 1992, Assembly Bill 2494 (Statutes of 1992, Chapter 1292 [AB 2494]), changed the method of determining goal compliance. Under this newer legislation, a jurisdiction's compliance with AB 939 is no longer determined by what percentage of solid waste is diverted, but rather by the reduction in the solid waste disposed through landfilling or incineration. Jurisdictions are no longer required to attempt to track diversion from activities which they do not sponsor. Diversion programs sponsored by public agencies, however, must be monitored and these reports are sent annually to the California Integrated Waste Management Board (CIWMB).

Transition From Riverside County Solid Waste Management Plan (CoSWMP) to Countywide Integrated Waste Management Plan (CIWMP)

Prior to adoption of AB 939, the countywide waste management system was shaped by the Riverside County Solid Waste Management Plan (CoSWMP). The California Solid Waste Management and Resource Recovery Act of 1972 required that each county within the State prepare a comprehensive, coordinated solid waste management plan for all waste disposed within a county and all waste exported out-of-county. On January 1, 1975, the California Waste

Zoning



Legend

Zoning

- ▨ OTHER ZONING
- 🟩 A-1
- 🟩 A-1-1
- 🟩 A-1-1 1/2
- 🟩 A-1-1/2
- 🟩 A-1-10
- 🟩 A-1-15
- 🟩 A-1-2
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- 🟩 A-P-10
- 🟩 A-P-2 1/2

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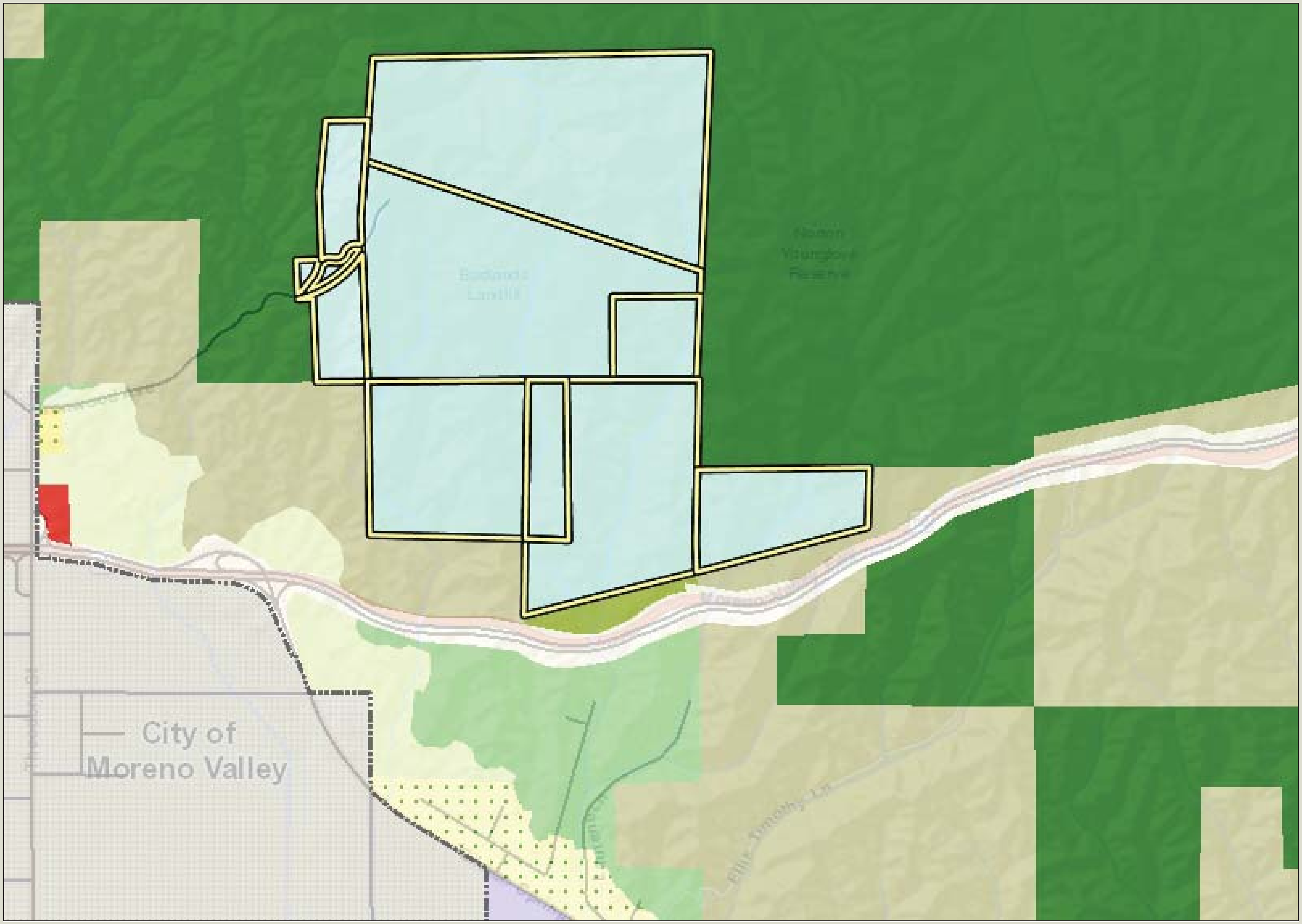
Notes

W-2
Controlled Development

General Plan Land Use Designation



Legend

General Plan Land Use

- Rural Community - Estate Density F
- Rural Community - Very Low Densi
- Rural Community - Low Density Re
- Estate Density Residential
- Very Low Density Residential
- Low Density Residential
- Medium Density Residential
- Medium High Density Residential
- High Density Residential
- Very High Density Residential
- Highest Density Residential
- Commercial Retail
- Commercial Tourist
- Commercial Office
- Community Center
- Light Industrial
- Heavy Industrial
- Business Park
- Public Facilities
- Mixed Use Area
- Rural Residential
- Rural Mountainous
- Rural Desert
- Agriculture
- Conservation
- Conservation Habitat

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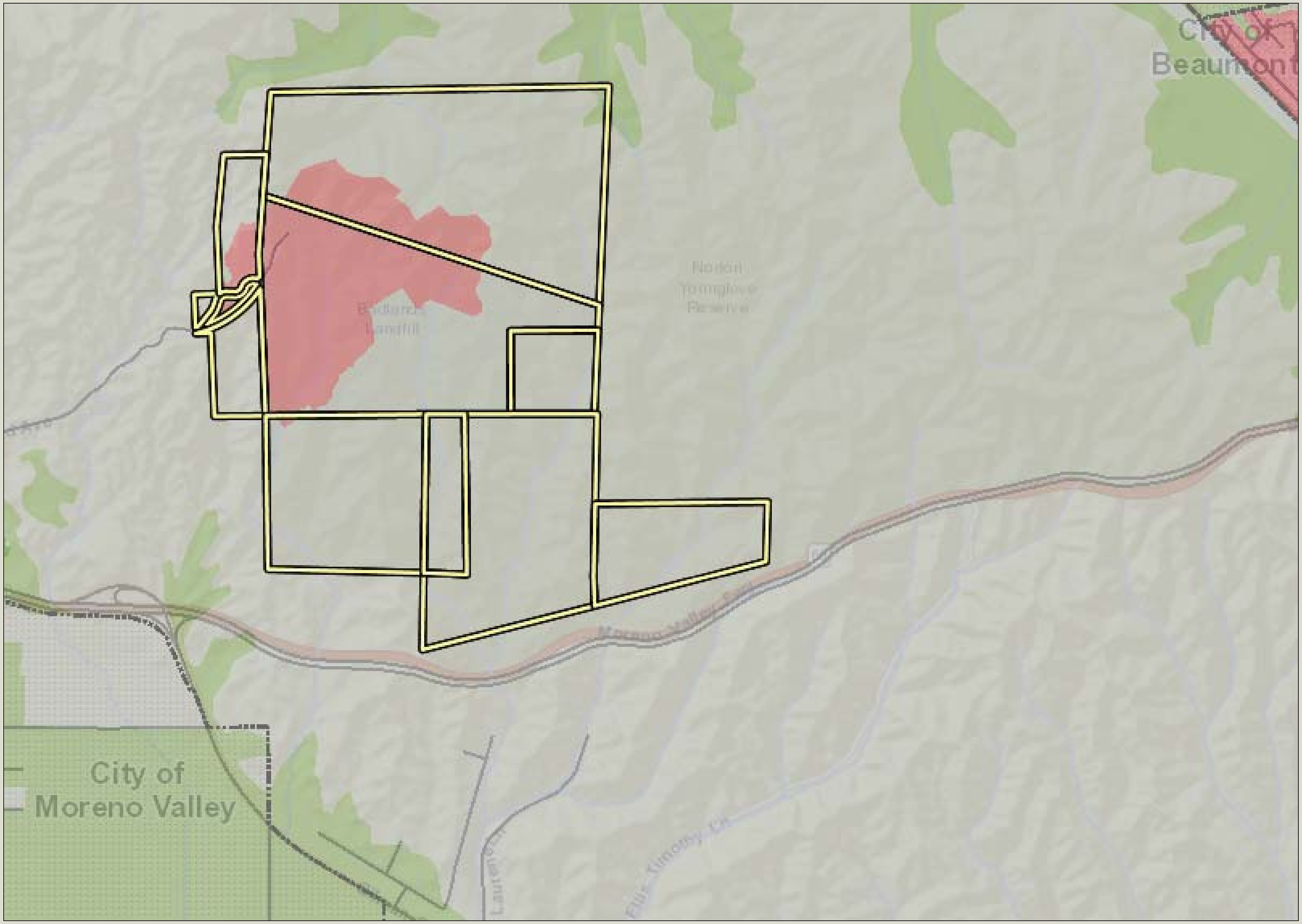
Notes

Farmlands



Legend

Farmlands
- ▨ OTHER FARMLANDS
- 🟫 GRAZING LAND
- 🟩 LOCAL IMPORTANCE
- ⬜ OTHER LANDS
- 🟩 PRIME FARMLAND
- 🟨 STATEWIDE IMPORTANCE
- 🟩 UNIQUE FARMLAND
- 🟥 URBAN-BUILT UP LAND

County Centerline Names

— County Centerlines

— Blueline Streams

⋮⋮ City Areas

World Street Map

Notes

0 3,009 6,019 Feet

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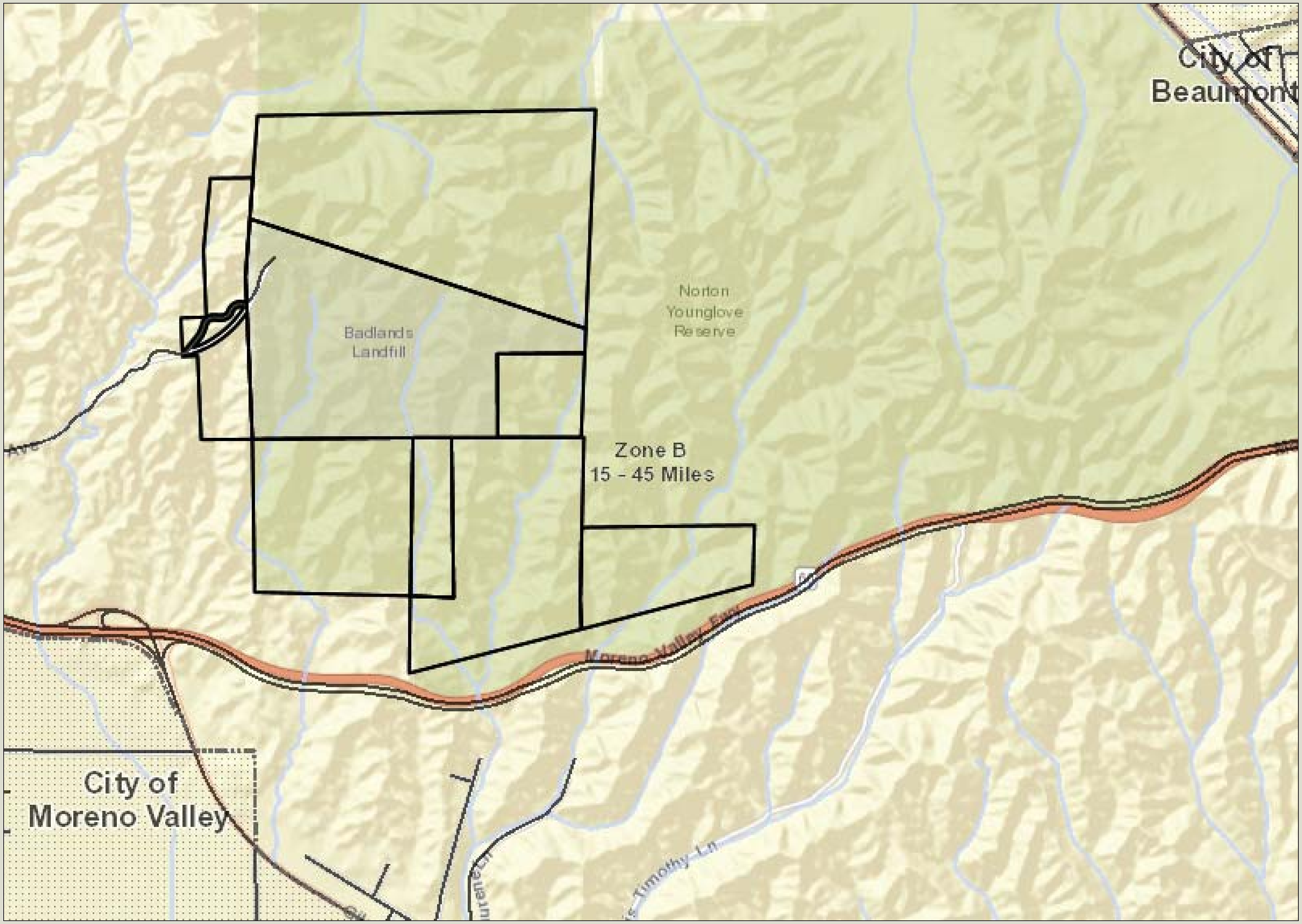
Mt. Palomar Observatory Zone



Legend

County Centerline Names
— County Centerlines
Blueline Streams
☐ Mt. Palomar Lighting Zones
City Areas
World Street Map

0 3,009 6,019 Feet

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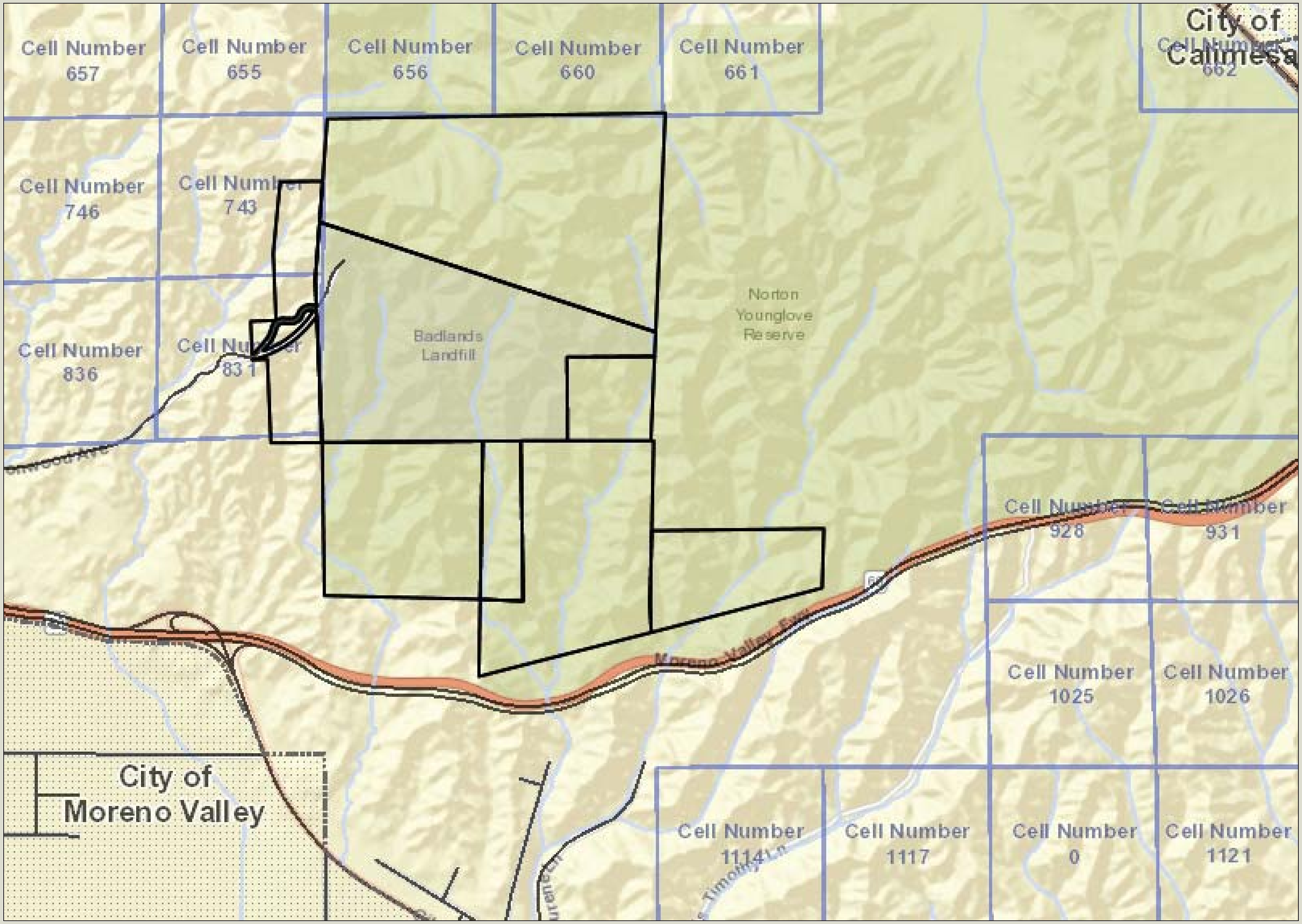
Notes

Criteria Cell Numbers



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- ☐ WRC Criteria Cell Numbers
- County Centerline Names
- — County Centerlines
- — Blueline Streams
- ⋮ City Areas
- World Street Map

0 3,009 6,019 Feet

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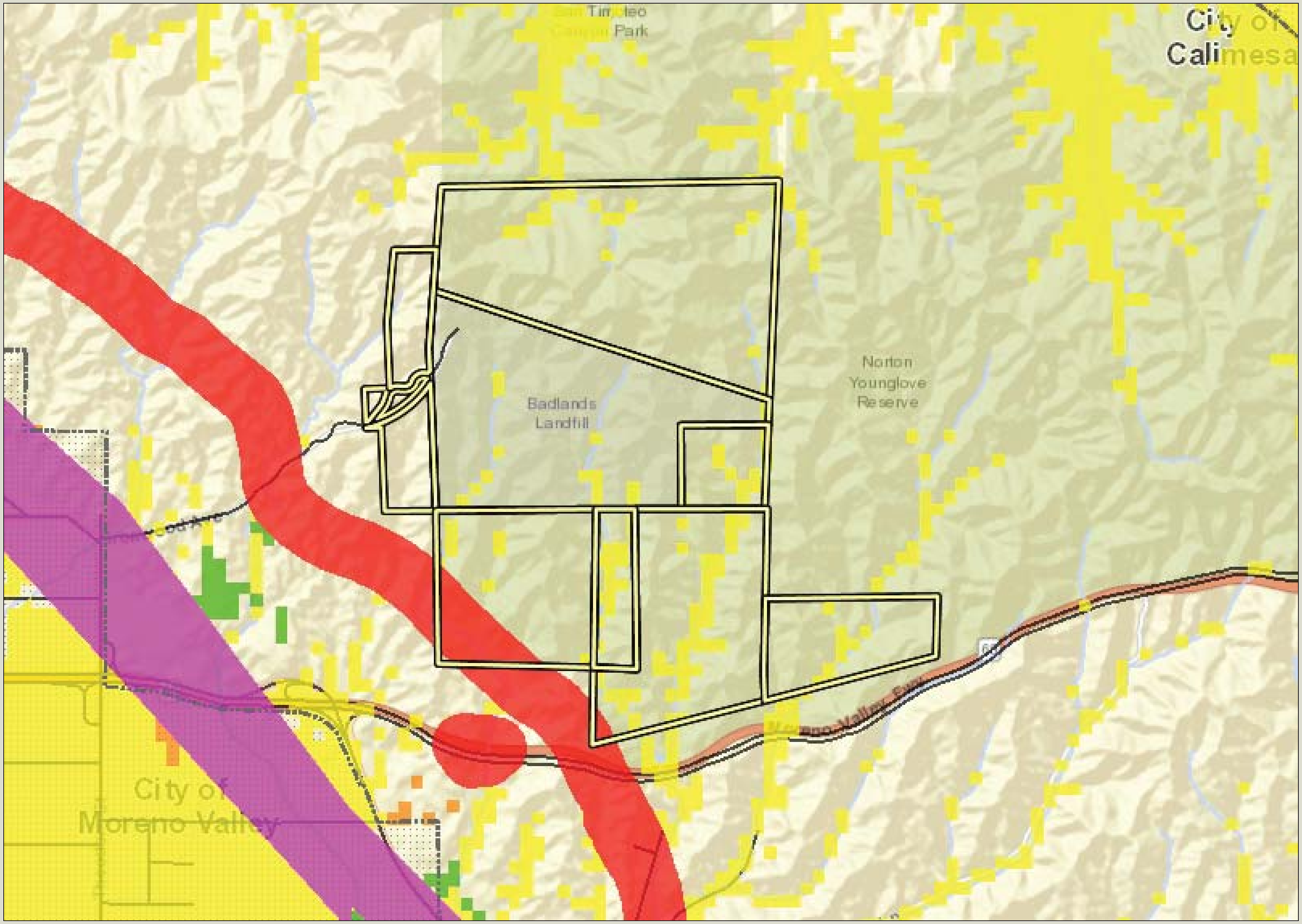
Notes

Geology and Soils



Legend

Fault Zones

▨ OTHER FAULT ZONE
🟥 COUNTY FAULT ZONE
🟦 ELSINORE FAULT ZONE
🟨 SAN ANDREAS FAULT ZONE
🟪 SAN JACINTO FAULT ZONE

Liquefaction

▨ Other Susceptibility
🟥 High
🟧 Low
🟨 Moderate
🟩 Very High
🟩 Very low

Subsidence

▨ Other Susceptibility
🟪 Active
🟩 Susceptible

County Centerline Names
— County Centerlines
— Blueline Streams
░ City Areas
World Street Map

0 3,009 6,019 Feet

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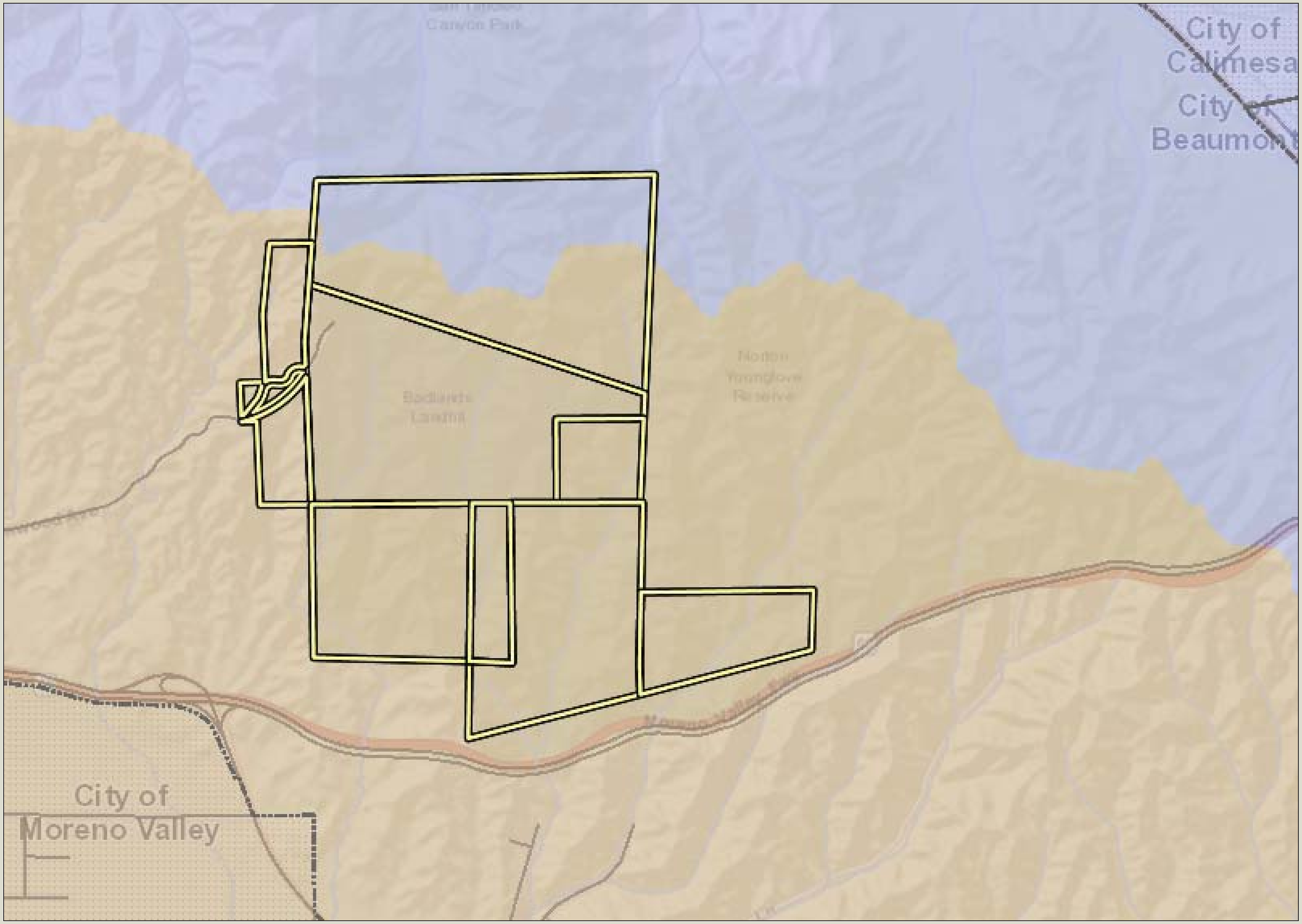
Notes

Watersheds



Legend

Watersheds

- ▨ OTHER WATERSHED
- ANZA BORREGO
- CADIZ
- CHUCKWALLA
- CLARK
- COLORADO
- DALE
- EAST SALTON
- HAYFIELD
- IMPERIAL
- JOSHUA TREE
- RICE
- SALTON SEA
- SAN JACINTO VALLEY
- SAN JUAN
- SAN LUIS REY
- SANTA ANA RIVER
- SANTA MARGARITA
- WARD
- WHITEWATER

County Centerline Names

— County Centerlines

— Blueline Streams

City Areas

World Street Map

RCIT

0 3,009 6,019 Feet

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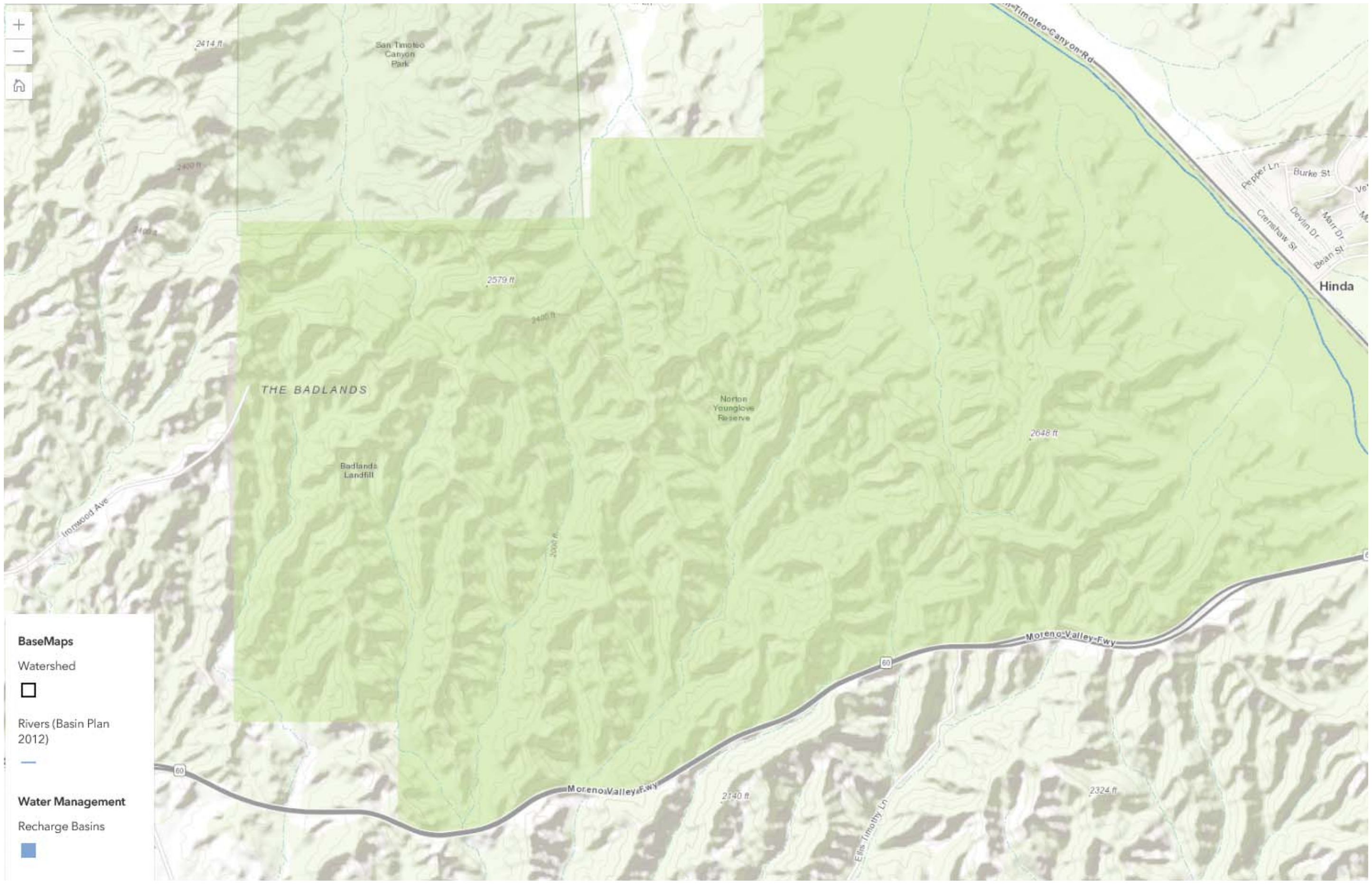
Notes

San Jacinto Valley
Santa Ana River

Santa Ana Watershed Project Authority (SAWPA): http://www.sawpa.net/gisviewer/basemaps.htm#



Printed 2/06/2019

From:	Ray Huaute <RHuaute@morongo-nsn.gov>
Sent:	Wednesday, October 4, 2017 1:39 PM
To:	Hesterly, Kinika
Subject:	Mitigation Measures and Monitoring Template
Attachments:	2017-3-27 Cultural Monitoring Contract FINAL.docx
Follow Up Flag:	Follow up
Due By:	Tuesday, October 10, 2017 3:30 PM
Flag Status:	Flagged

Hi Kinika,
Sorry for the delay in getting these action items to you. I have attached our standard monitoring agreement to this email. As a best practice, we do not discuss artifact treatment in our monitoring contract. This should be outlined in the conditions for the project since different tribes have different views on this subject. Please see the recommended mitigation measures below. As we discussed at our meeting, Morongo recommends that there should be a Morongo tribal monitor to monitor ground disturbance on Phases 1 and 2 as well as the northern most boundary of the project including the stockpile area. Pending the results of those areas should inform us if monitoring would be warranted for any other future phases. If you have any additional questions, feel free to contact me directly.

Tribal Monitoring
MM1: The County shall enter into an agreement with the Morongo Band of Mission Indians to have a qualified Native American Cultural Resource Monitor on-site during all required ground disturbing activities outlined in the agreement. A copy of such agreements shall be provided to the County. The County shall also retain a qualified archaeologist in the event there should be an inadvertent discovery of a cultural resource.

Discovery Protocols
MM2: If cultural resources are discovered during any ground disturbing activities associated with the project, the following measures shall be taken:
1) All ground disturbing activities within a 60 foot radius of the discovery shall be halted until a meeting is convened between the developer, the project archaeologist, the Native American tribal representative and the Planning Director or Lead Agency representative to discuss the significance of the find. 2) At the meeting, and in consultation with the tribal representative and archaeologist, a decision shall be made as to the appropriate mitigation and treatment to be applied to the resource (avoidance, relocation, removal, etc.). 3) Further ground disturbance may not continue in the area of the discovery until a monitoring, mitigation and treatment plan has been agreed upon and implemented by the group.

Temporary Curation
MM3: All inadvertent discoveries of cultural resources shall be temporarily curated on site in a secured location until the end of the project or at a secure off-site location acceptable to the tribe. At the close of the project the County shall relinquish all cultural resources to the tribe for appropriate disposition.

Treatment and Disposition of Cultural Resources
MM4: No destructive analysis or other laboratory testing of a cultural resource shall take place unless agreed upon by the tribe. If requested by the tribe, the County shall, if feasible, make accommodations for on-site reburial of cultural resources in an area not subject to further ground disturbance in the future (open spaces, nature preserves, easements, etc.). The location of the reburial shall remain confidential and shall be recorded on a DPR form by the project

archaeologist and filed with the Eastern Information Center at UC Riverside. If required, a final report of the cultural monitoring activities shall be prepared and a copy provided to the tribe.

Human Remains

MM5: The County acknowledges that Human remains require special handling, and must be treated with appropriate dignity. Pursuant to State Health and Safety Code Section 7050.5, if human remains are encountered, no further disturbance shall occur until the County Coroner has made the necessary findings as to origin. Specific actions must take place pursuant to CEQA Guidelines §15064.5e, State Health and Safety Code Section 7050.5 and Public Resource Code (PRC) §5097.98. In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following procedures shall be followed: a)There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until: i)A County Official is contacted. ii)The County Coroner is contacted to determine that no investigation of the cause of death is required, and If the Coroner determines the remains are Native American: iii)The Coroner shall contact the Native American Heritage Commission within 24 hours. b)The Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American. c)The Most Likely Descendent (MLD) may make recommendations to the landowner or the person responsible for the excavation work, for the treatment of human remains and any associated grave goods as provided in PRC §5097.98. d)Under the following conditions, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods on the property in a location not subject to further disturbance: i)The Commission is unable to identify a MLD or the MLD failed to make a recommendation within 24 hours after being notified by the commission. (1)The MLD identified fails to make a recommendation; or (2)The landowner or his authorized representative rejects the recommendation of the MLD, and the mediation.

Raymond Huaute
Tribal Historic Preservation Officer
Morongo Band of Mission Indians
12700 Pumarra Road
Banning, CA 92220
Phone: (951) 755-5025
Fax: (951) 572-6004
Email: rhuaute@morongo-nsn.gov

SOBOBA BAND OF LUISEÑO INDIANS
EST. JUNE 19, 1883

September 6, 2017

Attn: Kinika Hesterly, Urban/ Regional Planner IV
Riverside County Department of Waste Services
14310 Frederick Street
Moreno Valley, CA 92553

RE: Standard Mitigation for Cultural Resources; Badlands Landfill Expansion Project & Lamb Canyon Landfill Acquisition

The Soboba Band of Luiseño Indians appreciates your observance of Tribal Cultural Resources and their preservation in your projects. Below you will find proposed language that the tribe is requesting to be included in the standard mitigation for cultural resources:

TREATMENT OF DISCOVERIES:

If a significant archaeological resource(s) or tribal cultural resource is discovered on the property, ground disturbing activities shall be suspended 100 feet around the resource(s). The archaeological monitor and a representative of the consulting Native American Tribe(s), and the Riverside County Department of Waste Services shall confer regarding mitigation of the discovered resource(s). A treatment plan shall be prepared and implemented to protect the identified archaeological resource(s) or tribal cultural resources from damage and destruction. The treatment plan shall contain a research design and data recovery program necessary to document the size and content of the discovery such that the resource(s) can be evaluated for significance under CEQA criteria. The research design shall list the sampling procedures appropriate to exhaust the research potential of the archaeological resource(s) or tribal cultural resources in accordance with current professional archaeology standards. The treatment plan shall require monitoring by the consulting Native American Tribe(s) during data recovery and shall require that all recovered artifacts undergo basic field analysis and documentation or laboratory analysis, whichever is appropriate. At the completion of the basic field analysis and documentation or laboratory analysis, any recovered archaeological or tribal cultural resources shall be processed and curated according to current professional repository standards. The collections and associated records shall be donated to an appropriate curation facility, or, the artifacts may be delivered to the consulting Native American Tribe(s) if that is recommended by the Riverside County Department of Waste Services. A final report containing the significance and treatment findings shall be prepared by the archaeologist and submitted to the Riverside County Department of Waste Services, the Eastern Information Center, and the consulting Native American Tribe(s).

DISPOSITION OF DISCOVERIES:

In the event that Native American cultural resources are inadvertently discovered during the course of grading for this project. The following procedures will be carried out for treatment and disposition of the discoveries:

The Riverside County Department of Waste Services shall relinquish ownership of all cultural resources, including sacred items, burial goods, and all archaeological artifacts and non-human remains as part of the required mitigation for impacts to cultural resources. The Riverside County

Department of Waste Services shall relinquish the artifacts through one or more of the following methods and provide the consulting Native American Tribe(s) with evidence of same.

a) A fully executed reburial agreement with the consulting Native American Tribe(s) or bands. This shall include measures and provisions to protect the future reburial area from any future impacts. Reburial shall not occur until all cataloguing and basic recordation have been completed.

b) A curation agreement with an appropriate qualified repository within Riverside County that meets federal standards per 36 CFR Part 79 and therefore would be professionally curated and made available to other archaeologists/researchers for further study. The collections and associated records shall be transferred, including title, to an appropriate curation facility within Riverside County, to be accompanied by payment of the fees necessary for permanent curation.

c) If more than one Native American Group is involved with the project and cannot come to an agreement as to the disposition of cultural materials, they shall be curated at the Western Science Center by default.

d) Should reburial of collected cultural items be preferred, it shall not occur until after the Phase IV monitoring report has been submitted to the Riverside County Department of Waste Services and consulting Native American tribe(s). Should curation be preferred, the developer/permit applicant is responsible for all costs and the repository and curation method shall be described in the Phase IV monitoring report.

MONITORING:

The Project applicant shall contact the consulting Native American Tribe(s) that have requested monitoring through consultation with the Riverside County Department of Waste Services during the AB 52 process. The applicant shall coordinate with the Tribe(s) to develop a Tribal Monitoring Agreement(s). A copy of the agreement shall be provided to the Riverside County Department of Waste Services **Prior to the Issuance of a Grading Permit**.

Please feel free to contact me with any additional questions or concerns.

Sincerely,

Joseph Ontiveros
Cultural Resource Director
Soboba Band of Luiseño Indians
P.O. Box 487
San Jacinto, CA 92581
Phone (951) 654-5544 ext. 4137
Cell (951) 663-5279
jontiveros@soboba-nsn.gov

Organics Processing BMPs

	Riverside County Best Management Practices
Applicability	The County BMPs shall be applied to all composting and chip and grind operations undergoing the entitlement process for a Conditional Use Permit (CUP), Plot Plan, or other land-use entitlements.
Feedstock (F)	1. Acceptable feedstock materials include: • Greenwaste as defined in Title 14 CCR • Agricultural materials as defined in Title 14 CCR • Food Material that meets the definitions in Title 14 CCR • Manure as defined in Title 14 CCR • Paper products • Restaurant grease and oils • Digestate (if permissible under Title 14 CCR)
Additives (Ad)	If applicable: 1. Mix additives with feedstock or active compost to create favorable composting conditions. 2. The amount of additives added shall be consistent with applicable regulatory requirements or prevailing industry standards 3. Additives do not include septage, biosolid, or compost feedstock. 4. Additives shall undergo random load-checking for physical contaminants and refuse.
Amendments (Am)	If applicable: 1. Add amendments to cured or stabilized compost to provide attributes for the products. 2. The amount of amendments added shall be consistent with applicable regulatory requirements or prevailing industry standards. 3. Amendments do not include septage, biosolids, or compost feedstock. 4. Amendments shall undergo random load-checking for physical contaminants and refuse.
Feedstock Preparation (FP)	1. Feedstock load-checking operations shall be conducted in accordance with the standards set forth in Title 14 CCR. 2. Removal of physical contaminants and refuse (overs/trash) shall be removed from the facility in accordance with Title 14 CCR, or within seven (7) days of screening, whichever date is sooner. 3. Greenwaste shall be processed/ground within the timeframes provided in Title 14 CCR. 4. Foodwaste and manure shall be covered with ground greenwaste, or unscreened or screened compost within 3 hours of receipt and incorporated into an active pile within 48 hours of receipt to minimize odor generation and attraction to vectors. 5. Incorporate wet or odiferous feedstock loads directly into actively composting windrows or aerated static piles, where practical. 6. Mix odiferous feedstock materials with appropriate amount of bulking agent, high carbon amendments, or finished compost and then moisture conditioned to reduce odor releases. 7. Manure shall not exceed 20% by volume. 8. Restaurant grease and oils shall not exceed 5% by volume. 9. Application of restaurant grease and oils shall comply with the following standards: a. Apply to processed feedstock or an active windrow/pile at the time of receipt. b. Mix with processed feedstock prior to or during pile formation. c. Once grease trap liquids have been applied to a windrow, the windrow will be

	turned immediately to incorporate the liquid into the windrow feedstock. d. At no time shall grease trap liquids will be stored onsite in tanks or ponds. e. Grease trap liquids will not be applied in a manner that results in ponding around the windrow/pile. f. No direct application to an active windrow that still has a compost cover for emissions control, as required by SCAQMD Rule 1133.3. g. Directly apply to an active windrow that no longer requires a compost cover, or to an active static pile that is aerated under negative pressure and uses an emissions control device, as required by SCAQMD Rule 1133.3. 10. Grinding of odiferous feedstock materials should be accompanied with the application of misting water or other odor control measures approved by the DEH/LEA. 11. Feedstock composition must be adjusted to achieve a high carbon to nitrogen ratio (30:1), proper moisture contents, and good porosity, all of which are conducive to aerobic decomposition and odor minimization. 12. Reduce material mixing activities in unfavorable weather conditions (stagnant air or windy) to minimize odor generation.
Active Composting (AC)	1. Static pile composting method is prohibited for facilities that will contain more than 5,000 cubic yards of material (including feedstock, additives, amendments, chipped/ground material, and compost) at any one time. 2. Active composting shall be by means of either the windrow method, aerated static pile, extended aerated static pile, or an alternative technology approved by the LEA/DEH. 3. Where feasible, the active composting pad location and windrow/pile configuration and orientation should be such that wind-driven off-site exposures of receptors to composting odors can be minimized. 4. Daily monitoring of windrow moisture content and temperature shall be conducted to ensure continuous aerobic composting and detect overheating so as to avoid spontaneous combustion. 5. All windrows and piles aerated with positive or negative pressures shall be covered with a layer of finished compost, or other covering methods as approved by LEA/DEH, immediately after windrow and/or pile formation. 6. Moisture conditioning of active windrows and piles during the rainy season should be coordinated with weather forecasts. The composter should use his best judgment on the degree of watering to be carried out when rainfall is forecasted. As a good practice, no moisture conditioning should be carried out during rainfall or when there is a 60% or greater chance of rainfall in the next day or two. 7. When heavy or extended rainfalls are forecasted, the composter should take the appropriate measures to protect active windrows and piles from saturation with water, including but are not limited to: cover windrows and piles with tarps; add dry feedstock or compost on top of windrows and piles; and increase positive drainage on side slopes of windrows and piles by making the slopes steeper or covering them with tarps. 8. The active composting pad shall be graded and maintained to prevent ponding and transmit any free liquid laterally to containment structures on-site. The composting pad and containment structures shall be designed and constructed in compliance with all applicable water quality control regulations. 9. All windrows shall be turned regularly to ensure continuous aerobic composting, or according to applicable regulatory requirements pertaining to achieving pathogen reduction and odor minimization standards. 10. Avoid windrow turning in unfavorable weather conditions.

	11. Where applicable, construct smaller windrows to increase the surface to volume ratio, thus aeration efficiency.
Compost Curing (CC)	1. Curing of compost shall be conducted away from the active composting area to avoid cross-contamination and facilitate separate odor monitoring. 2. Curing compost that have temperature exceeding 122°F, or are seeping leachate, and/or emitting odors on a consistent basis shall be re-composted in the active composting area. 3. Long-term storage of finished compost shall be limited to no greater than one year to avoid it becoming a fire hazard. 4. Screen compost to facilitate aeration and expedite the curing process. 5. Avoid screening of compost in unfavorable weather conditions, or apply misting water or other odor reducing measures, as approved by the LEA/DEH during screening to lessen odor emissions.
OIMP Implementation (OI)	1. The facility shall have a designated full-time staff in charging of implementation of the facility's Odor Impact Minimization Plan (OIMP) and handling of odor complaints and investigations. This person shall also be responsible for regular reviewing and updating of the OIMP in pace with changes in composting operation or procedures. 2. The composting staff shall be well acquainted with and adequately trained to implement the OIMP. 3. If the facility receives an infraction (Area of Concern and/or Notice of Violation) during monthly inspections from the LEA/DEH involving odors, in addition to addressing the LEA/DEH, the operator shall submit a Report to the Riverside County Department of Waste Resources and the TLMA Planning Department, documenting the source of the odor and both propose and implement mitigation measures which may include installation of wind barriers, such as contiguous tall vegetation, misting systems, or other odor reducing measures, to the County's satisfaction. 4. If after 15 days of implementing mitigation measures, as stated in the Report submitted to the Department of Waste Resources and Planning Department, the odor issues have not been resolved, as verified by the LEA, the operator shall immediately remove the odiferous material offsite for disposal in accordance with all applicable local, State, and Federal laws, ordinances, and regulations.
Facility Maintenance (FM)	1. On-site dust control shall use domestic water, non-potable reclaimed water, or dust suppressants, as identified in SCAQMD Rule 403. 2. Site drainage design shall prevent run-on onto the active composting area, feedstock storage area, compost curing area, and finished compost storage area. 3. Surface run-off from all compostable materials processing, treatment, and storage areas shall be contained on-site, in compliance with applicable water quality control regulations. 4. All wastewater conveyance and containment facilities shall be periodically inspected to ensure performance and assess their capacity to attract vectors and generate odors and to effectively collect and contain wastewater. 5. Use compost filter berms to filter stormwater entering the containment structure. The compost filters can be reintroduced back to the composting process. 6. Re-circulate retained wastewater into the composting process.

Characteristics	**Tier 1**	**Tier 2**
Total Facility Capacity at Any One Time	<25,000 cy (all allowable materials received, processed, and stored: feedstock, amendments, active and curing composting, and finished products)	≥25,000 cy (all allowable materials received, processed, and stored: feedstock, amendments, active and curing composting, and finished products)
Allowable Feedstock[1]	Agricultural material, green material, paper material, vegetative food material, or a combination of this feedstock, including anaerobic digestate derived from the acceptable feedstock.	Tier 1 feedstock plus biosolids, or food materials, or manure, or grease waste, or a combination of these feedstocks.
Bond Amount Calculation Methodology		
Base Bond Amount (**BBA**)	$250,000 or Apply Formula	APPLY FORMULA
Cleanup Activities Covered	Material Loading + Transportation + Disposal + Testing + Administration (assuming 7.5%)	
Material Loading Cost[2]	$8 per ton	
Transportation Cost[2]	0.0041 cent per ton per vehicle-mile-traveled (VMT), assuming 22 tons/truck load	
Total Disposal VMT (**TVMT**)	Total onsite Storage Capacity (**TSC**) ÷22 tons/load x roundtrip VMT to landfill	
Disposal in Riverside County	At current fees: Unprocessed Greenwaste (**GW**) @ Greenwaste Rate (**GR**) (e.g., $45.80 in 2014) Active compost, biosolid, and grease waste @ Hard-to-Handle Rate (**H2H**) (e.g., $47.73/ton in 2014) Finished compost and ground clean greenwaste @ Beneficial Refuse Rate (**BR**) (e.g., $10/ton in 2014)	
Administration Fee (**AF**)	7.5% of the sum of material loading and transportation costs	
Material Testing (**MT**)	$5,000	$10,000
Maximum Total On-site Storage Capacity (ton or cy)[3]	Feedstock Receiving Area: Maximum Greenwaste (**GW**) capacity Active Composting Area: Maximum Active Compost (**AC**) capacity Curing & Product Storage Areas: Maximum Finished Compost (**FC**) capacity **TSC** = **GW** + **AC** + **FC**	
Conversion Factors	**GW**: 0.5 ton/cy **AC**: 0.65 ton/cy **FC**: 0.4 ton/cy	
Formula	{[(**TSC** x $8/ton) + (**TSC** x **TVMT** x 0.0041 cent/ton/mile x 1 dollar/100 cent)] x (1 + 7.5%)} + (**GW** x **GR** + **AC** x **H2H** + **FC** x **BR**) + **MT**; or **BBA**, whichever is greater.	
Annual Bond Adjustment	Due to the long CUP life of composting facilities, the bond value need be adjusted according to the CPI during its annual update. Adjustable values include: **BBA**, material loading cost ($8/ton), transportation cost (0.0041 cent), **MT**, and **AF**. In addition, disposal fee needs be updated, as warranted.	

[1] A composting facility is a Tier 2 facility regardless of its total facility capacity, as long as it composts food materials, or manure, or grease waste.

[2] Material loading and transportation unit costs are derived from the Department of Waste Resources unit costs for CalBioMass cleanup.

[3] Materials are assumed to be stored in windrows (trapezoids) 12' wide at the base and 8' tall with 8-foot aisles space between windrows

Aerated Static Pile Source Test Example

West Valley MRF, LLC

SCAQMD Permit Application No.: 559590
Facility ID: 156065

GORE® Cover Composting System
Air Emissions Compliance Test

Compliance Re-Test Report

Revision 0

March 2016

Prepared by

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Contents

Tables

Figures

Attachments

1.0 Introduction

This report describes the results of the re-testing effort for compliance with the Permit to Construct (PTC) A/N 559590 issued by the South Coast Air Quality Management District (SCAQMD) on April 11, 2014, for the West Valley MRF, LLC located at 13373 Napa St., Fontana, CA 92335 (SCAQMD Facility ID: 156065).

The purpose of this testing effort was to conduct a re-test of selected unit processes at the facility pursuant to the SCAQMD compliance test requirement for the GORE® Cover Compost System bunkers and cure pile. The primary test objectives were:

1. Test the GORE® covered process surface (flux), for total non-methane hydrocarbons (SCAQMD Method 25.3) and ammonia (SCAQMD Method 207.1).
2. Determine the overall emission factors of the process for total non-methane hydrocarbons, and ammonia (fugitive emissions through the cover and seal leaks compared to SCAQMD baseline emission factors).
3. Demonstrate by screening the acceptance of utilizing measured leak-rate emission factors from prior testing to determine the overall emission factors of the process for total non-methane hydrocarbons, and ammonia (fugitive emissions through the cover and seal leaks compared to SCAQMD baseline emission factors).

The complete list of test methods used is as follows:

- SCAQMD Method 25.3 for total non-methane non-ethane organic carbon (TNMNEOC) and trace gas helium
- SCAQMD Method 207.1 for ammonia

All SCAQMD Method 25.3 samples were taken by Almega Environmental.

Table 1.1. Compliance Testing Summary for the GORE® Cover Compost System.

Bunker	Phase	Total Days into Compost Process	Flux Tests On Cover 25.3/207.1
1	1	3	4
4	1	14	4
2	1	27	4
5	2	34	4
6	2	40	4
Blank	NA	NA	2
Replicate	NA	NA	2
TOTAL	NA	NA	24

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2.0 Summary

The compliance re-test was completed on February 4 – 5, 2016. It was completed per the submitted protocol. The key results are presented in Table 2.1. The system passed on all criteria. The complete data set is provided in Attachment 1 – **Data Validation Technical Memorandum.**

Table 2.1 Summary of Results.

	Emission Factor			
Compound	**Baseline (#/ton mix)**	**Required Performance**	**Measured Performance (#/ton mix)**	**Measured Reduction**
VOC (TNMNEOC)	4.25	80% Reduction	0.468	89.0%
Ammonia	0.46	80% Reduction	0.0025	99.5%

The estimated daily emissions, based on these test measurements, for the facility are provided in Table 2.2. These emissions include emissions from the cover leaks. The unit leak test data from the original test was used, but the length of leak seam was determined specifically for this re-test by FID field screening. The calculated leakage was small (less than 1% of total emissions) from each cover.

Table 2.2 Estimated Facility Daily Emissions (pounds per day)

Phase	VOC	NH3
Phase I	26.3	0.12
Phase II	7.1	0.05
Overall	33.3	0.17

3.0 Facility Description

The Gore® Compost System was located in Fontana, CA. Figure 3.1 shows the plant location. This facility composts a mixture of greenwaste and food waste to produce a marketable product.

The GORE® Cover Compost System relies on micropore covers and sophisticated process control to both provide a superior compost product while reducing the air emissions from the process. Figure 3.2 shows a plan view of the GORE® Cover Compost System. There are eight compost bunkers and a cure pad. Each compost bunker has interior dimensions of 163 feet long by 26’ 4” wide.

The compost operation occurs in three phases. Phase 1 lasts 4 weeks, Phase 2 lasts 2 weeks, and Phase 3 lasts 2 weeks. Phase 1 and Phase 2 are covered with the GORE® Cover using a micropore cover system. Phase 3 and curing are not covered. Each bunker has air supplied to the process with a 1,100 cfm fan. The fan is computer controlled based on pile temperature and oxygen concentration. The fan does not operate continuously.

Each bunker holds a nominal 500 tons of feedstock.

Figure 3.1 Site Vicinity Map

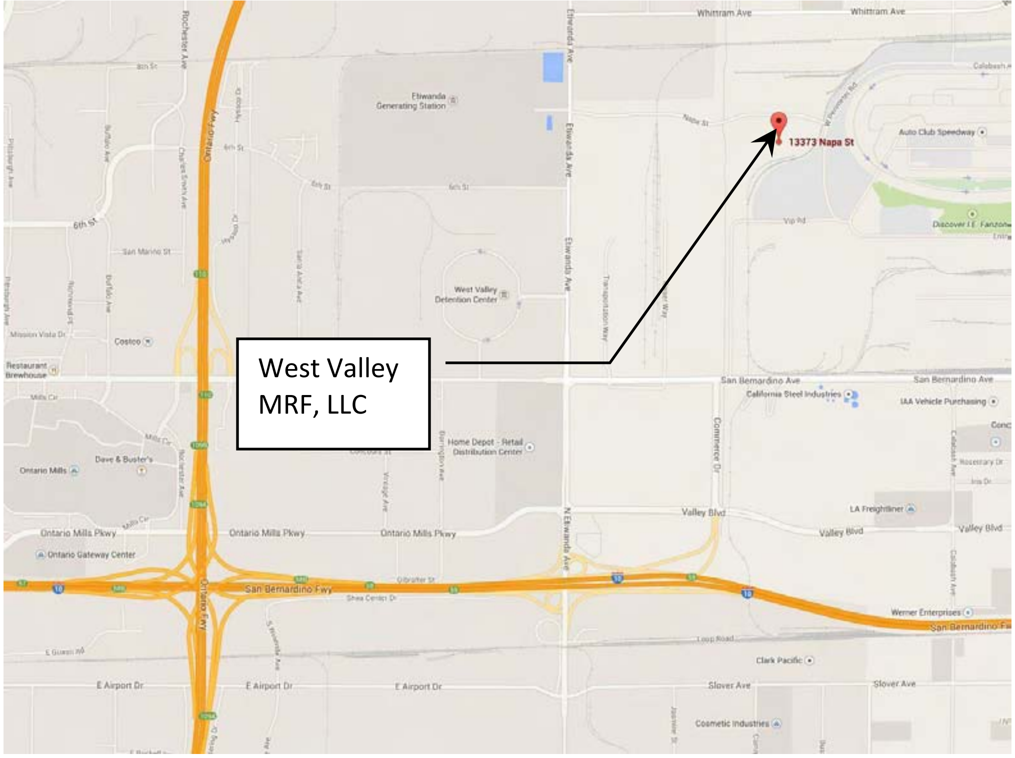
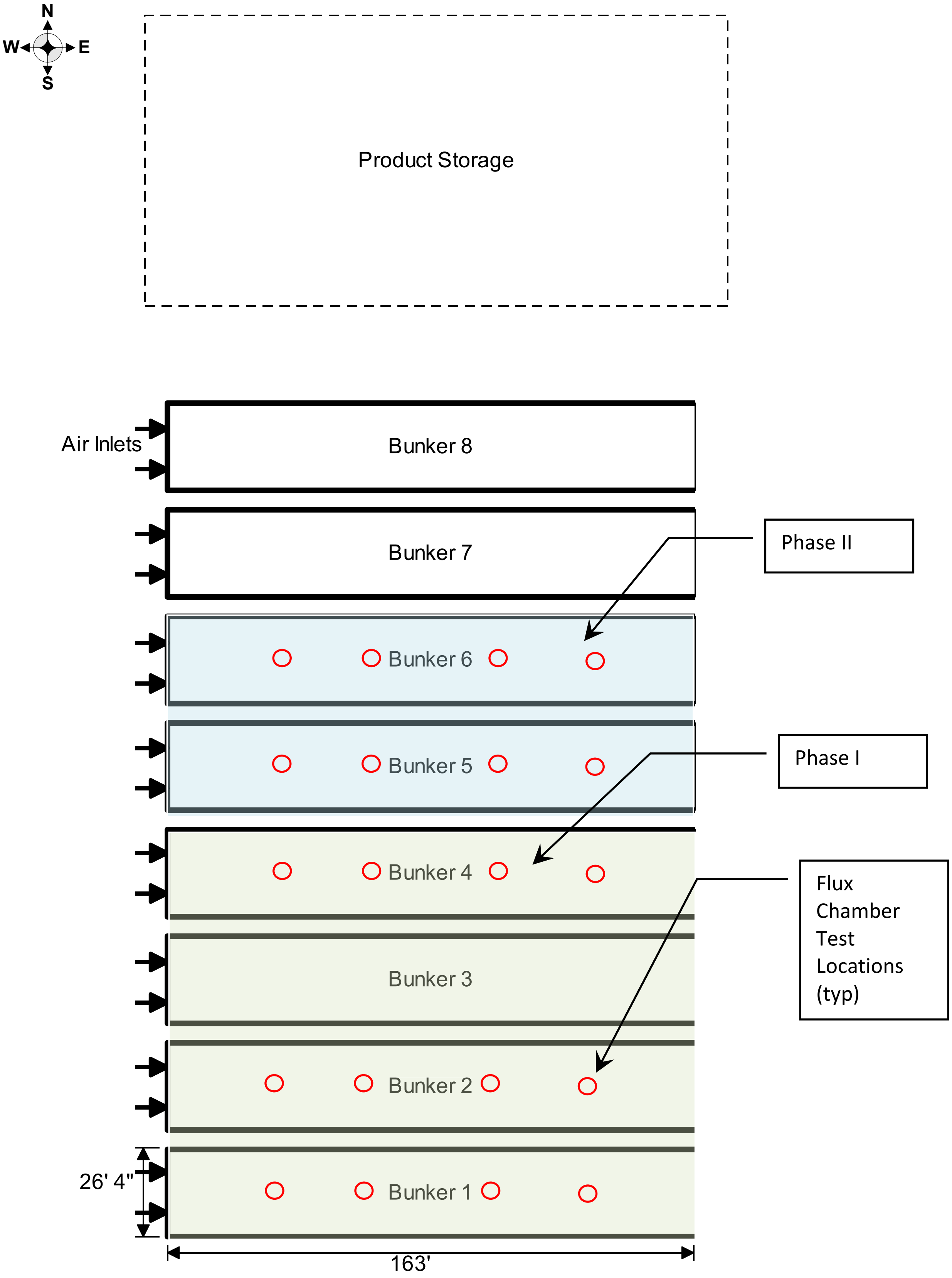


Figure 3.2 Plan View of Gore® Compost Installation.



4.0 Sampling Results

Table 4.1 presents a summary of the laboratory results and calculated flux values. All data was taken on February 4 – 5, 2016. The flux value was calculated by:

Concentration (mg/m3) x Chamber Flow Rate (m3/min)/Chamber Area (0.13 m2)

The VOC flux was further corrected using the SCAQMD 25.3 bias factor of 1.086

Table 4.1 Summary of Results

SOURCE	DAY	TNMNEO	TNMNEO	NMNEO Trap	NMNEO Tank	AQMD Multiplier	NH3	NH3 Vol	NH3	Helium	Helium Detected	Total Flow	Total Flow	TNMNEO	NH3
		(ppmvC)	(mg/m3)	(ppmv)	(ppmv)		(mg)	(m3)	(mg/m3)	(%)	(%)	(lpm)	(m3/min)	**Flux**	**Flux**
Bunker 1, Phase 1	3	471	**308**	111	360	1.086	0.007	0.0353	0.198	10.00	6.73	7.43	0.00743	19.1	0.0113
Bunker 1, Phase 1	3	141	**92.1**	45.2	95.6	1.086	0.007	0.0310	0.226	10.00	5.36	9.33	0.00933	7.2	0.0162
Bunker 1, Phase 1	3	136	**88.8**	45.8	90.5	1.086	0.007	0.0307	0.228	10.00	1.61	31.1	0.0311	23.0	0.0545
Bunker 1, Phase 1	3	86.2	**56.3**	33.1	53.1	1.086	0.007	0.0303	0.231	10.00	4.30	11.6	0.0116	5.5	0.0207
Bunker 4, Phase 1	14	7.30	**4.77**	2.44	4.85	1.086	0.005	0.0288	0.174	9.88	1.26	39.21	0.0392	1.6	0.0524
Bunker 4, Phase 1	14	11.1	**7.25**	3.72	7.43	1.086	0.004	0.0338	0.118	9.88	1.90	26.00	0.0260	1.6	0.0237
Bunker 4, Phase 1	14	16.4	**10.7**	7.55	8.85	1.086	0.004	0.0328	0.122	9.88	3.54	13.95	0.0140	1.2	0.0131
Bunker 4, Phase 1	14	24.1	**15.7**	7.01	17.1	1.086	0.004	0.0334	0.120	9.88	4.47	11.05	0.0111	1.5	0.01018
Bunker 2, Phase 1	27	5.13	**3.35**	3.79	1.34	1.086	0.007	0.0313	0.224	9.88	1.81	27.3	0.0273	0.8	0.0470
Bunker 2, Phase 1	27	11.3	**7.38**	4.84	6.46	1.086	0.005	0.0322	0.155	9.88	3.56	13.9	0.0139	0.9	0.0166
Bunker 2, Phase 1	27	25.6	**16.7**	15.8	9.76	1.086	0.005	0.0319	0.157	9.88	2.68	18.4	0.0184	2.6	0.0222
Bunker 2, Phase 1	27	6.68	**4.36**	4.88	1.80	1.086	0.006	0.0306	0.196	9.88	4.72	10.5	0.0105	0.4	0.0158
Bunker 5, Phase 2	34	3.43	**2.24**	2.16	1.27	1.086	0.005	0.0330	0.152	9.88	1.94	25.46	0.0255	0.5	0.0297
Bunker 5, Phase 2	34	23.1	**15.1**	21.6	1.47	1.086	0.006	0.0312	0.192	9.88	2.54	19.45	0.0194	2.5	0.0288
Bunker 5, Phase 2	34	66.7	**43.6**	55.8	10.9	1.086	0.005	0.0322	0.155	9.88	4.80	10.29	0.0103	3.7	0.0123
Bunker 5, Phase 2	34	142	**92.7**	130	11.8	1.086	0.005	0.0282	0.177	9.88	7.41	6.67	0.00667	5.2	0.00909
Bunker 6, Phase 2	40	13.8	**9.01**	5.37	8.40	1.086	0.004	0.0311	0.129	9.90	2.93	16.89	0.0169	1.3	0.0167
Bunker 6, Phase 2	40	45.5	**29.7**	29.1	16.4	1.086	0.004	0.0328	0.122	9.90	4.43	11.17	0.0112	2.8	0.0105
Bunker 6, Phase 2	40	16.2	**10.6**	8.92	7.29	1.086	0.004	0.0344	0.116	9.86	2.21	22.31	0.0223	2.0	0.0200
Bunker 6, Phase 2	40	30.1	**19.7**	24.1	6.06	1.086	0.005	0.0334	0.150	9.86	1.43	34.48	0.0345	5.7	0.0397

TNMNEO- Total non-methane non-ethane organic carbon reported as methane (carbon # = 1)

Flux = (concentration, mg/m3)(total flow, m3/min)/(surface area, 0.13 m2) = mg/m2,min-1

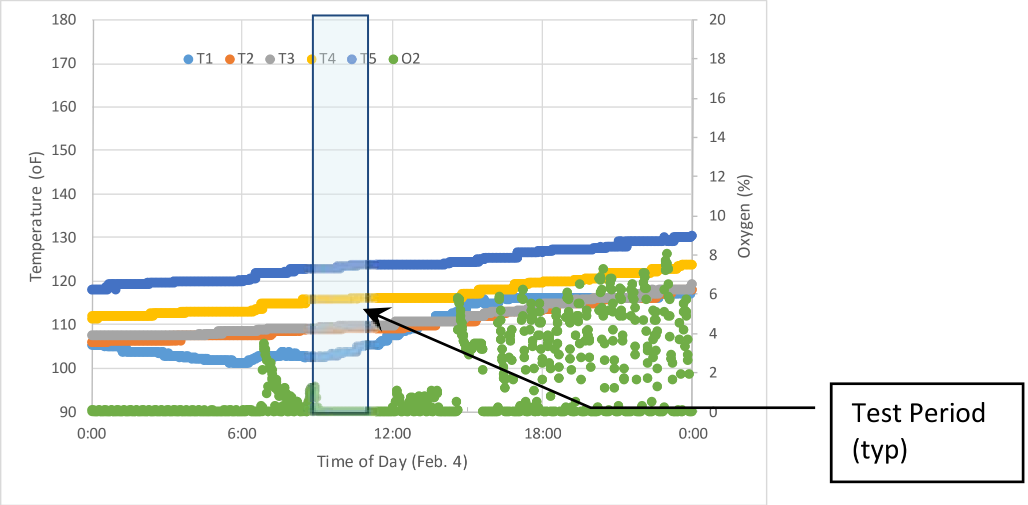
Note: Flux values are in mg/min-m2, leak rate values are in mg/min-m, highlighted cells represent the detection limit for non-detect values.

Complete results, along with QA/QC data are presented in the attachment, **Data Validation Technical Memorandum.**

Process Data

Figure 4.1 through 4.5 present the operational temperature and oxygen concentration data for the day of the test. Figures 4.6 through 4.10 show the fan operation during the time of the testing. All tests experienced at least one full fan cycle.

Figure 4.1. Process Data – Phase I Day 3



Test Period (typ)

Figure 4.2. Process Data – Phase I Day 14

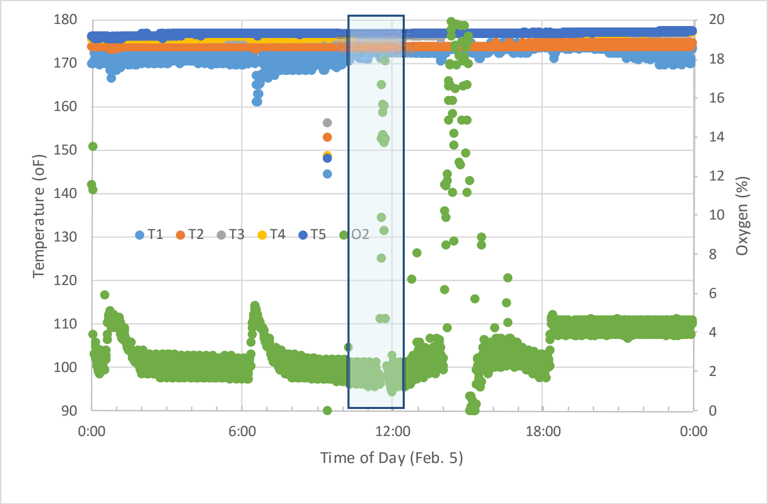


Figure 4.3. Process Data – Phase I Day 27

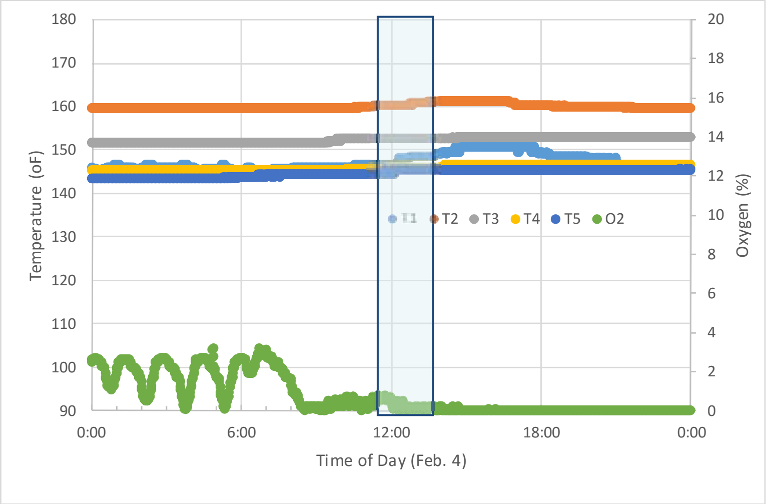


Figure 4.4. Process Data – Phase II Day 34

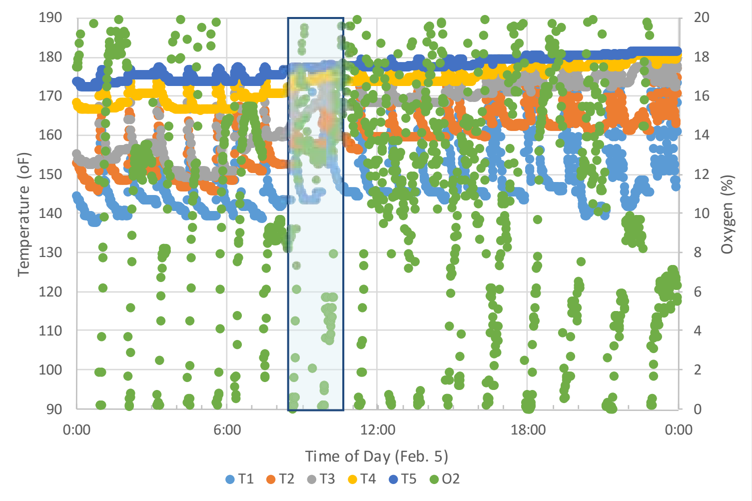


Figure 4.5. Process Data – Phase II Day 40

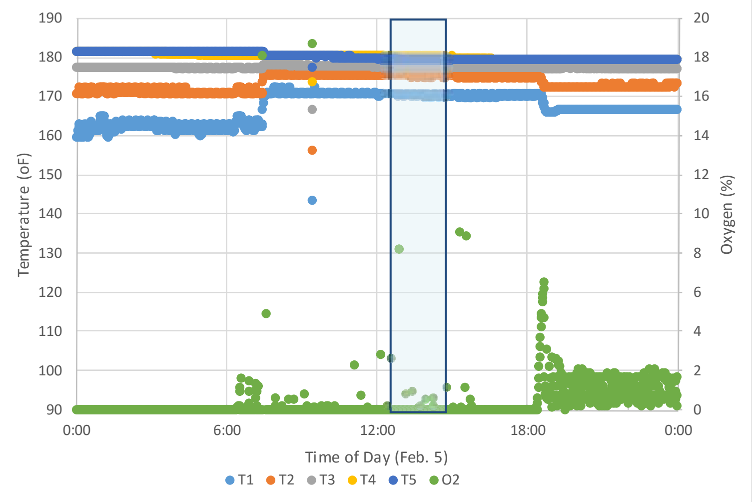


Figure 4.6. Process Fan Data – Phase I Day 3

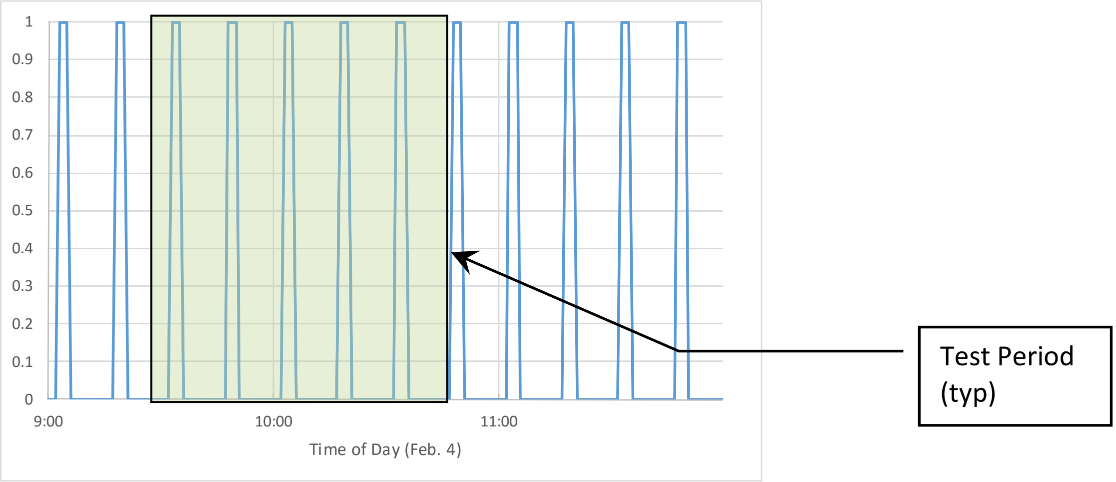


Figure 4.7. Process Fan Data – Phase I Day 14

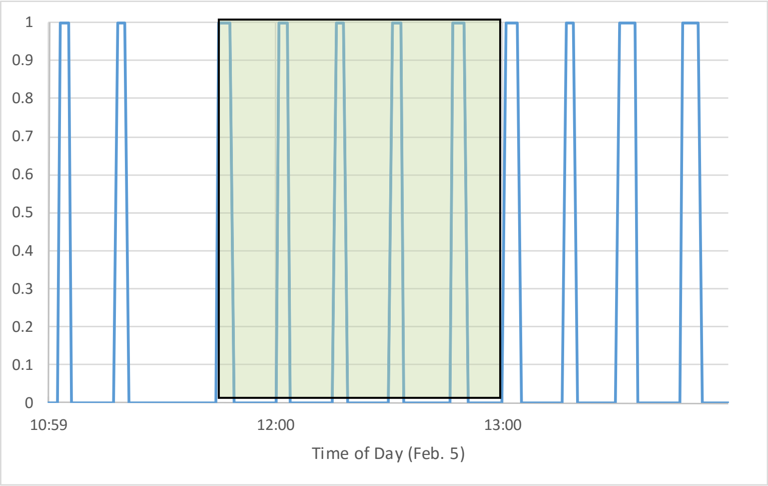


Figure 4.8. Process Fan Data – Phase I Day 27

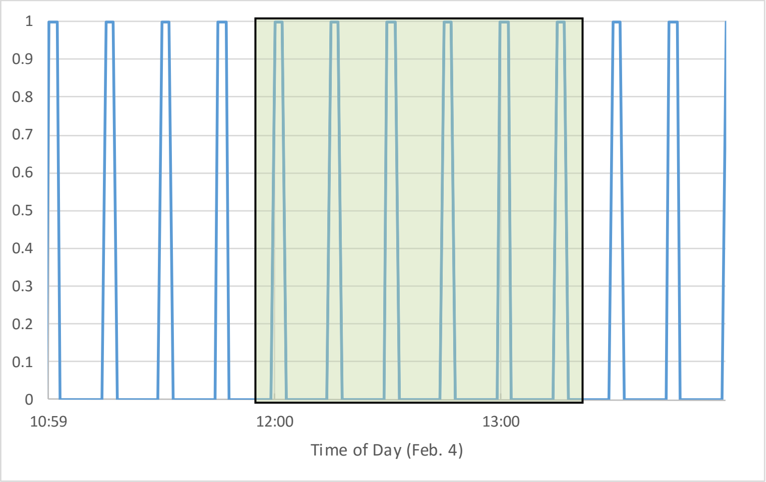


Figure 4.9. Process Fan Data – Phase II Day 34

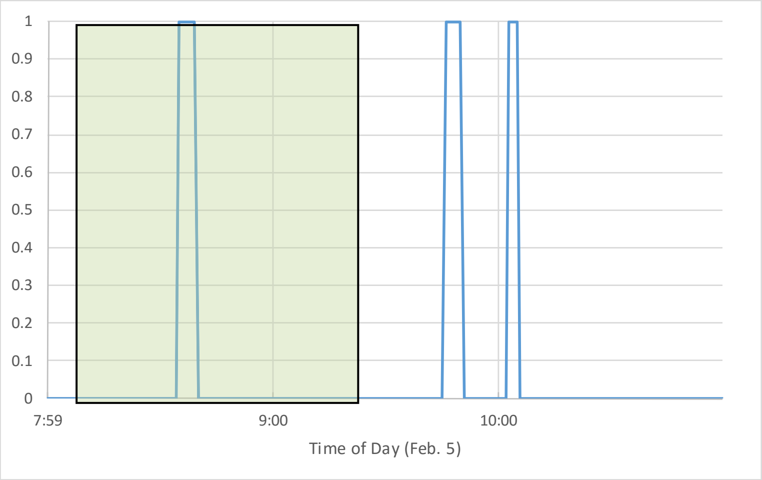
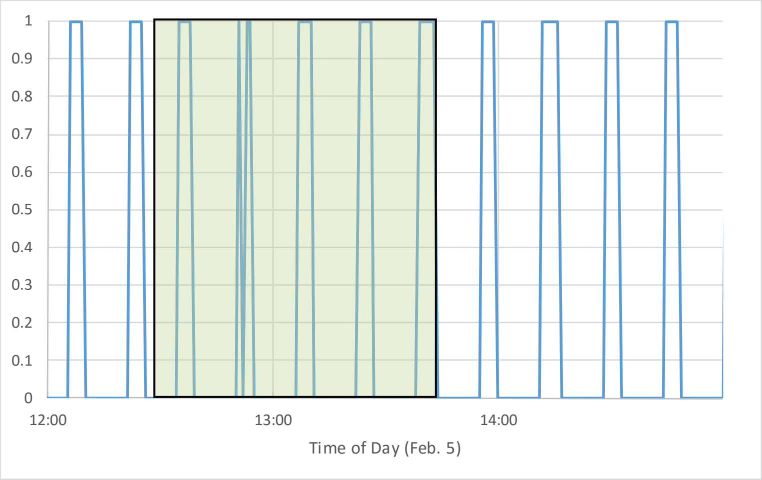


Figure 4.9. Process Fan Data – Phase II Day 40



5.0 Data Analysis

Cover Emissions

The emissions from the cover were calculated by multiplying the flux value times the cover surface area. The measured cover surface area was 378.27 m2. The total cover area for the six (four Phase I and two Phase II) covered bunkers was 2,269.62 m2. Table 5.1 presents a summary of these calculations.

Table 5.1 Summary of Cover Emissions

Cover Flux (mg/min-m2)		
Phase	**VOC**	**NH3**
Phase I D3	13.69	0.026
Phase I D14	1.46	0.025
Phase I D27	1.14	0.025
Phase II D34	2.96	0.020
Phase II D40	2.92	0.022
Site Average	4.60	0.02
Total System Cover Emissions (mg/min)		
Phase	**VOC**	**NH3**
Phase I	8,219	38
Phase II	2,224	16
Total System	10,443	54

Leak Emissions

Screening

During the test event, the cover edge of the heap planned for testing was screened with a field flame ionization detector (FID) calibrated for methane. The length of perimeter that was leaking was measured for the screening event. Table 5.2 shows the results of the perimeter leak screening. Intermittent leaks over 100 ppmv, and consistent leaks over 30 ppmv (above ambient) were considered leaks.

Table 5.2 Summary of Length of Perimeter Leaks (meters)

Phase	**Total Leak Length (m)**
Phase I D3	1
Phase I D14	0.5
Phase I D27	0
Phase II D34	2
Phase II D40	1

Leak Rates

Table 5.3 presents the measured unit leak rate test data for the first test event. For this event they include the AQMD Method 25.3 bias factor. This unit leak rate was used to calculate leak emissions for the re-test.

Table 5.3 Unit Leak Rates (mg/min-m) Used for Leak Rate Quantification.

Phase	VOC	NH3
Phase I D3	34.7	0.31
Phase I D14	34.7	0.31
Phase I D27	5.8	0.13
Phase II D34	3.2	0.18
Phase II D40	3.2	0.18

Leak Rate Calculations

Table 5.4 presents the leak rate calculation results. The lineal leak distance was provided in Table 5.2

Table 5.4 Leak Rate Calculation Results (mg/min).

Phase	VOC	NH3
Phase I	52.0	0.5
Phase II	9.5	0.6
Total System	61.5	1.0

Total Emissions

Table 5.5 provides the total system emissions (cover emissions plus leak emissions) for the site in mg/min and pounds per year. Each line in the table represents two bunkers.

Table 5.5 Total System Emissions

Total Emissions (mg/min, cover plus leaks)		
Phase	**VOC**	**NH3**
Phase I	8,271	39
Phase II	2,233	16
Total System	10,504	55
Total Site Emissions (#/yr)		
Phase	**VOC**	**NH3**
Phase I	9,585	45
Phase II	2,588	19
Overall	12,172	64

Emission Factor Calculation

Table 5.6 presents the emission factor calculation in pounds of emissions per ton of mix feed. The annual site capacity used was 26,000 tons per year.

Table 5.6 Emission Factors (#/ton mix)

Phase	VOC	NH3
Phase I First Half	0.37	0.002
Phase I Second Half	0.10	0.001
Overall	0.468	0.0025
Baseline	4.25	0.46
% Control	89.0%	99.5%

Comparison to Regulatory Baseline

The Rule 1133.3 baseline is for VOC is 4.25 pounds per ton and for ammonia 0.46 pounds per ton. The emissions from this site show an 89.0% reduction in VOC from the baseline and a 99.5% reduction in ammonia from the baseline.

Attachment 1

Data Validation Technical Memo

CE Schmidt, Ph.D.
Environmental Consultant

TECHNICAL MEMORANDUM

COMPLIANCE TESTING- BURRTEC WASTE INDUSTRIES, INC
WEST VALLEY COMPOST FACILITY
Fontana, California

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EXECUTIVE SUMMARY

Field emission measurements were conducted on the Burrtec Waste Industries, Inc. West Valley compost facility located in Fontana, CA on February 4 and 5, 2016. The objective of the assessment was to provide measured flux data in compliance with the facility South Coast Air Quality Management District (SCAQMD) emission assessment requirements. The greenwaste composting facility utilizes the WL Gore® cover compost system.

The data collection approach included field screening with a flame ionization detector (FID) sensitive to volatile organic compounds (including methane), detection tubes sensitive to ammonia, temperature, advective flow, and Total Non-Methane Non-Ethane Organic Carbon (TNMNEOC) and ammonia as measured using the SCAQMD Modified USEPA-recommended flux chamber. TNMNEOC was quantitatively measured by sample collection and analysis by SCAMQD Method 25.3, and ammonia was quantitatively measured by sample collection and analysis by SCAQMD Method 207.1. Advective gas flow measurement into the flux chamber from the covered compost process was achieved by using a helium trace gas (10%) as the sweep air in the chamber and measuring the dilution of the tracer by analyzing the chamber exhaust gas using ASTM Method 1945. Flux chamber measurements were made compliant with SCAQMD Rule 1133, and according to the SCAQMD conditionally approved work plan.

The program objectives included assessing fugitive emissions of study compounds from the compost process expressed as pounds of study compounds per ton of feed stock, and assessing the control efficiency of the cover control device. The program included measuring fugitive study compound emissions through the air pollution control device or the Gore® membrane cover, and at selected locations defining cover ‘leaks’ as the cover is sealed by mechanical means to side wall and push wall structure, and at the ‘loading end’ of the compost piles. In order to assess the control efficiency of the cover, head space concentration measurements of compost emissions were measured below the cover.

The Gore® compost process includes three phases: Phase 1- covered composting with positive air flow supplied based on oxygen demand, Phase 2- compost mixing with positive air flow based on oxygen demand, and Phase 3- mixing and uncovered product curing. The testing program was focused on Phases 1 and 2 and evaluating the control efficiency of the membrane cover. In total, three of the Phase 1 compost piles (life-cycle Day 3, Day 14, and Day 27) were tested, and two of the Phase 2 compost piles (life-cycle Day 34 and Day 40) were tested. Testing included four flux measurements equally spaced along the top-center of each pile located about 31 feet apart and from each end.

In addition to the flux chamber testing on the cover, extensive screening for fugitive cover seal leak emissions were performed prior to testing. The highest leak point of the cover sealing was measured per pile, along with other locations of detected leaks down to a lower limit level of 30 ppmv as measured by an FID. The leaks were observed as ‘pin-point’ leaks (less than one inch of cover seal span) and easily contained within a flux chamber measurement (16” diameter chamber opening). These seal leaks were observed to be related to small folds in the cover as the cover is sealed mechanically to the bunker wall along the push wall and side walls. Given that the leak screening data showed that the leaks detected were similar to the prior round of testing, leak flux rate measurements were not required to be performed. Historic leak flux rate data and screening data were used to estimate mass emissions from cover-seal leaks. This fugitive emission value was used in estimating control efficiency, and added to the process study compound emission factor.

The data tables generated and reported in this document describe the fugitive air emission from the area sources tested. These flux data, combined with engineering estimates of odor source surface area, can be used to estimate study compound emissions representative of these sources on the West Valley facility. The engineering estimates for study compound emissions are reported elsewhere.

I. INTRODUCTION

This technical memorandum describes the field testing that was conducted as the characterization of TNMNEOC and ammonia emissions from the active covered composting facility at the Burrtec Waste Industries, Inc. West Valley facility (Facility ID: 156065) located in Fontana, CA. A work plan Addendum was prepared titled Compliance Test Protocol, SCAQMD Permit Application No. 559590, Gore® Composting System Air Emission Compliance Test (Compliance Test Protocol) dated December 2015. Site testing was conducted on February 4 and 5, 2016.

The objective of the study was to provide representative, fugitive air emissions of study compounds from the Gore® compost system for the purpose of satisfying permit conditions of fugitive air emissions, which includes assessing site emissions and estimating the percent control efficiency of the air pollution control devise or the Gore® micropore membrane cover. The assessment was accomplished by selecting representative test locations of area sources approved by the SCAQMD throughout the compost process, and quantitative analysis of air emissions producing representative air emissions data of study compounds, including TNMNEOC and ammonia.

This memorandum includes a discussion of the testing methodology, quality control procedures, results, discussion of the results, and summary statements.

II. TEST METHODOLOGY

Testing for surface flux of study compounds from area sources was conducted using the SCAQMD modified USEPA recommended Surface Isolation Flux Chamber (USEPA. Radian Corporation, February 1986) as modified by the SCAQMD for advective flow sources (Rule 1133). Flux chamber sampling was performed on fugitive emission sources as directed by the Compliance Test Protocol (May 2015) and Compliance Test Protocol Addendum (December 2015).

A technical approach has been developed for this site based on scientific data collection and site engineering information. The number and location of testing points has been determined by conducting engineering evaluations of these selected area sources and developing a testing approach that considered variability of emissions and operational conditions as related to process emissions.

The operation of the surface flux chamber is given below:

1) Flux chamber, sweep air (ultra high purity air- UHP air), sample collection equipment, and field documents were located on-site.

2) The site information, location information, equipment information, date, and time of testing were documented on the Emissions Measurement Field Data Sheet (Attachment A).

3) The exact test location was selected and the flux chamber was placed on the test surface of the selected source sealing the chamber using a custom made flange-type collar and weights to secure the chamber to the surface. Sealing the chamber on the cover prevented ambient air flow into the chamber.

4) The sweep air flow rate was initiated and the rotometer, which controls the flow rate, was set at 5.0 liters per minute. A constant sweep air flow rate was maintained throughout the measurement for each sampling location.

5) Flux chamber data were recorded every residence interval (6 minutes) for five intervals, or 30 minutes. Measurements made in the chamber included temperature, screening for ammonia by color detection tubes, and infrequently total hydrocarbon screening using a real-time FID instrument. Measurement data were recorded on the Data Sheet.

6) At steady-state (assumed to be greater than 5 residence intervals) integrated sample

collection was performed by sampling exhaust gas from the chamber by interfacing a sample container (impinge/canister, canister, impinge) to the flux chamber following sample collection protocols as per the sampling plan.

7) After sample collection (impinger/canister, and impinger) the sampling media were sealed, labeled, and stored as per protocol, and sample collection information was documented on the field data sheets.

8) After sampling, the flux measurement was discontinued by shutting off the sweep air, removing the chamber, and securing the equipment. The chamber was cleaned by dry or wet wipe with a clean paper towel, and the sample lines were purged with UHP air.

9) Sampling locations were recorded on the field data sheet. The equipment was then relocated to the next test location and steps 1) through 8) were repeated.

III. QUALITY CONTROL

Control procedures that were used to assure that data of sufficient quality resulted from the flux chamber study are listed and described below. The application and frequency of these procedures were developed to meet the program data quality objectives as described in the Compliance Test Plan.

Field Documentation -- A field notebook containing data forms, including sample chain-of-custody (COC) forms, was maintained for the testing program. Attachment A contains the Emission Measurement Data Sheets.

Chain-of-Custody -- COC forms were not used for field data collection. Field data were recorded on the Chain-of-Custody forms provided in Attachment B.

Ammonia Determination by SCAQMD Method 207.1

Sample Hold Time-- All samples were delivered to the laboratory and analyzed meeting the hold time recommendation for the method of 7 days.

Method Quality Control – All method QC testing was completed in accordance with method specifications and these data indicate acceptable method performance.

Field System Blank – Two media (field) blank samples were analyzed as field samples (blind quality control (QC) samples); A-114 ad A-215. Sample A-114 showed 0.005 mg NH3 (N) and Sample A-215 showed non-detect at the MDL of 0.004 mg per sample (MDL of 0.004 mg per sample). These data indicate blind blank detection below or very near the method detection limit, and demonstrate acceptable method performance.

Spike Recovery – Four spike samples (A-104, A-201, A-206, and A-210) were analyzed in duplicate and reported for the flux data set. The spike recovery showed a range of 99% to 110% recovery for the spike samples. These data indicate acceptable method performance

Lab Method Precision – Four field samples were spiked and analyzed in duplicate for the flux chamber testing; all replicate samples showed a relative percent difference (RPD) of 0.0. These data indicate acceptable performance.

Field Method Precision – Two field samples were collected and analyzed in duplicate for the flux chamber testing. The replicate sample pairs showed the following RPD: A-204/A-205 RPD of 0.0; A-209/A-210 RPD of 0.0. These precision data are within criteria and indicate acceptable method performance.

Total Non-Methane and Non-Ethane Organic Compound Analysis by SCAQMD Method 25.3

Sample Hold Time-- All samples were delivered to the laboratory and analyzed meeting the hold time recommendation for the method of 7 days for the trap and 14 days for the canister.

Method Quality Control –Method quality control included method blank determinations, and method response to three-point calibration curves. All method QC testing was completed in accordance with method specifications and these data indicate acceptable method performance.

Field System Blank –Two media (field) blank samples were analyzed as blind QC samples. TNMNEOC values were less than the MDL of 1.0 ppmv carbon as methane; MDL 1.0 ppmvC for samples: G-114 at <1.0 ppmvC, and G-215 at <1.0 ppmvC. These data indicate acceptable method performance.

Method Precision –Two flux field samples were collected in duplicate and analyzed; the RPD values for TNMNEOC was 0.69 RPD for sample pair G-204/G-205, and 4.2 RPD for sample pair G-209/G-210. Both sample/replicate pairs were within the QC criteria (50 RPD). These data indicate acceptable method performance.

Helium Analysis by ASTM Method 1945

Sample Hold Time-- All samples were delivered to the laboratory and analyzed meeting the hold time recommendation for the method of 14 days.

Accuracy Determination or Recovery Samples-- Two blank trace gas samples (one per day of field testing and batch shipment as related to helium samples) were collected and analyzed as a blind recovery of standard samples or for method accuracy determination. The reported percent recovery for the samples were: G-114 at 101% recovery, and G-215 at 102%. These data meet the accuracy criteria (70% recovery) and indicate acceptable method performance.

Replicate Samples -- Two sample/replicate pairs were collected in order to demonstrate field precision. The sample/replicate pair data were: G-204/-205 RPD 5.1, and G-209/-210 RPD 1.2. These data indicate acceptable method performance.

IV. RESULTS AND DISCUSSIONS

A summary of the Burrtec West Valley area odor sources tested and sample count is presented below.

SOURCE	Phase	DAY
Bunker 1	Phase 1	3
Bunker 1	Phase 1	3
Bunker 1	Phase 1	3
Bunker 1	Phase 1	3
Bunker 4	Phase 1	14
Bunker 4	Phase 1	14
Bunker 4	Phase 1	14
Bunker 4	Phase 1	14
Sample Replicate	QA	14
Bunker 2	Phase 1	27
Bunker 2	Phase 1	27
Bunker 2	Phase 1	27
Bunker 2	Phase 1	27
Media Blank	QA	NA
Bunker 5	Phase 2	34
Bunker 5	Phase 2	34
Bunker 5	Phase 2	34
Bunker 5	Phase 2	34
Sample Replicate	QA	34
Bunker 6	Phase 2	40
Bunker 6	Phase 2	40
Bunker 6	Phase 2	40
Bunker 6	Phase 2	40
Media Blank	QA	NA

Twenty flux chamber measurements were performed on the cover along with four QA samples (two media blanks and 2 replicate samples).

Study compound flux samples were collected from key sources at the compost facility including ‘on cover’ flux chamber measurements (through the cover fugitive emissions).

Prior to flux testing, extensive screening was performed using a calibrated FID for cover-seal leaks. The Gore® compost system includes two side-wall and one push-wall structure (process control installation) with an open end for compost filling and removal. The Gore® membrane is placed on the 'bunker' after filling with greenwaste and stretched, fit, and sealed to the push wall and bunker side walls by a mechanical strapping system that utilizes compression straps and buggie cords. The cover at the open end is folded and sealed by weighting the folded cover with sand bags atop plywood sheet. Fugitive compost emissions were observed on the cover seals, and cover seal emission assessment was included in the program. Several screening exercises were performed on each test pile using the calibrated FID by sniffing along the cover seal on all sides of the bunker structure. Screening data indicated variable locations and low levels of compost emission leaks. Note that most of the cover seal showed screening levels below 30 ppmv, and areas where leaks were detected were very limited to a small length of seal such as an inch or less. When flux testing, the leak area was easily contained within the opening width of the flux chamber at 16". The leak screening for this testing effort was less than prior testing, both in terms of number of leaks and concentration of fugitive gas leakage.

A summary of the field sample collection information and field data for the field testing is shown in Table 1. All field data for the surface flux chamber testing and sample identification information are presented in Table 1. All laboratory data including quality control data are presented in Table 2. Surface flux data are shown in flux units for study compound emissions (mg/m2, min-1). Surface flux calculations for TNMNEOC include the SCAQMD Method 25.3 bias factor of 1.086. The laboratory report TNMNEOC data does not include this factor.

Surface flux data for a surface area source are calculated using measured target compound concentrations and flux chamber operating parameter data (sweep air flow rate of 5.0 liters per minute [or 0.005 m3/min] or total flow if the source has a measured advective flow, and surface area of 0.13 square meters [m^2]). The site emissions can be calculated by multiplying the flux by the surface area of the source. The flux is calculated from the sweep air flow rate Q (cubic meters per minute- m^3/min), the species concentration Yi (mg/m3), and exposure to the chamber surface area A (square meters- m^2), as follows:

$$Fi = (Q)\ (Yi) / (A)$$

Emission rate (mass per time) from a source tested using the flux chamber technology, can be obtained by multiplying unit or average flux data per compound by the surface area of the source.

Photo 1. Flux Chamber Testing on the Gore® Cover.

V. SUMMARY

A facility air emissions source characterization was performed on the greenwaste windrow composting facility on the Burrtec Waste Industries, Inc West Valley facility for the purpose of generating air emission data for the study compounds. The following is a summary of activities and results associated with this objective:

- Surface flux measurements of fugitive study compounds were measured on the covered and controlled greenwaste compost facility. Testing the air emissions from area sources was performed using the SCAQMD Modified USEPA recommended surface flux chamber technology as described in the USEPA User's Guide for flux chamber testing on area sources, and the appropriate analytical methods for sample collection and analysis. These technologies quantitatively measured the flux of study compounds at the various test surfaces.

- Field and laboratory quality control data indicate acceptable data quality for SCAQMD Method 25.3 and SCAQMD Method 207.1. Laboratory QC objectives were achieved. Field media blank levels for the analytical methods were found to be typical for this application of the test method. Method precision for sample replicate pairs for these methods were within the RPD criteria of 50 for all samples. The laboratory and field QC criteria demonstrated that the method performance was acceptable, and these can be used without qualification for the stated project purposes.

- The data reported herein is found to be acceptable for use and representative of project species flux describing the air emissions from the greenwaste composting operation and control efficiency of the Gore® membrane cover at the West Valley facility.

REFERENCES

USEPA. 1986. "Measurement of Gaseous Emission Rates from Land Surfaces Using an Emission Isolation Flux Chamber, Users Guide." EPA Environmental Monitoring Systems Laboratory, Las Vegas, Nevada, EPA Contract No. 68-02-3889, Work Assignment No. 18, Radian Corporation, February 1986. NTIS # PB 86-223161.

Card, T.R. and C.E. Schmidt. Compliance Test Protocol, SCAQMD Permit Application No. 559590, Gore® Composting System Air Emission Compliance Test (Compliance Test Protocol) dated May 2015.

Card, T.R. and C.E. Schmidt. Compliance Test Protocol Addendum, SCAQMD Permit Application No. 559590, Gore® Composting System Air Emission Compliance Test (Compliance Test Protocol) dated December 2016.

Table 1. Summary of Field Data Information, Burrtec Compliance Test, February 4-5, 2016.

DATE	**TIME**	**SOURCE**	**DAY**	**LOC**	**BLOWER**		**NH3**	**25.3**	**207.1**	**FLOW**	**He**	**IN SURF**	**STACK**	**IN AIR**	**OUT SURF**	**OUT AIR**	**FID**	**COMMENT**
					ON	**OFF**	**(ppmv)**	**ID**	**ID**	**(ft/min)**	**%**						**TNMHC**	
2/4/2016	946	Bunker 1, Phase 1	3	1	959	1002	0.5	G-101	A-101	24	10.00	73	72	64	79	62	82	Locations 1 thru 4 bulkhead to feed end; FID no filter minus filter reading
2/4/2016	947	Bunker 1, Phase 1	3	2	959	1002	<0.05	G-102	A-102	32	10.00	78	72	67	76	59	12	Blower time is first interval fan on during sampling time period
2/4/2016	948	Bunker 1, Phase 1	3	3	959	1002	<0.05	G-103	A-103	56	10.00	80	79	64	78	63	23	Location 1 thru 4 spaced about 31 feet apart and from both ends
2/4/2016	948	Bunker 1, Phase 1	3	4	959	1002	1	G-104	A-104	84	10.00	79	76	66	70	62	11	
2/4/2016	1205	Bunker 2, Phase 1	27	1	1214	1217	<0.05	G-105	A-105	75	9.88	90	80	76	89	66	1	
2/4/2016	1203	Bunker 2, Phase 1	27	2	1214	1217	<0.05	G-106	A-106	27	9.88	91	88	70	92	65	0	
2/4/2016	1204	Bunker 2, Phase 1	27	3	1214	1217	<0.05	G-107	A-107	60	9.88	99	92	78	102	67	5	
2/4/2016	1203	Bunker 2, Phase 1	27	4	1214	1217	<0.05	G-108	A-108	45	9.88	102	89	79	94	67	0.6	
2/4/2016	1610	Media Blank	NA	QC	NA	NA	NA	G-114	A-114	NA	9.88	NA	NA	NA	NA	NA	NA	Reagent blanks in sample media containers
2/5/2016	852	Bunker 5, Phase 2	34	1	946	951	<0.05	G-201	A-201	51	9.88	79	77	71	80	65	2	
2/5/2016	850	Bunker 5, Phase 2	34	2	946	951	<0.05	G-202	A-202	46	9.88	85	81	69	83	66	2	
2/5/2016	852	Bunker 5, Phase 2	34	3	946	951	<0.05	G-203	A-203	32	9.88	95	84	74	84	70	17	
2/5/2016	850	Bunker 5, Phase 2	34	4	946	951	<0.05	G-204	A-204	30	9.88	91	84	71	79	67	30	
2/5/2016	850	Sample Replicate	34	QC	946	951	<0.05	G-205	A-205	30	9.88	91	84	71	79	67	30	Replicate sample collection
2/5/2016	1046	Bunker 4, Phase 1	14	1	1047	1050	<0.05	G-206	A-206	81	9.88	93	83	74	76	72	3	
2/5/2016	1046	Bunker 4, Phase 1	14	2	1047	1050	<0.05	G-207	A-207	66	9.88	89	84	76	83	71	0.2	
2/5/2016	1044	Bunker 4, Phase 1	14	3	1047	1050	<0.05	G-208	A-208	40	9.88	89	86	74	80	69	0.2	
2/5/2016	1044	Bunker 4, Phase 1	14	4	1047	1050	<0.05	G-209	A-209	37	9.88	94	87	73	81	71	0	
2/5/2016	1044	Sample Replicate	14	QC	1047	1050	<0.05	G-210	A-210	37	9.88	94	87	73	81	71	0	
2/5/2016	1247	Bunker 6, Phase 2	40	1	1250	1254	<0.05	G-211	A-211	35	9.90	88	82	77	85	72	0	
2/5/2016	1246	Bunker 6, Phase 2	40	2	1250	1254	<0.05	G-212	A-212	48	9.90	95	88	77	84	73	0.5	
2/5/2016	1245	Bunker 6, Phase 2	40	3	1250	1254	<0.05	G-213	A-213	58	9.86	108	94	85	82	72	2.2	
2/5/2016	1244	Bunker 6, Phase 2	40	4	1250	1254	<0.05	G-214	A-214	56	9.86	103	91	82	85	72	55	
2/5/2016	1359	Media Blank	NA	QC	NA	NA	NA	G-215	A-215	NA	9.86	NA	NA	NA	NA	NA	NA	Reagent blanks in sample media containers

Table 2. Summary of Concentration and Flux Data, Burrtec Compliance Test, February 4-5, 2016.

SOURCE	DAY	25.3	207.1	Methane		Ethane		TNMNEO		TNMNEO		NMNEO Trap		NMNEO Tank		AQMD Multiplier	CO2		NH3		NH3 Vol		NH3		Helium	Helium	Total Flow	Total Flow	Methane		TNMNEO		NH3	
		ID	ID	(ppmvC)		(ppmvC)		(ppmvC)		(mg/m3)		(ppmv)		(ppmv)			(ppmv)		(mg)		(m3)		(mg/m3)		(%)	Detected	(lpm)	(m3/min)	Flux		Flux		Flux	
Bunker 1, Phase 1	3	G-101	A-101	6.19		ND	U	471		**308**		111		360		1.086	15772		0.007		0.0353		0.198		10.00	6.73	7.43	0.00743	0.231		19.09		0.0113	
Bunker 1, Phase 1	3	G-102	A-102	10.7		ND	U	141		**92.1**		45.2		95.6		1.086	6389		0.007		0.0310		0.226		10.00	5.36	9.33	0.00933	0.501		7.18		0.0162	
Bunker 1, Phase 1	3	G-103	A-103	121		ND	U	136		**88.8**		45.8		90.5		1.086	8,025		0.007		0.0307		0.228		10.00	1.61	31.1	0.0311	18.9		23.04		0.0545	
Bunker 1, Phase 1	3	G-104	A-104	41.4		ND	U	86.2		**56.3**		33.1		53.1		1.086	8325		0.007		0.0303		0.231		10.00	4.30	11.6	0.0116	2.42		5.47		0.0207	
Bunker 2, Phase 1	27	G-105	A-105	20.9		ND	U	5.13		**3.35**		3.79		1.34		1.086	2,729		0.007		0.0313		0.224		9.88	1.81	27.3	0.0273	2.87		0.76		0.0470	
Bunker 2, Phase 1	27	G-106	A-106	48.2		ND	U	11.3		**7.38**		4.84		6.46		1.086	5,216		0.005		0.0322		0.155		9.88	3.56	13.9	0.0139	3.36		0.86		0.0166	
Bunker 2, Phase 1	27	G-107	A-107	21.9		ND	U	25.6		**16.7**		15.8		9.76		1.086	5,112		0.005		0.0319		0.157		9.88	2.68	18.4	0.0184	2.03		2.57		0.0222	
Bunker 2, Phase 1	27	G-108	A-108	14.6		ND	U	6.68		**4.36**		4.88		1.80		1.086	2,331		0.006		0.0306		0.196		9.88	4.72	10.5	0.0105	0.768		0.38		0.0158	
Media Blank	NA	G-114	A-114	1	U	ND	U	1	U	**0.653**	U	0.5	U	1	U	1.086	2.29		0.005		0.0350		0.143		9.88	9.94	5.00	0.00500	0.0251	U	0.03	U	0.00549	
Bunker 5, Phase 2	34	G-201	A-201	24.3		ND		3.43		**2.24**		2.16		1.27		1.086	2203		0.005		0.0330		0.152		9.88	1.94	25.46	0.0255	3.11		0.48		0.0297	
Bunker 5, Phase 2	34	G-202	A-202	78.2		ND		23.1		**15.1**		21.6		1.47		1.086	2828		0.006		0.0312		0.192		9.88	2.54	19.45	0.0194	7.64		2.45		0.0288	
Bunker 5, Phase 2	34	G-203	A-203	103		ND		66.7		**43.6**		55.8		10.9		1.086	3587		0.005		0.0322		0.155		9.88	4.80	10.29	0.0103	5.32		3.74		0.0123	
Bunker 5, Phase 2	34	G-204	A-204	205		ND		142		**92.7**		130		11.8		1.086	2,731		0.005		0.0282		0.177		9.88	7.41	6.67	0.00667	6.86		5.16		0.00909	
Sample Replicate	34	G-205	A-205	230		ND		147		**96.0**		129		18.0		1.086	2877		0.005		0.0307		0.163		9.88	6.99	7.07	0.00707	8.16		5.67		0.00885	
Bunker 4, Phase 1	14	G-206	A-206	15.8		ND		7.30		**4.77**		2.44		4.85		1.086	1,653		0.005		0.0288		0.174		9.88	1.26	39.21	0.0392	3.11		1.56		0.0524	
Bunker 4, Phase 1	14	G-207	A-207	4.42		ND		11.1		**7.25**		3.72		7.43		1.086	2,729		0.004		0.0338		0.118		9.88	1.90	26.00	0.0260	0.577		1.57		0.0237	
Bunker 4, Phase 1	14	G-208	A-208	6.57		ND		16.4		**10.7**		7.55		8.85		1.086	3931		0.004	U	0.0328		0.122	U	9.88	3.54	13.95	0.0140	0.461		1.25		0.0131	U
Bunker 4, Phase 1	14	G-209	A-209	26.5		ND		24.1		**15.7**		7.01		17.1		1.086	7150		0.004	U	0.0334		0.120	U	9.88	4.47	11.05	0.0111	1.47		1.45		0.01018	U
Sample Replicate	14	G-210	A-210	26.8		ND		23.4		**15.3**		7.40		16.0		1.086	7163		0.004		0.0317		0.126		9.88	4.42	11.18	0.0112	1.50		1.43		0.0108	
Bunker 6, Phase 2	40	G-211	A-211	15.0		ND		13.8		**9.01**		5.37		8.40		1.086	3684		0.004		0.0311		0.129		9.90	2.93	16.89	0.0169	1.27		1.27		0.0167	
Bunker 6, Phase 2	40	G-212	A-212	6.08		ND		45.5		**29.7**		29.1		16.4		1.086	9,246		0.004	U	0.0328		0.122	U	9.90	4.43	11.17	0.0112	0.341		2.77		0.0105	U
Bunker 6, Phase 2	40	G-213	A-213	10.7		ND		16.2		**10.6**		8.92		7.29		1.086	5911		0.004		0.0344		0.116		9.86	2.21	22.31	0.0223	1.20		1.97		0.0200	
Bunker 6, Phase 2	40	G-214	A-214	159		ND		30.1		**19.7**		24.1		6.06		1.086	4443		0.005		0.0334		0.150		9.86	1.43	34.48	0.0345	27.5		5.66		0.0397	
Media Blank	NA	G-215	A-215	1	U	1.00	U	1.0	U	**0.65**	U	0.5	U	1	U	1.086	1.12		0.004	U	0.0340		0.118	U	9.86	10.03	5.00	0.00500	0.0251	U	0.03	U	0.00452	U

TNMNEO- Total non-methane non-ethane organic carbon reported as methane (carbon # = 1)

Flux = (concentration, mg/m3)(total flow, m3/min)/(surface area, 0.13 m2) = mg/m2,min-1

CE Schmidt, Ph.D.
Environmental Consultant

ATTACHMENT A

EMISSION MEASUREMENT DATA SHEETS

Bunker Screening

Burrtec West Valley Air Emissions Compliance Test

Date 02/03/16

Time 08:30

Bunker Number 1 Bunker Material 10% Food 500 ton Day 2

Samplers D. Yonemori

Instrument Used TVA2020

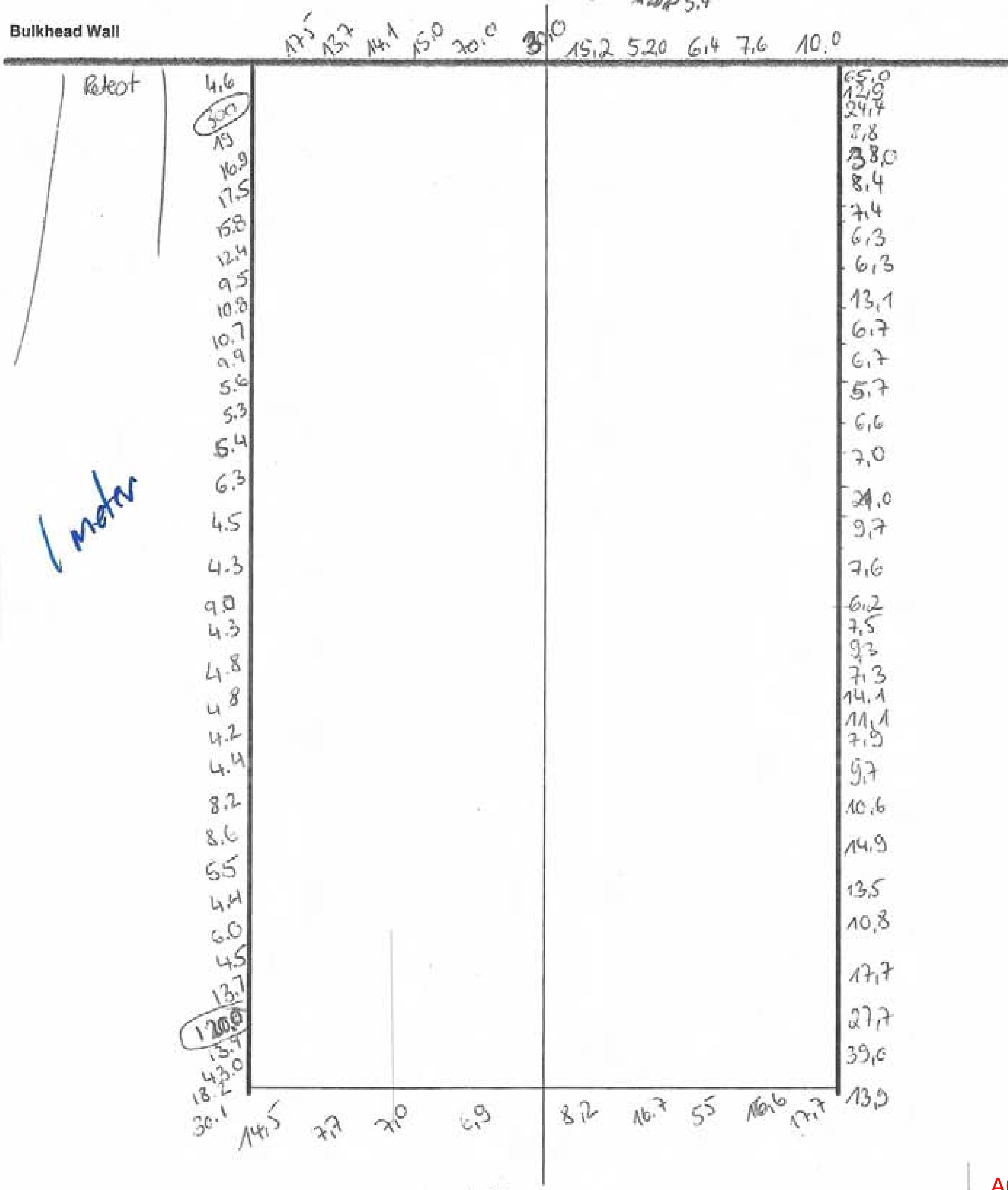
Windspeed 0-2 mph Wind Direction S/W

Instrument Baseline

Comments

FID Concentration Threshold ________ ppmv

Ambient H- 5,7
W- 5,6
G- 5,4



17,5 13,7 14,1 15,0 20,0 30,0 15,2 5,20 6,4 7,6 10,0

4,6
300
19
16.9
17.5
15.8
12.4
9.5
10.8
10.7
9.9
5.6
5.3
5.4
6.3
4.5
4.3
9.0
4.3
4.8
4.8
4.2
4.4
8.2
8.6
5.5
4.4
6.0
4.5
13.7
1200
13.9
43.0
18.2
30.1

65,0
12,9
24,7
8,8
38,0
8,4
7,4
6,3
6,3
13,1
6,7
6,7
5,7
6,6
7,0
24,0
9,7
7,6
6,2
7,5
9,3
7,3
14,1
11,1
7,9
9,7
10,6
14,9
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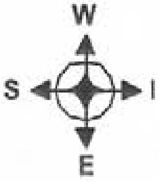
17,7
27,7
39,6
13,9

14,5 7,7 7,0 6,9 8,2 16,7 5,5 16,6 17,7



7 = 7
1 = 1
, = ,

Ambient H- 5,6
W- 11,0

Bunker Screening

Burrtec West Valley Air Emissions Compliance Test

Date 02/03/16

Time 905

Bunker Number 2

Bunker Material 10% FW 1500t Day26

Samplers D. Yonemori

Instrument Used TVA 2020

Windspeed 0-2 mph

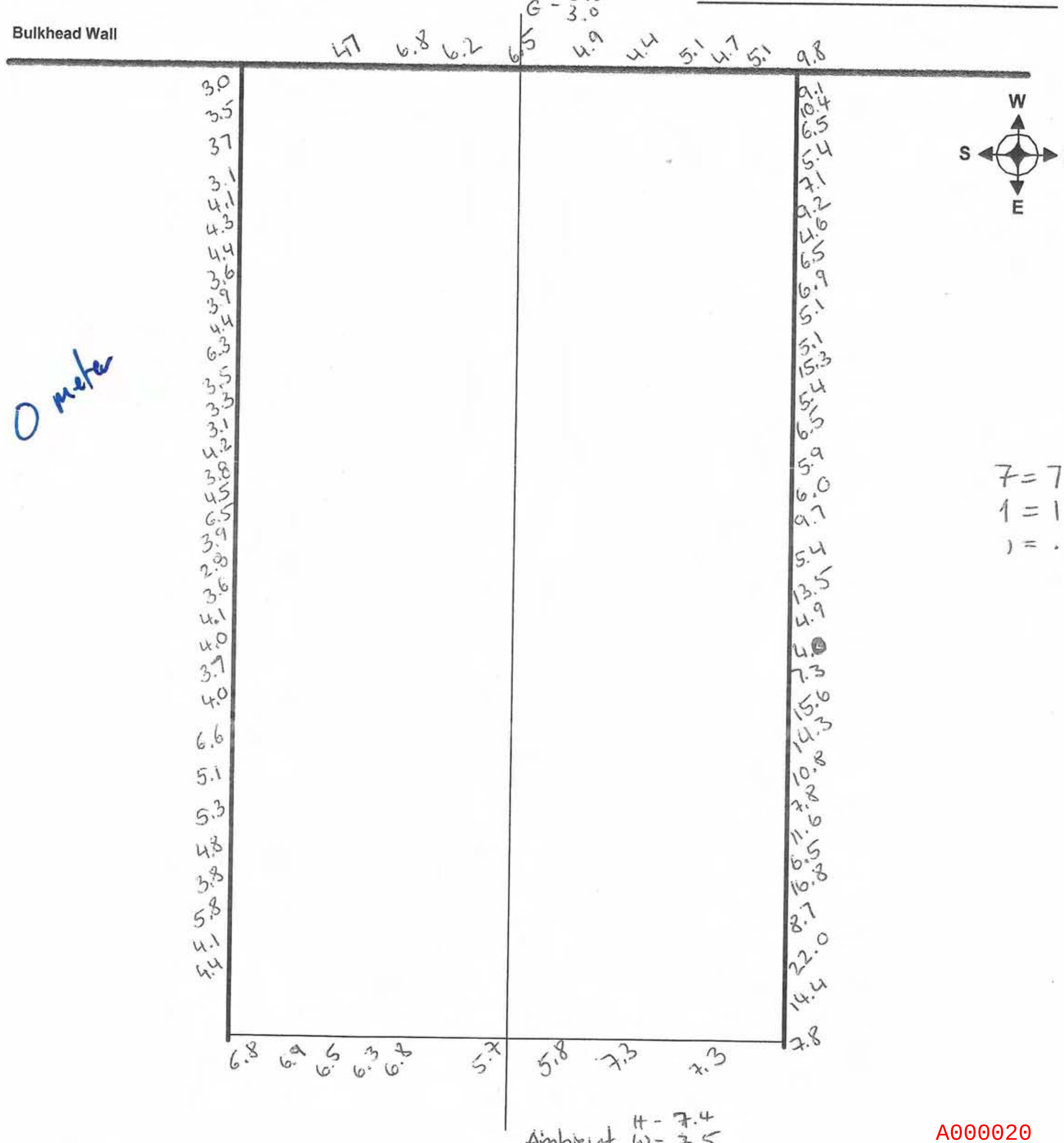
Wind Direction SW

Instrument Baseline

Comments

FID Concentration Threshold ________ ppmv

Ambient H - 3.0
W - 3.0
G - 3.0



0 meter

7 = 7
1 = 1
) = .

Ambient H - 7.4
W - 7.5
G - 6.4

Bunker Screening

Burrtec West Valley Air Emissions Compliance Test

~~09~~/05/ 16
02
RE-SCREEN

Date 02/03/16

Time 9³⁰

Bunker Number 4 Bunker Material 10% FW, 500t Day 12

Samplers D. Yonemori +CES

Instrument Used TVA 2020

Windspeed 0-2 mph Wind Direction SW

Instrument Baseline ______

Comments ______

FID Concentration Threshold ______ ppmv

Ambient: H-2.9 W-2.7 G-2.5

AMBIENT 6H 10 H
10 W
(COLD!) 10 G

Bulkhead Wall

20 -20 -15 - 20 —— 30 —— 30 -20 ——

37.0 8.3 13.0 83.0 45 36.0 25 8.5 12.0

RESCREEN NOTING ANAMOLIES (HIGH BASELINE) ≈ AMBIENT - STILL AIR CONDITIONS.

<15 ↕ 20.0 6.3 4.5 8.1 14.5 6.3 8.5 7.8 14.0 10.2 11.5

27 10 ↓ 7.6 7.0 6.2 6.5 9.9

0.5 mph

LOW 20s 15 10.1 10.3 21.0

LOW TEENS ↓ 9.3 7.9 9.6 10.9 11.5 7.0 10.7

<20 7.2 10.2 9.5 11.0 8.3 48.0

40 <40
25
20 <10
42
8.6 40
13.5
19.3 20s
11.2
8.9
4.0
10.1
8.6
6.2 10-15
4.7
6.2
9.0
5.2
5.0
5.4 <20
6.6
10.5
5.9
10.2
10.5 LOW TEENS
12.1
9.9
8.4 <10
12.4
9.2 15
13.1 100 PIN POINT (NOT REPEATED)
9.7 7
15.8 40
25.0 7
30.0

A H-5.6

7 = 7
1 = 1
, = .

30.0 18.5 18.8 10.9 5.1 10.3 10.1 5.8

← 10-15 → <20 30-10

Ambient H-5.7 W-6.9 G-5.7

Ambient H-2.9 W-7.2 G-8.0

AA ~ 10 (HIGH) ZERO ~2

A000021

Bunker Screening

Burrtec West Valley Air Emissions Compliance Test

~~09~~ 02 /05/16

Date 02/02/16

Time 1000

Bunker Number 5 Bunker Material 10% FW, 500t Day 32

Samplers D. Yonemori

Instrument Used TVA 2020

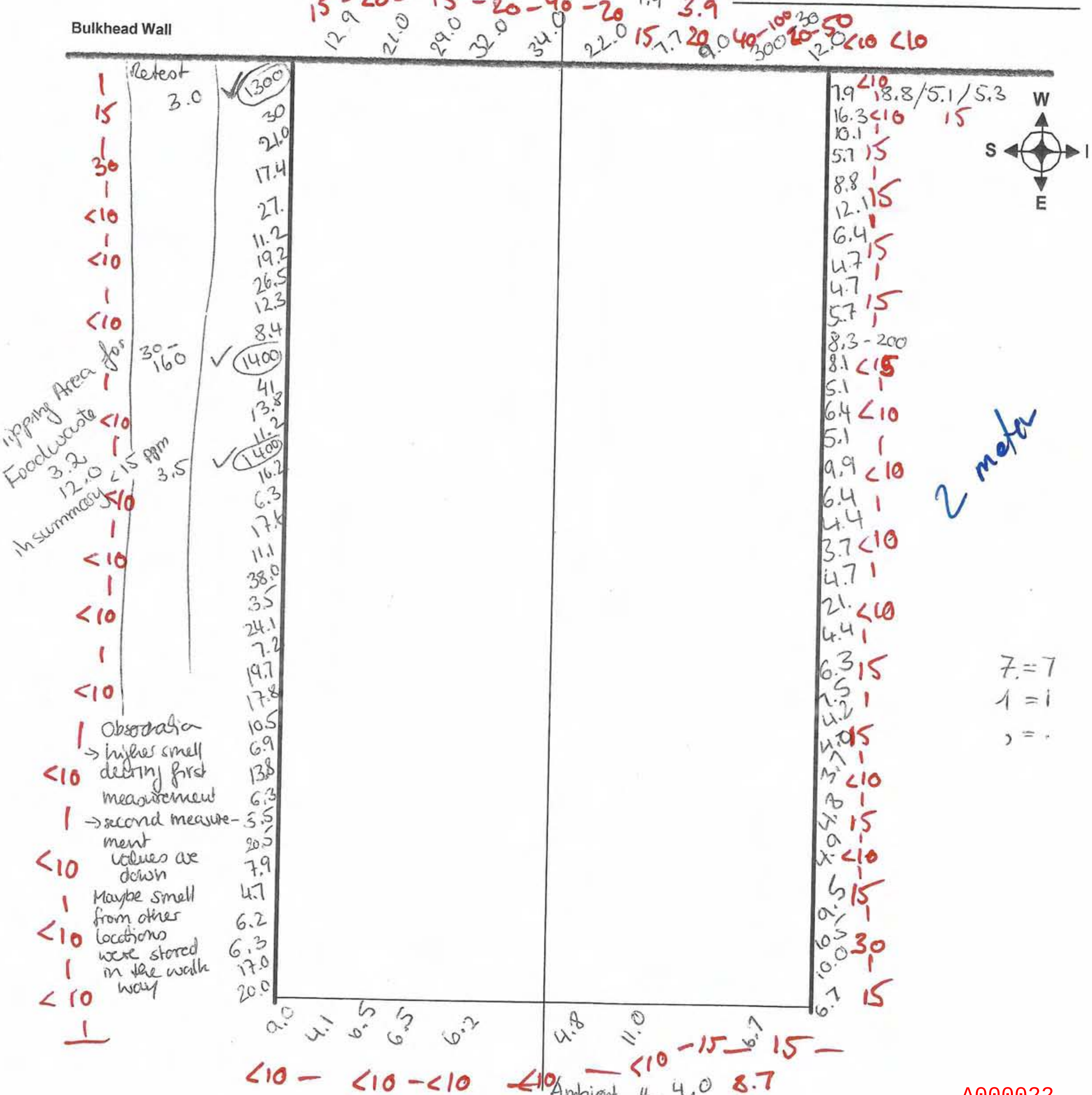
Windspeed 0-2 mph Wind Direction SW

Instrument Baseline ____

Comments ____

Ambient H- 2.0 4.0
W- 2.1 4.9
G- 1.9 3.9

FID Concentration Threshold ____ ppmv



Ambient H- 4.0 8.7
W- 3.6 7.3
G 3.5 7.1

Bunker Screening

Burrtec West Valley Air Emissions Compliance Test

02/05/16 Date 02/03/16

Time 11⁰⁰

Bunker Number 6

Bunker Material 10% FW, 500t Day38

Samplers D. Yonemori

Instrument Used TVA 2020

Windspeed 0-2 mph

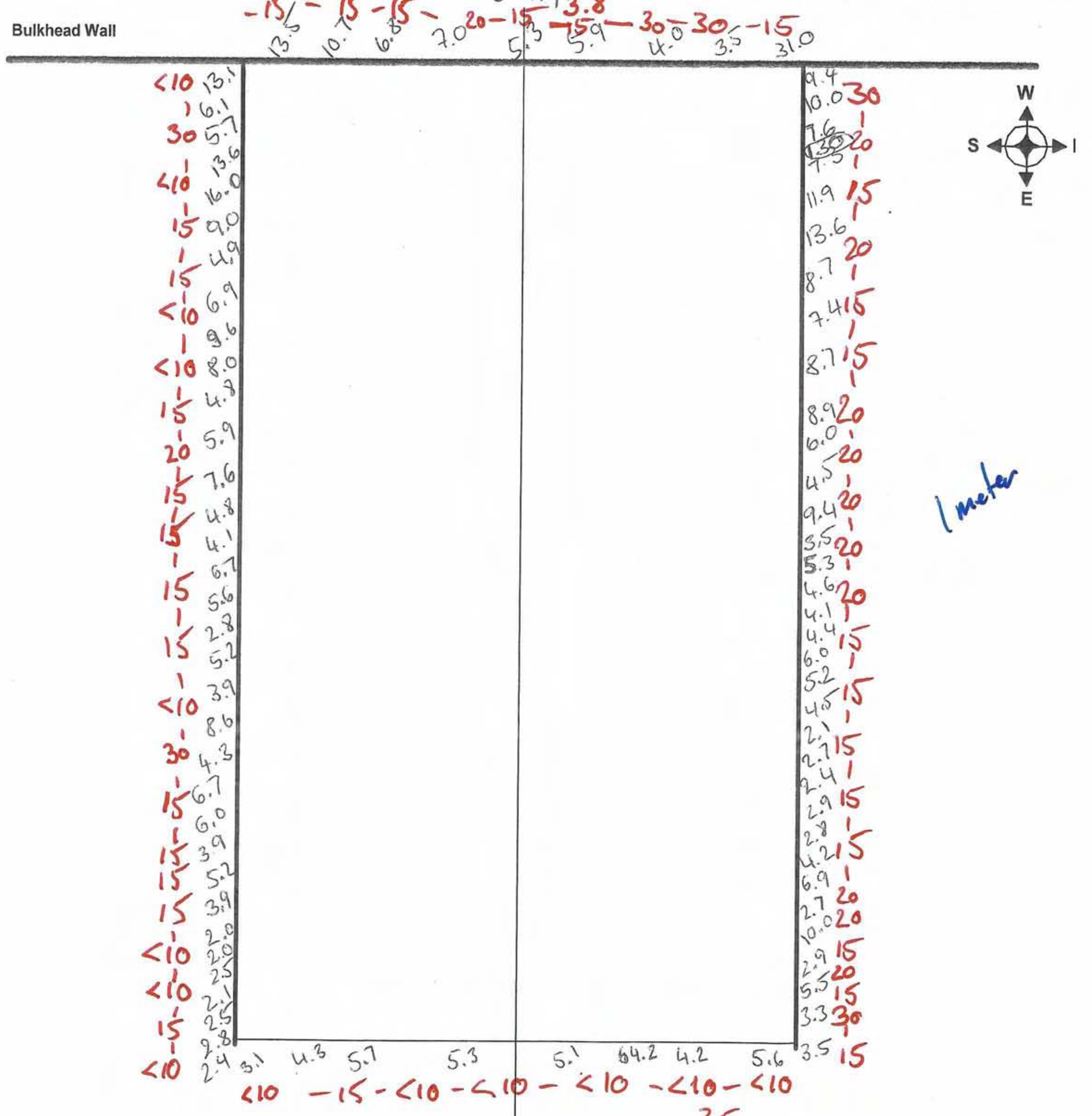
Wind Direction SW

Instrument Baseline

Comments

FID Concentration Threshold ________ ppmv

Ambient
H- 1.4 3.5
W- 1.4 3.3
G- 1.4 3.8



Ambien
H- 1.6 3.5
W- 2.8 4.2
G- 1.6 4.2

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/4/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunker #1 Day 3 Loc #1

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE I.D. NO. TYPE ID NO.

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. # A PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-5 mph Wind at Seal, mph

TEMP RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☒ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP He 10.00% CC 29004 SUPPLIER SM PSIG START 900 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA THC	NH3		
			Surf	Air	Air	Surf	Air				
0909	5.0	0									
0915		1									
0921		2									
0927		3									
0933		4						106			
0939		5	73	72	64	79	62		0.5		A1231
0954						TVA THC →	12 M	108 WF	0946	G-101	C, H [redacted]
0956						Ambm	8	~~5.6M~~ 5.6 ff	0946	A-101	Z2081
1001								92 WF			

10 M

COMMENTS:

Straight stack

Flow: 24 ft/min @ 0941

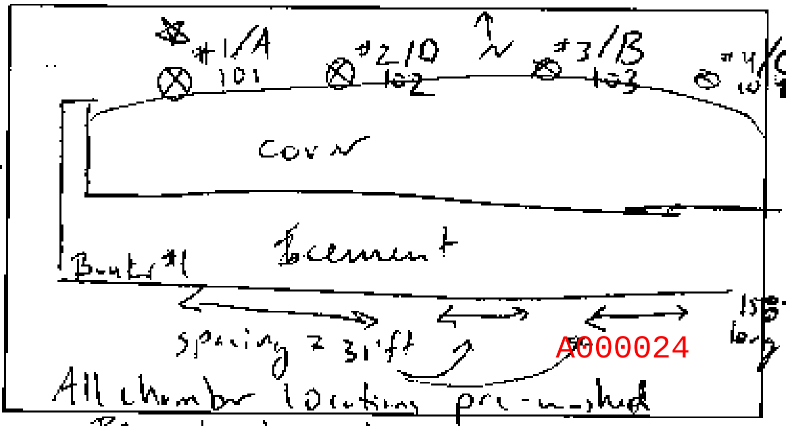
		#1	#2	#3	#4
Over ← more time	Blower ON	0932	0948	0959	1003
	OFF	0935	0950	1002	1006

ID	Start	End
G-101	0946	1047
A-101	0946	1047

Ambient TVA 4.5 0935

3.9 1001

SITE DIAGRAM



All chamber locations pre-washed Paper towels + water

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/4/16 SAMPLERS CGS, TRC, KTS, JDA

LOCATION Bunker #1 Day #3 Loc #2

SURFACE DESCRIPTION gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ______ I.D. NO. ______ TYPE ______ ID NO. ______

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☑ REPLICATE MEASUREMENTS ☑

AMBIENT CONCENTRATIONS

CHAMBER I.D. #D PHOTO TAKEN: Yes ☑ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL Y CONDENSATION: Yes ☑ No ☐ BARM PRESS

AMBIENT CONDITIONS: Sun ☑ P.Sun ☐ Cloudy ☐ Wind at 5', 0-5 mph Wind at Seal, ____ mph

TEMP ______ RAIN: Yes ☐ No ☑ Comment

PRIOR CHAMBER CLEANING: Full Wash ☑ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☑ PURGED PRIOR TO SAMPLING ☑ New ☐ Used ☑

SWEEP AIR UHP/He 10.00% CC ~~[illegible]~~ ~~[illegible]~~ 29004 SUPPLIER SM PSIG START ~~1000~~ 900 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA THC	NH3		
			Surf	Air	Air	Surf	Air				
0909	5.0	0									
0915	↓	1									
0921		2									
0927		3									
0933		4						19.7			
0939		5	78	72	67	76	59	stack	<0.05	G-102	Can # 5029
0957								14 32 WF		A-102	
								Ambient			
0957								5.2 M 4.5 VF			

COMMENTS:

Slant stack

Flow .32 ft/min @ 0938

		#1	#2	#3	#4
Blower	ON	0932	0948	0959	1003
	OFF	0935	0950	1002	1006

ID	Start	End
G-102	0947	1045
A-102	0947	1045

Ambient TVA 5.3 0933

SITE DIAGRAM

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/14/16 SAMPLERS CES, JRC, KTS, JDA
LOCATION Bunker #1, Day #3 Loc #3
SURFACE DESCRIPTION Gore covered compost
CURRENT ACTIVITY
INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____
INSTRUMENT BASELINE
PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☑ REPLICATE MEASUREMENTS ☑
AMBIENT CONCENTRATIONS
CHAMBER I.D. B PHOTO TAKEN: Yes ☑ No ☐ STACK SIZE/VELOCITY 2"/
CHAMBER SEAL Y CONDENSATION: Yes ☑ No ☐ BARM PRESS
AMBIENT CONDITIONS: Sun ☑ P.Sun ☐ Cloudy ☐ Wind at 5', 0.5 mph Wind at Seal, ____ mph
TEMP ____ RAIN: Yes ☐ No ☑ Comment
PRIOR CHAMBER CLEANING: Full Wash ☑ Wet Wipe ☐ Dry Wipe ☐ None ☐
SAMPLE LINE: BACK FLUSHED PRIOR TO START ☑ PURGED PRIOR TO SAMPLING ☑ New ☐ Used ☑
SWEEP AIR UHP +He 10.0% CC 74082 SUPPLIER SM PSIG START 1000 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F) Chamber Surf	Chamber Air	Stack Air	Ambient Surf	Ambient Air	Real-Time (ppmv) TVA THC	NH3	Sample Number	Comments
0909	5.0	0									
0915	↓	1									
0921		2									
0927		3									
0933	↓	4	80	79	64	78	63	60.3	<0.05		
0939		5						stack	0948	G-103	Can #5076
0958								58 / 65	↓	A-103	
								Ambient			
0955								4.6 / WF			

COMMENTS:

Straight stack

Flow 56 ft/min @ 0937

	#1	#2	#3	#4
Blower ON	0932	0948	0959	1003
OFF	0935	0950	1002	1006

Ambient TVA 3.9

SITE DIAGRAM

ID	Start	End
G-103	0948	1046
A-103	↓	1046

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/14/16 SAMPLERS CSS, TRC, KTB, TDA

LOCATION Bunker#1 Day#3 Loc#4

SURFACE DESCRIPTION gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ______ I.D. NO. ______ TYPE ______ ID NO. ______

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☑ REPLICATE MEASUREMENTS ☑

AMBIENT CONCENTRATIONS

CHAMBER I.D. # C PHOTO TAKEN: Yes ☑ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL Y CONDENSATION: Yes ☑ No ☐ BARM PRESS

AMBIENT CONDITIONS: Sun ☑ P.Sun ☐ Cloudy ☐ Wind at 5', 0-5 mph Wind at Seal, ____ mph

TEMP ______ RAIN: Yes ☐ No ☑ Comment

PRIOR CHAMBER CLEANING: Full Wash ☑ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☑ PURGED PRIOR TO SAMPLING ☑ New ☐ Used ☑

SWEEP AIR UHP+He 10.00% CC 7U083 SUPPLIER SM PSIG START 1000 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA THC	NH3		
			Surf	Air	Air	Surf	Air				
0909	5.0	0									
0915		1									
0921		2						chamb			
0927		3	79	76	66	70	62	21.2	1		
0933		4									
0939		5						stack		G·104	Can# E0022
1000								314F 20 ppm		A·104	
								Amb			
1000								0.0WE			

COMMENTS: ~~Straight~~ slant stack

Flow: 30 ft/min @ 0931

	#1		#2	#3	#4
Blower	0932	ON	0948	0959	1003
	0935	off	0950	1002	1004

ambient 4.8 TVA 0932

SITE DIAGRAM

IO	Start	End
G-104	0948	1047
A-104	↓	1047

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/4/16 SAMPLERS CES, JRL, KTB, JDA

LOCATION Bunker #2 Phase I Day 27 loc# 1/A

SURFACE DESCRIPTION gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☑ REPLICATE MEASUREMENTS ☑

AMBIENT CONCENTRATIONS

CHAMBER I.D. A PHOTO TAKEN: Yes ☑ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL Y CONDENSATION: Yes ☐ No ☑ BARM PRESS

AMBIENT CONDITIONS: Sun ☑ P.Sun ☐ Cloudy ☐ Wind at 5', 3-6 mph Wind at Seal, ____ mph

TEMP ____ RAIN: Yes ☐ No ☑ Comment

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☑ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☑ PURGED PRIOR TO SAMPLING ☑ New ☐ Used ☑

SWEEP AIR UHP+He 9.80% CC 06678 SUPPLIER SM PSIG START ~~06678~~ 2000 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time NH₃ (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		~~[illegible]~~	TVA F = Filter A = Amb		
			Surf	Air	Air	Surf	Air	~~DF~~	~~UF~~ ~~unfilter~~ without filter		
1126	5.0	0									
1132		1									
1138		2			76						
1144		3	90	80	~~50~~	89	66	~~[illegible]~~	12 ~~UF~~ 5.2		
1150	↓	4						<0.05	11 Filter		
1156		5								G-105	E0019
										A-105	

COMMENTS:

straight stack

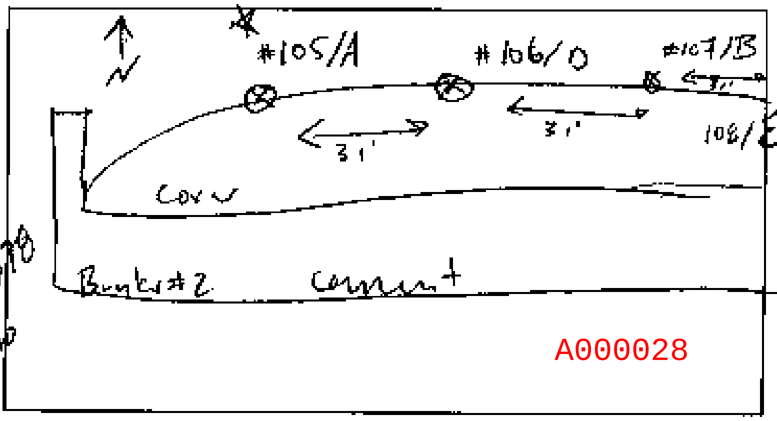
Flow: 75 ft/min @ 1146

ID	Start	End
G-105	1205	1500
A-105	↓	↓

MEDIA BLANK
G114 1610
S070
Cyl 06678
9.86%

* All chamber locations prewashed w/ water + paper towels

SITE DIAGRAM



[illegible] over →

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/4/16 SAMPLERS CES, JRC, KTB, JDA

LOCATION Bunker #2 Phase I Day 27 Loc # 2/D

SURFACE DESCRIPTION gore covered fabric

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. D PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 3-6 mph Wind at Seal, ____ mph

TEMP ____ RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP tHe 9.88% CC 06678 SUPPLIER SM PSIG START 2000 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA A = Amb WF = w/o filter	NH3		
			Surf	Air	Air	Surf	Air				
1126	5.0	0									
1132	↓	1									
1138		2						30 F			
1144		3						3.5 A 30 WF	<0.05		
1150		4	91	88	70	92	65				
1156		5								G-106	Can # A106
										A-106	

COMMENTS:

Slant stack

Flow: 27 ft/min @ 1150

SITE DIAGRAM

ID	Start	End
G-106	1203	1302
A-106	↓	↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/4/16 SAMPLERS CES, TRL, MB, JDA

LOCATION Bunker #2 Phase I Day 27 Loc #3/B

SURFACE DESCRIPTION gore covered fabric

CURRENT ACTIVITY ______

INSTRUMENT TYPE ______ I.D. NO. ______ TYPE ______ ID NO. ______

INSTRUMENT BASELINE ______

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS ______

CHAMBER I.D. B PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL ______ CONDENSATION: Yes ☒ No ☐ BARM PRESS ______

AMBIENT CONDITIONS: Sun ☒ Pt. Sun ☐ Cloudy ☐ Wind at 5', 3-8 mph Wind at Seal, ______ mph

TEMP ______ RAIN: Yes ☐ No ☒ Comment ______

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ ______

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 98734 SUPPLIER SM PSIG START 2000 PSIG STOP ______

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA A=Amb [illegible]	NH3 w Filter		
			Surf	Air	Air	Surf	Air				
1126	5.0	0									
1132		1									
1138		2									
1144		3									
1150		4						15=F			
1156		5	99	92	78	102	67	32=A 20=F	<0.05	G-107	5077
										A-107	

COMMENTS:

Straight stack

Flow: 60 ft/min @ 1154

SITE DIAGRAM

ID	Start	End
G-107	1204	1259
A-107		

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/4/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunker #2 Phase I Day 27 Loc #4 / C

SURFACE DESCRIPTION go'e covered fabric

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. C PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS ____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 3-6 mph Wind at Seal, ____ mph

TEMP ____ RAIN: Yes ☐ No ☒ Comment ____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 98739 SUPPLIER SM PSIG START 2000 PSIG STOP ____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA A = Ambt F = Filter UF = V/O	NH3		
			Surf	Air	Air	Surf	Air				
1126	5.0	0									
1132	↓	1									
1138		2									
1144		3									
1150		4						6.5 = F			
1156		5	102	89	79	94	67	4.5 = A 7.1 = F	<0.05	G-108	Can # 301
										A-106	

COMMENTS:

Slant stack

Flow: 45 ft/min @ 1154

SITE DIAGRAM

ID	start	End
G-108 A-106	1203 ↓	1257 ↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS LES, TRC, KTS, JDA

LOCATION Bunker 5 Phase II Day 34 Loc #1

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☑ REPLICATE MEASUREMENTS ☑

AMBIENT CONCENTRATIONS

CHAMBER I.D. C PHOTO TAKEN: Yes ☑ No ☐ STACK SIZE/VELOCITY 2"/51 ft/ 0835

CHAMBER SEAL Y CONDENSATION: Yes ☑ No ☐ BARM PRESS ____

AMBIENT CONDITIONS: Sun ☑ P.Sun ☐ Cloudy ☐ Wind at 5', 0-2-7 mph Wind at Seal, ____ mph

TEMP ____ RAIN: Yes ☐ No ☑ Comment ____

PRIOR CHAMBER CLEANING: Full Wash ☑ Wet Wipe ☐ Dry Wipe ☐ None ☐ ____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☑ PURGED PRIOR TO SAMPLING ☑ New ☐ Used ☑

SWEEP AIR UHP+He 9.85% CC 98739 SUPPLIER SM PSIG START 1000 PSIG STOP ____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA A = Amb F = Filter WF = w/o Filter	NH3		
			Surf	Air	Air	Surf	Air				
0816	5.0	0									
0822	↓	1									
0828		2									
0834		3	79	77	71	80	65	5.5 A 17 WF	<0.05		
0840		4						15 F			
0846		5								G-201	Can# 0298
										A 201	

COMMENTS:

Slant stack

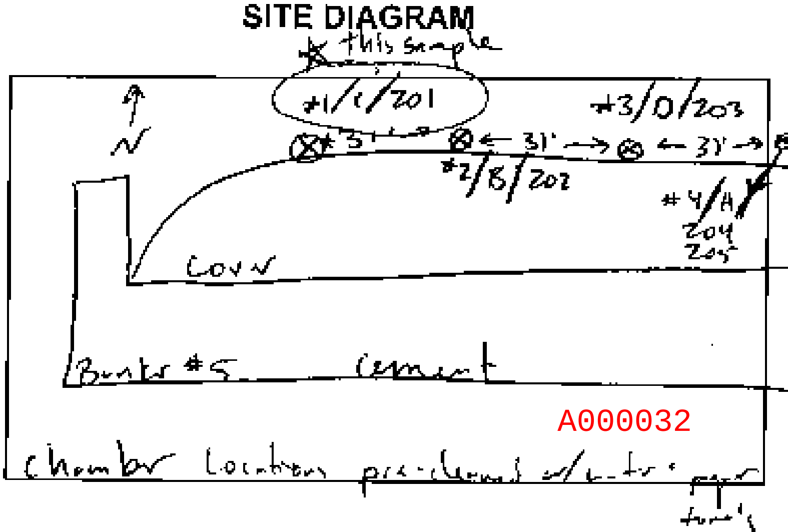
~~Flow ft/[illegible]~~

	ON	OFF
Blown	0835	0840
	0946	~~0957~~ 0951

ID	Start	End
G-201	0852	0949
A-201	↓	↓

* wind increasing during test run

SITE DIAGRAM



SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunker 5 Phase II Day 34 Loc #2

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE I.D. NO. TYPE ID NO.

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. B PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/46 ft/ 0838

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-3 -7 mph Wind at Seal, mph

TEMP RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☒ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 98739 SUPPLIER SM PSIG START 1000 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air	A = Amb F = Filter WF = W/o Filter	Filter		
0816	5.0	0									
0822	↓	1									
0828		2									
0834		3						5.1 A 136 WF	<0.05		
0840		4	85	81	69	83	66	160 F			
0846		5						235 WF 233 F		G-202	Lung A116
										A-202	

COMMENTS:

Straight stack

SITE DIAGRAM

ID	Start	End
G-202 A-202	0850 ↓	0947 ↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS LES, TRC, KTS, JDA

LOCATION Bunker 5 Phase # Day 34 loc #3

SURFACE DESCRIPTION Gore covered & compost

CURRENT ACTIVITY

INSTRUMENT TYPE ______ I.D. NO. ______ TYPE ______ ID NO. ______

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. D PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/32 ft/ 0842

CHAMBER SEAL ______ CONDENSATION: Yes ☒ No ☐ BARM PRESS ______

AMBIENT CONDITIONS: Sun ☒ P. Sun ☐ Cloudy ☐ Wind at 5', 0-3 .7 mph Wind at Seal, ____ mph

TEMP ______ RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☒ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 06676 SUPPLIER SM PSIG START 1000 PSIG STOP ______

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA A=ambd F=FID [illegible]	NH3 [illegible]		
			Surf	Air	Air	Surf	Air				
0816	5.0	0									
0822		1									
0829		2									
0834		3									
0840		4	95	84	74	84	70	20 A 225 vF	<0.05		
0846		5						208 F		G-203	Can # 91180
										A-203	

COMMENTS:

Slant stack

SITE DIAGRAM

ID	Start	End
G-203 A-203	0852 ↓	0952 ↓

A000034

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunker 5 Phase II Day 34 Loc #4

SURFACE DESCRIPTION Gore Covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE I.D. NO. TYPE ID NO.

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. A PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/30 ft/min

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS 0548

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-3 -7 mph Wind at Seal, mph

TEMP RAIN: Yes ☐ No ☒ Comment

PRIOR CHAMBER CLEANING: Full Wash ☒ Wet Wipe ☐ Dry Wipe ☐ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 06676 SUPPLIER SM PSIG START 1000 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
0816	5.0	0									
0822	↓	1									
0828		2									
0834		3									
0840		4									
0846		5	91	84	71	79	67	10 A 300 WF	<0.05	G-204	Can # 5017
								250 F		A-204	
										G-205	Can #5037
										A-205	

COMMENTS:

straight stack

* Camera photo the advance of real time

SITE DIAGRAM

ID	Start	End
G-204	0850	0943
A-204	↓	↓
G-205		
A-205		

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CAS, TRC, KTS, JOA

LOCATION Bunker 4 Phase I Day 14 Loc #1

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. B PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/8 ft/min 1039

CHAMBER SEAL 4 CONDENSATION: Yes ☐ No ☒ BARM PRESS ____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-10 15-20 mph Wind at Seal, ____ mph

TEMP ____ RAIN: Yes ☐ No ☒ Comment increasing winds

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 98734 SUPPLIER SM PSIG START 600 PSIG STOP 100

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
1011	5.0	0									
1017		1									
1023		2									
1029		3									
1035		4	93	83	74	76	72	2.5 A 22 WF	<0.05		
1041		5						19 F		G-206	Can # 91187
										A-206	

COMMENTS:

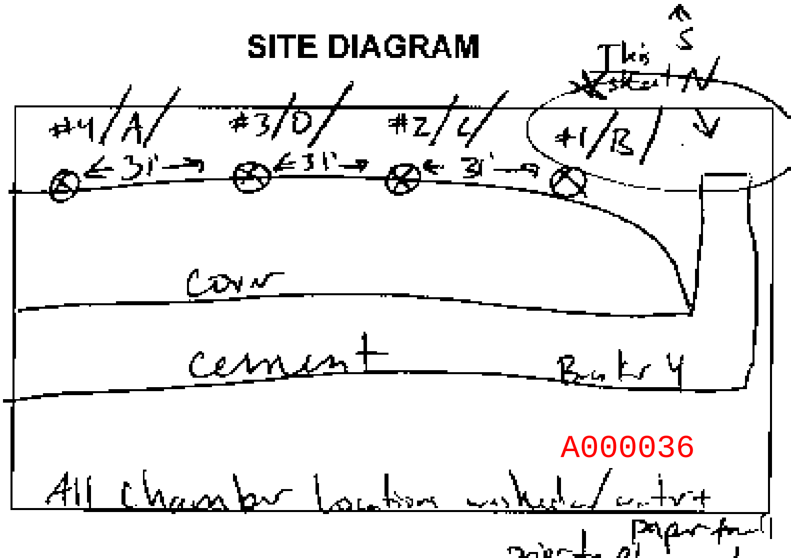
straight stack

Blower	ON	OFF
	1017	1020
	1035	1036
	1047	1050
	1102	1105

ID	Start	End
G-206	1047	1133
A-206	↓	↓

Blower	on	OFF
	1119	1120

SITE DIAGRAM



A000036

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS LES, TRC, KTS, SDA

OCATION Bunker 4. Phase I Day 14 loc #2

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE I.D. NO. TYPE ID NO.

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. C PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2" / 66 ft

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS 1035

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', slight 0-10 15-20 mph Wind at Seal, ___ mph

TEMP RAIN: Yes ☐ No ☒ Comment increasing winds

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR VHP+He 9.88% CC 98739 SUPPLIER SM PSIG START 600 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
1011	5.0	0									
1017	↓	1									
1023		2									
1029		3									
1035		4	89	84	76	83	71	2.5 A 7 WF	<0.05	G-207	Can# A124
1041		5						6.8 F		A-207	

COMMENTS:

Slant stack

SITE DIAGRAM

ID	Start	End
G-207	1046	1144
A-207	↓	↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunker 4 Phase I Day 14 Loc #3

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE I.D. NO. TYPE ID NO.

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. D PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/40 ft/m 1030

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-10 -15-20 mph Wind at Seal, ___ mph

TEMP RAIN: Yes ☐ No ☒ Comment increasing winds

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 06678 SUPPLIER SM PSIG START 600 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH		
			Surf	Air	Air	Surf	Air				
1011	5.0	0									
1017	↓	1									
1023		2									
1029		3	89	86	74	80	69	2.5 A 4.2 F	<0.05		
1035		4						3.6 F			
1041		5								G-208	Can # E0021
										A-208	

COMMENTS:

Slant stack

SITE DIAGRAM

ID	Start	End
G-208	1044	1141
A-208	1045	↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CCS, TRC, KTB, JPA

OCATION Bunker 4 Phase I Day 14 loc #4

SURFACE DESCRIPTION Gore Covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE I.D. NO. TYPE ID NO.

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. A PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2" / 37 ft/m

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS 1028

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 0-10 ~15-20 mph Wind at Seal, mph

TEMP RAIN: Yes ☐ No ☒ Comment increasing winds

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.88% CC 06678 SUPPLIER SM PSIG START 600 PSIG STOP

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
1011	5.0	0									
1017	↓	1									
1023		2	94	87	73	81	71	2.5 A 20 VF	<0.05		
1029		3						20 F			
1035		4									
1041		5								G-209	Can # A126
										A 209	
										G-210	Can #A107
										A-210	

COMMENTS:

Straight stack

SITE DIAGRAM

ID	Start	End
G-209	1044	1142
A-209	↓	↓
G-210		
A-210		

A000039

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunker 6 Phase II Day 40 Loc #1

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. D PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/35 ft/min 1229

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS ____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 7-15-20 mph Wind at Seal, ___ mph

TEMP ____ RAIN: Yes ☐ No ☒ Comment ____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ ____

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.90% CC 109940 SUPPLIER SM PSIG START 2100 PSIG STOP ____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
1212	5.0	0									
1218	↓	1									
1224		2						3.0 A			
1230		3	88	82	77	85	72	19 LF	<0.05		
1236		4						19 F			
1242		5								G-211	Can# Z6002
										A-211	

COMMENTS:

slant stack

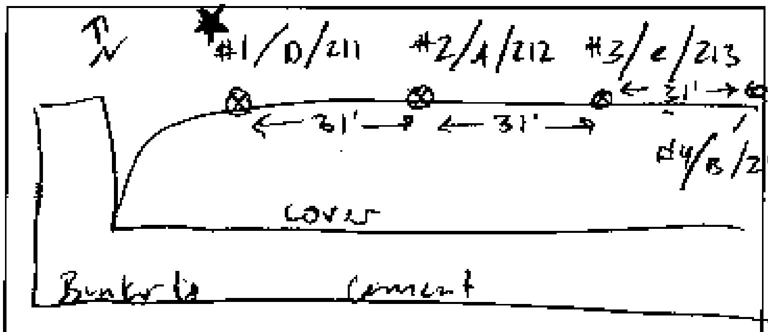
← Over for Blower times/bunk

MEDIA BK 56078 9.866 He

G-215 1359

ID	Start	End
G-211	1247	1343
A-211	↓	↓

SITE DIAGRAM



chamber locations wiped yesterday

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CCS, TRC, MB, JDA

OCATION Bunker 6 Phase II Day 40 Loc #7

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ______ I.D. NO. ______ TYPE ______ ID NO. ______

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. A PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/48 ft/s 1233

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS ______

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 7-15 20 mph Wind at Seal, ___ mph

TEMP ______ RAIN: Yes ☐ No ☒ Comment *Steady 20 mph winds w/ higher gusts

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR VMP+He 9.90% CC 10994 SUPPLIER SM PSIG START 2100 PSIG STOP ______

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
1212	5.0	0									
1218	↓	1									
1224		2									
1230		3						2.7 A 4.2 WF			
1236		4	95	88	77	84	73	3.7 F	<0.05		
1242		5								G-212	Can # 91185
										A-212	

COMMENTS:

Straight stack

SITE DIAGRAM

ID	Start	End
G-212	1246	1345
A-212	↓	↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CCS, TRC, KTS, JDA

LOCATION Bunker 6 Phase II Day 40 Can #3

SURFACE DESCRIPTION bare covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ______ I.D. NO. ______ TYPE ______ ID NO. ______

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☐

AMBIENT CONCENTRATIONS

CHAMBER I.D. C PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/58 ft/ 1236

CHAMBER SEAL Y CONDENSATION: Yes ☒ No ☐ BARM PRESS ______

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 7-15 212 mph Wind at Seal, ____ mph

TEMP ______ RAIN: Yes ☐ No ☒ Comment ______

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐ ______

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☐

SWEEP AIR UHP+He 9.86% CC 56873 SUPPLIER SM PSIG START 2000 PSIG STOP ______

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH_3		
			Surf	Air	Air	Surf	Air				
1212	5.0	0									
1218	↓	1									
1224		2									
1230		3									
1236		4	108	94	85	82	72	2.5A 8.7wF 6.5 F	<0.05		
1242		5								G-213	Can # 5036
										A-213	

COMMENTS:

Slant stack

SITE DIAGRAM

ID	Start	End
G-213	1245	1345
A-213	↓	↓

SURFACE FLUX MEASUREMENT DATA FORM

DATE 2/5/16 SAMPLERS CES, TRC, KTS, JDA

LOCATION Bunkr 6 Phase II Day 40 Loc # 4

SURFACE DESCRIPTION Gore covered compost

CURRENT ACTIVITY

INSTRUMENT TYPE ____ I.D. NO. ____ TYPE ____ ID NO. ____

INSTRUMENT BASELINE

PROJECT QC: BACKGROUND MEASUREMENTS ☐ BLANK MEASUREMENTS ☒ REPLICATE MEASUREMENTS ☒

AMBIENT CONCENTRATIONS

CHAMBER I.D. B PHOTO TAKEN: Yes ☒ No ☐ STACK SIZE/VELOCITY 2"/56 1240

CHAMBER SEAL Y CONDENSATION: ~~Yes~~ ☒ No ☒ BARM PRESS ____

AMBIENT CONDITIONS: Sun ☒ P.Sun ☐ Cloudy ☐ Wind at 5', 7-15-20 mph Wind at Seal, ____ mph

TEMP ____ RAIN: Yes ☐ No ☒ Comment ____

PRIOR CHAMBER CLEANING: Full Wash ☐ Wet Wipe ☐ Dry Wipe ☒ None ☐

SAMPLE LINE: BACK FLUSHED PRIOR TO START ☒ PURGED PRIOR TO SAMPLING ☒ New ☐ Used ☒

SWEEP AIR UHP+He 9.86% CC 56876 SUPPLIER SM PSIG START 2000 PSIG STOP ____

Time	Sweep Air (L/min)	Residence Number	Temperature (°F)					Real-Time (ppmv)		Sample Number	Comments
			Chamber		Stack	Ambient		TVA	NH3		
			Surf	Air	Air	Surf	Air				
1212	5.0	0									
1218	↓	1									
1224		2									
1230		3									
1236		4									
1242		5	103	91	82	85	72	2.5A 160WF	<0.05	G-214	Can # 22083
								105 F		A-214	

COMMENTS:

Straight stack

SITE DIAGRAM

ID	Start	End
G-214	1244	1345
A-214	↓	↓

Test No.

Date 2/ 4 /2016

Company Name **Burrtec WV Gore Compliance Test**

Recorded by CES

Sampling Location Bunker #1 Day 3 Location 1 / A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure 275 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds – / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds – / in Hg

Reference Point #

Sample ID: G-101

Sample Data

	Sample #1	Sample #2
Canister No. A123	22081	
Trap No.		
Controller No.	71	
Location within Stack		
Initial Time	0946	
Initial Vacuum (in Hg)	-28.0"	
Intermediate Time	1004	
Intermediate Vacuum (in Hg)	-23"	
Intermediate Time	10:16	
Intermediate Vacuum (in Hg)	~16"	
Intermediate Time	1037	
Intermediate Vacuum (in Hg)	-8"	
Final Time	10:47	
Final Vacuum (in Hg)	-5'	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ____________________ Date 2/ 7 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by ____________

Sampling Location Bunker #1 Day 3 Location 2 1D

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds — / in Hg

Reference Point # ____________

Sample ID: G-102

Sample Data

	Sample #1	Sample #2
Canister No.	5029	
Trap No.		
Controller No.	35	
Location within Stack		
Initial Time	0947	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	1003	
Intermediate Vacuum (in Hg)	-22"	
Intermediate Time	10:16	
Intermediate Vacuum (in Hg)	-16	
Intermediate Time	1036	
Intermediate Vacuum (in Hg)	-5"	
Final Time	1045	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ______

Date 2/ 9 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CBS

Sampling Location Bunker #1 Day 3 Location 3 /B

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds — / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds — / in Hg

Reference Point # ______

Sample ID: G-103

Sample Data

	Sample #1	Sample #2
Canister No.	S076	
Trap No.		
Controller No.	19	
Location within Stack		
Initial Time	0948	
Initial Vacuum (in Hg)	-29"	
Intermediate Time	1002	
Intermediate Vacuum (in Hg)	-23"	
Intermediate Time	1017	
Intermediate Vacuum (in Hg)	-16"	
Intermediate Time	1035	
Intermediate Vacuum (in Hg)	-8"	
Final Time	1046	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ______

Test No. ______

Date 2/ 4 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CES

Sampling Location Bunker #1 Day 3 Loc #4/ C

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ______

Sample ID: G-104

Sample Data

	Sample #1	Sample #2
Canister No.	E0022	
Trap No.		
Controller No.	21	
Location within Stack		
Initial Time	0943	
Initial Vacuum (in Hg)	-29"	
Intermediate Time	1001	
Intermediate Vacuum (in Hg)	-23"	
Intermediate Time	1016	
Intermediate Vacuum (in Hg)	-17"	
Intermediate Time	1034	
Intermediate Vacuum (in Hg)	-8"	
Final Time	1047	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ____

Date 2/ 9 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CBZ

Sampling Location Bnkr #2 Phase I Day 27 loc#1/A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum 5 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ____

Sample ID: G-105

Sample Data

	Sample #1	Sample #2
Canister No.	E009	
Trap No.		
Controller No.	33	
Location within Stack		
Initial Time	1205	
Initial Vacuum (in Hg)	-20"	
Intermediate Time	12:18	
Intermediate Vacuum (in Hg)	-22"	
Intermediate Time	1232	
Intermediate Vacuum (in Hg)	-17"	
Intermediate Time	12:47	
Intermediate Vacuum (in Hg)	-10"	
Final Time	13:00	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ______________________

Date 2/ 9 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by

Sampling Location Bunkr #2 Phase I Day 27 Loc #21D

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -10 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -7 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ______________

Sample ID: G-106

Sample Data

	Sample #1	Sample #2
Canister No.	A106	
Trap No.		
Controller No.	30	
Location within Stack		
Initial Time	12:03	
Initial Vacuum (in Hg)	-29"	
Intermediate Time	12:20	
Intermediate Vacuum (in Hg)	-22"	
Intermediate Time	1233	
Intermediate Vacuum (in Hg)	-17"	
Intermediate Time	12:48	
Intermediate Vacuum (in Hg)	-10"	
Final Time	1302	
Final Vacuum (in Hg)	-6"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ______________________

Test No. ______________________

Date 2/ 9 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by

Sampling Location Bunker #2 Phase I Day 27 Loc #3 /B

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -3 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ______________

Sample ID: G-107

Sample Data

	Sample #1	Sample #2
Canister No.	S0D37	
Trap No.		
Controller No.	10	
Location within Stack		
Initial Time	1204	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	12:21	
Intermediate Vacuum (in Hg)	-22"	
Intermediate Time	1234	
Intermediate Vacuum (in Hg)	-16"	
Intermediate Time	12:48	
Intermediate Vacuum (in Hg)	-9"	
Final Time	1259	
Final Vacuum (in Hg)	-0"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ____________________ Date 2/ 4 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by CES

Sampling Location Bunker #2 Phase I Day 27 Loc # 4/ C

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -13 / in Hg

Loss in 60 seconds – / in Hg

Post-test Leak Check

Gauge Vacuum / in Hg

Loss in 60 seconds / in Hg

Reference Point # ____________

Sample ID: G-108

Sample Data

	Sample #1	Sample #2
Canister No.	301	
Trap No.		
Controller No.	22	
Location within Stack		
Initial Time	1203	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	12:22	
Intermediate Vacuum (in Hg)	-19"	
Intermediate Time	1235	
Intermediate Vacuum (in Hg)	-13"	
Intermediate Time	12:49	
Intermediate Vacuum (in Hg)	-6"	
Final Time	1257	
Final Vacuum (in Hg)	-4.5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ____________

Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CFS/DY

Sampling Location Bunker 5 Phase II Day 34 Loc #1/C

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum 12 / in Hg

Loss in 60 seconds – / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds / in Hg

Reference Point # ____________

Sample ID: G-201

Sample Data

	Sample #1	Sample #2
Canister No.	0298	
Trap No.		
Controller No.	19	
Location within Stack		
Initial Time	0852	
Initial Vacuum (in Hg)	-29	
Intermediate Time	0906	
Intermediate Vacuum (in Hg)	-23	
Intermediate Time	0930	
Intermediate Vacuum (in Hg)	-12	
Intermediate Time		
Intermediate Vacuum (in Hg)		
Final Time	0949	
Final Vacuum (in Hg)	-5	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ______

Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CB/DY

Sampling Location Bnkr 5 Phase II Day 34 Loc #2/B

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ______

Sample ID: G-202

Sample Data

	Sample #1	Sample #2
Canister No.	A116	
Trap No.		
Controller No.	22	
Location within Stack		
Initial Time	0850	
Initial Vacuum (in Hg)	-28	
Intermediate Time	0907	
Intermediate Vacuum (in Hg)	-21	
Intermediate Time	0932	
Intermediate Vacuum (in Hg)	-10	
Intermediate Time Finish	0947	
Intermediate Vacuum (in Hg)	-5	
~~Final Time~~		
~~Final Vacuum (in Hg)~~		

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ______

Test No. ______________________

Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CKS/DN

Sampling Location Bunker 5 Phase II Day 34 loc # 3/10

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -6 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ______

Sample ID: G-203

Sample Data

	Sample #1	Sample #2
Canister No.	91190	
Trap No.		
Controller No.	35	
Location within Stack		
Initial Time	0852	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	0905	
Intermediate Vacuum (in Hg)	-23"	
Intermediate Time	0932	
Intermediate Vacuum (in Hg)	-12"	
Intermediate Time Finish	0952	
Intermediate Vacuum (in Hg)	-5"	
~~Final Time~~		
Final Vacuum ~~(in Hg)~~		

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ______________________

Test No. ______

Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CGS / DY

Sampling Location Bunker 5 Phase II Day 34 loc#4/A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -8 / in Hg

Loss in 60 seconds — / in Hg

Reference Point # ______

Sample ID: G-204

Sample Data

	Sample #1	Sample #2
Canister No.	S017	
Trap No.		
Controller No.	41	
Location within Stack		
Initial Time	0850	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	0905	
Intermediate Vacuum (in Hg)	-23"	
Intermediate Time	0934	
Intermediate Vacuum (in Hg)	-11"	
Intermediate Time Finish	0943	
Intermediate Vacuum (in Hg)	-8"	
~~Final Time~~		
Final Vacuum ~~(in Hg)~~		

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ______

Test No. ____________

Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by AS/DY

Sampling Location Bunker 5 Phase II Day 34 Loc #4/A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -4 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ____________

Sample ID: G-205

Sample Data

	Sample #1	Sample #2
Canister No.	S037	
Trap No.		
Controller No.	22	
Location within Stack		
Initial Time	0850	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	0905	
Intermediate Vacuum (in Hg)	-21"	
Intermediate Time	0934	
Intermediate Vacuum (in Hg)	-7"	
Intermediate Time Finish	~~0939~~ D/	0943
Intermediate Vacuum (in Hg)	-4"	
Final Time		
Final Vacuum (in Hg)		

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. __________

Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CBS / DM

Sampling Location Bunker 4 Phase I Day 14 Loc #1 / B

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds – / in Hg

Post-test Leak Check

Gauge Vacuum -2 / in Hg

Loss in 60 seconds – / in Hg

Reference Point # __________

Sample ID: G-206

Sample Data

	Sample #1	Sample #2
Canister No.	91187	
Trap No.		
Controller No.		
Location within Stack		
Initial Time	1046	
Initial Vacuum (in Hg)	-29"	
Intermediate Time	1103	
Intermediate Vacuum (in Hg)	-21	
Intermediate Time	1120	
Intermediate Vacuum (in Hg)	-14	
Intermediate Time		
Intermediate Vacuum (in Hg)		
Final Time	1138	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments __________

Test No. ____________________ Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by CS/DY

Sampling Location Bunker 4 Phase I Day 14 Loc #2/C

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -7 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ____________________

Sample ID: G-207

Sample Data

	Sample #1	Sample #2
Canister No.	A124	
Trap No.		
Controller No.	30	
Location within Stack		
Initial Time	1046	
Initial Vacuum (in Hg)	-29^{4}	
Intermediate Time	1102	
Intermediate Vacuum (in Hg)	-22^{4}	
Intermediate Time	1120	
Intermediate Vacuum (in Hg)	-15^{4}	
Intermediate Time	1136	
Intermediate Vacuum (in Hg)	-9^{4}	
Final Time	1144	
Final Vacuum (in Hg)	-6^{4}	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ____________________

Test No. ______________________ Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by OB/DY

Sampling Location BUNKER 4 PHASE I DAY 14 LOC#3/D

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds — / in Hg

Post-test Leak Check

Gauge Vacuum -6 / in Hg

Loss in 60 seconds — / in Hg

Reference Point # ______________

Sample ID: G-208

Sample Data

	Sample #1	Sample #2
Canister No.	E0021	
Trap No.		
Controller No.		
Location within Stack		
Initial Time	1044	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	1101	
Intermediate Vacuum (in Hg)	-22"	
Intermediate Time	1120	
Intermediate Vacuum (in Hg)	-13"	
Intermediate Time	1134	
Intermediate Vacuum (in Hg)	-6"	
Final Time	1141	
Final Vacuum (in Hg)	-5.5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ______________________________

Test No. ____________________ Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by CB/DY

Sampling Location BUNKER 4 PHASE I DAY 14 LOC #4/A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -10 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ____________

Sample ID: G-209

Sample Data

	Sample #1	Sample #2
Canister No.	4126	
Trap No.		
Controller No.	7	
Location within Stack		
Initial Time	1044	
Initial Vacuum (in Hg)	-28^{4}	
Intermediate Time	1100	
Intermediate Vacuum (in Hg)	-23^{9}	
Intermediate Time	1119	
Intermediate Vacuum (in Hg)	-17^{7}	
Intermediate Time	1135	
Intermediate Vacuum (in Hg)	-12	
Final Time	1142	
Final Vacuum (in Hg)	-10	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ____________________

Test No. ______ Date 2/5/2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by ______

Sampling Location BUNKER 4 PHASE I DAY 14 LOG#4/A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ______

Sample ID: G-210

Sample Data

	Sample #1	Sample #2
Canister No.	A107	
Trap No.		
Controller No.	33	
Location within Stack		
Initial Time	1044	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	1100	
Intermediate Vacuum (in Hg)	-22	
Intermediate Time	1119	
Intermediate Vacuum (in Hg)	-13"	
Intermediate Time	1135	
Intermediate Vacuum (in Hg)	7"	
Final Time	1142	
Final Vacuum (in Hg)	5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ______________________ Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by CBS/Dy

Sampling Location Bunker 6 Phase II Day 40 Loc #1/D

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds – / in Hg

Post-test Leak Check

Gauge Vacuum 5 / in Hg

Loss in 60 seconds / in Hg

Reference Point # ______________

Sample ID: G-211

Sample Data

	Sample #1	Sample #2
Canister No.	E0002	
Trap No.		
Controller No.	19	
Location within Stack		
Initial Time	1247	
Initial Vacuum (in Hg)	-29"	
Intermediate Time	1302	
Intermediate Vacuum (in Hg)	-23"	
Intermediate Time	1320	
Intermediate Vacuum (in Hg)	-14"	
Intermediate Time	1330	
Intermediate Vacuum (in Hg)	-9"	
Final Time	1343	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ____________________ Date 2/ 5 /2016

Company Name *Burrtec WV Gore Compliance Test* Recorded by

Sampling Location Bunker 6 Phase II Day 40 Loc #2/A

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ____________

Sample ID: G-212

Sample Data

	Sample #1	Sample #2
Canister No.	91185	
Trap No.		
Controller No.	21	
Location within Stack		
Initial Time	1246	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	1303	
Intermediate Vacuum (in Hg)	-21"	
Intermediate Time	1319	
Intermediate Vacuum (in Hg)	-14"	
Intermediate Time	1330	
Intermediate Vacuum (in Hg)	-10"	
Final Time	1345	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Test No. ____________________

Date ~~7/ /2015~~ 2/5/16

Company Name *Burrtec WV Gore Compliance Test*

Recorded by ____________________

Sampling Location Bunker 6 Phase II Day 40 Loc #3/C

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -12 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -5 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # ____________________

Sample ID: G-213

Sample Data

	Sample #1	Sample #2
Canister No.	S036	
Trap No.		
Controller No.	35	
Location within Stack		
Initial Time	1245	
Initial Vacuum (in Hg)	-28"	
Intermediate Time	1304	
Intermediate Vacuum (in Hg)	-21"	
Intermediate Time	1317	
Intermediate Vacuum (in Hg)	15"	
Intermediate Time	1331	
Intermediate Vacuum (in Hg)	-10"	
Final Time	1345	
Final Vacuum (in Hg)	-5"	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments ____________________

Test No. __________

Date ~~7/ /~~2015 2/5/16

Company Name *Burrtec WV Gore Compliance Test*

Recorded by CB/DY

Sampling Location Bunker 6 Phase II Day 40 Can #4/B

Method 25.3 Field Data Sheet

Pre-assembly Can Pressure -28 /

Pre-test Leak Check

Gauge Vacuum -11 / in Hg

Loss in 60 seconds - / in Hg

Post-test Leak Check

Gauge Vacuum -6 / in Hg

Loss in 60 seconds - / in Hg

Reference Point # __________

Sample ID: G-214

Sample Data

	Sample #1	Sample #2
Canister No.	22083	
Trap No.		
Controller No.	41	
Location within Stack		
Initial Time	1244	
Initial Vacuum (in Hg)	-29"	
Intermediate Time	1305	
Intermediate Vacuum (in Hg)	-21"	
Intermediate Time	1317	
Intermediate Vacuum (in Hg)	-16"	
Intermediate Time	1332	
Intermediate Vacuum (in Hg)	-10"	
Final Time	1345	
Final Vacuum (in Hg)	-6	

Reference Point Data

Time	Velocity Head (in H2O)	Temp. (oF)

Comments

Integrated Sample Data Collection Form

Date 2/ 4/2016 Project Burrtec WV Gore Compliance Sampler CBS

Location Bunker #1 Day 3 Location 1 /A

Sample Type Ammonia Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 101 Equipment ID /

Media ID /

QC Data Summary

Time	Flow Rate	Comment
0946		START
1014		Pump ✓
1037		Pump ✓

Start Time: 09:46 Initial Flow Rate: 565^{00}

Stop Time: 10:47 Final Flow Rate:

Sample Time: Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler

Location Bunker #1 Day 3 Location #2 10

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 102

Equipment ID 2

Media ID 2

QC Data Summary

Time	**Flow Rate**	**Comment**
0947		START
1018		Pump Up
1036		Pump Up

Start Time: 09:47

Initial Flow Rate: C24 28

Stop Time: 10:45

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler CES

Location Bunker #1 Day 3 Location 3 / B

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 103

Equipment ID 3

Media ID 3

QC Data Summary

Time	**Flow Rate**	**Comment**
0948		START
1017		Pmp ✓
1035		Pmp ✓
1046		STOP

Start Time:

Initial Flow Rate: SOP ½

Stop Time: 1046

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler CES

Location Bunker #1 Day 3 loc #4/C

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 104

Equipment ID 4

Media ID 4

QC Data Summary

Time	Flow Rate	Comment
0948		START
1016		Pump ok
1034		Pump ok
1047		STOP

Start Time:

Initial Flow Rate: 504 57

Stop Time: 1047

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler CES

Location Bunker #2 Phase I Day 27 loc #1/A

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 105

Equipment ID 5

Media ID 5

QC Data Summary

Time	Flow Rate	Comment
1205		START
12:18		✓
1232		✓
12:47		✓
13:00		Stop

Start Time: 1205

Initial Flow Rate: 5734

Stop Time: 13:00

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler CES

Location Bunker #2 Phase I Day 27 loc #210

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-**106 Equipment ID 6

Media ID 6

QC Data Summary

Time	Flow Rate	Comment
12:03		Start
12:20		✓
1233		✓
12:46		✓
1302		✓ Stop

Start Time: 12:03 Initial Flow Rate: 555-52

Stop Time: 1302 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler CES

Location BUNKER #2 PHASE I DAY 27 LOC# 3/B

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 107 Equipment ID 7

Media ID 7

QC Data Summary

Time	**Flow Rate**	**Comment**
1204		START
12:21		✓
1234		✓
12:48		✓
1259		STOP

Start Time: 1204 Initial Flow Rate: E 592 19

Stop Time: 1259 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

CES

Integrated Sample Data Collection Form

Date 2/ 4 /2016 Project *Burrtec WV Gore Compliance* Sampler CES

Location BUNKER #2 PHASE I DAY 27 LOC 4/C

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 108

Equipment ID 8

Media ID 8

QC Data Summary

Time	**Flow Rate**	**Comment**
1203		START
12:22		✓
1235		4
12:49		✓
1257		STOP

Start Time:

Initial Flow Rate: 577.99

Stop Time: 1257

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Burrtec WV Gore Compliance Test
Sample Log

Ammonia

NH3 Log Day 1

Prepared by ____________

		Pump Parameters										
		Time			Rate			Total Volume				
Station ID	Date	Start	Stop	Elapsed	Initial (ml/min)	Final (ml/min)	Average (ml/min)	(liters)	Pump ID	Media ID	Sample ID	Comments
	2/4/16	946	1047	61	565.00	591.05	578	35.3	1	1	A- 101	
	2/4/16	947	1045	58	524.28	543.82	534	31.0	2	2	A- 102	
	2/4/16	948	1046	58	507.12	557.35	529	30.7	3	3	A- 103	
	2/4/16	948	1047	59	504.58	524.23	514	30.3	4	4	A- 104	
	2/4/16	1205	1300	55	573.14	565.68	569	31.3	5	5	A- 105	
	2/4/16	1203	1302	59	555.57	536.84	546	32.2	6	6	A- 106	
	2/4/16	1204	1259	55	592.19	567.79	580	31.9	7	7	A- 107	
	2/4/16	1203	1257	54	577.01	555.26	566	30.6	8	8	A- 108	
	2/4/16	1444	1545	61	591.05	597.08	594	36.2	1	1	A- 109	
	2/4/16	1443	1545	62	543.82	559.24	552	34.2	2	2	A- 110	
	2/4/16	1442	1538	56	551.35	554.10	553	31.0	3	3	A- 111	
	2/4/16	1441	1538	57	524.23	539.53	532	30.3	4	4	A- 112	
	2/4/16	1441	1538	57	565.68	586.97	576	32.8	5	5	A- 113	
	2/4/16	1635						35.0			A- 114	

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project Burrtec WV Gore Compliance Sampler CKS/Dy

Location Bunker 5 Phase II Day 34 loc #1/C

Sample Type **Ammonia** Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 201

Equipment ID 1

Media ID 1

QC Data Summary

Time	Flow Rate	Comment
0852		✓ start
0906		✓
0930		✓
0949		Stop

Start Time: 0852

Initial Flow Rate: 500 cm^3

Stop Time: 0949

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project Burrtec WV Gore Compliance Sampler CB/Dy

Location Bunkr 5 Phase II Dy 34 lo. #2/B

Sample Type **Ammonia** Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 202 Equipment ID 2

Media ID 2

QC Data Summary

Time	Flow Rate	Comment
0850		✓ Start
0907		✓
0932		✓
0947		Finish

Start Time: 0850 Initial Flow Rate: 550^{66}

Stop Time: 0947 Final Flow Rate:

Sample Time: Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project *Burrtec WV Gore Compliance* Sampler CES/DY

Location Bunker 5 Phase II Day 34 Loc #3/D

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 203 Equipment ID 3

Media ID 3

QC Data Summary

Time	Flow Rate	Comment
0852		START
0905		✓
0932		✓
0952		Finish

Start Time: 0852 Initial Flow Rate: 518 $^{9/0}$

Stop Time: 0952 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project Burrtec WV Gore Compliance Sampler CES / DY

Location Bunker 5 Phase II Day 34 Loc #4/A

Sample Type **Ammonia** Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 204

Equipment ID 4

Media ID 4

QC Data Summary

Time	Flow Rate	Comment
0850		START
0905		✓
0934		✓
0943		Finish

Start Time: 0850 Initial Flow Rate: 520.DY

Stop Time: 0943 Final Flow Rate:

Sample Time: Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project Burrtec WV Gore Compliance Sampler CBS/DY

Location Bunker 5 Phase II Day 34 Loc #4/A

Sample Type Ammonia Calibration Equipment DC Lite Dry Cal

Sample ID: **A-205** Equipment ID 5

Media ID 5

QC Data Summary

Time	Flow Rate	Comment
0850		START
0905		✓
0934		✓
0943		Finish

Start Time: 0850 Initial Flow Rate: 585 09

Stop Time: 0943 Final Flow Rate:

Sample Time: Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project *Burrtec WV Gore Compliance* Sampler CES/DM

Location Bunker 4 Phase I Day 14 Loc#1 / B

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 206 Equipment ID 6

Media ID 6

QC Data Summary

Time	Flow Rate	Comment
1046		Start
1103		✓
1120		✓
1138		✓

Start Time: 1046 Initial Flow Rate: 56/60

Stop Time: 1138 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project *Burrtec WV Gore Compliance* Sampler CB/DY

Location Bunker 4 Phase I Day 14 Loc #2/C

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 207 Equipment ID 7

Media ID 7

QC Data Summary

Time	**Flow Rate**	**Comment**
1046		START
1102		✓
1120		✓
1136		✓

Start Time: 1046 Initial Flow Rate: 594B

Stop Time: 1144 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project Burrtec WV Gore Compliance Sampler CB/DH

Location Bunker 4 Phase I Day 14 Loc #3 / D

Sample Type **Ammonia** Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 208 Equipment ID 8

Media ID 8

QC Data Summary

Time	**Flow Rate**	**Comment**
1044		Start
1101		✓
1120		✓
1134		✓
1141		✓

Start Time: 1044 Initial Flow Rate: 582 [illegible]

Stop Time: 1141 Final Flow Rate:

Sample Time: Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project *Burrtec WV Gore Compliance* Sampler CRS/DM

Location BUNKER 4 PHASE I DAY 14 LOC #4/A

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 209

Equipment ID /

Media ID /

QC Data Summary

Time	Flow Rate	Comment
1044		START
1100		✓
1119		✓
1135		✓
1142		✓

Start Time: 1044

Initial Flow Rate: 580.6

Stop Time: 1142

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project *Burrtec WV Gore Compliance* Sampler OES/DY

Location BUNKER 4 PHASE I DAY 14 LOC #4/A

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 210 Equipment ID 2

Media ID 2

QC Data Summary

Time	Flow Rate	Comment
1044		START
1100		✓
1119		✓
1135		✓
1142		Finish

Start Time: 1044 Initial Flow Rate: 594.87

Stop Time: 1142 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project *Burrtec WV Gore Compliance* Sampler DBS/Dy

Location Bunker 6 Phase II Day 40 Loc#1/D

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 211

Equipment ID 3

Media ID 3

QC Data Summary

Time	Flow Rate	Comment
1247		START
1302		✓
1320		✓
1330		
1343		Stop

Start Time: 1247

Initial Flow Rate: 554^{01}

Stop Time: 1343

Final Flow Rate:

Sample Time:

Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/ 5 /2016 Project Burrtec WV Gore Compliance Sampler CB/DY

Location Bunker 6 Phase II Day 40 loc #2/A

Sample Type **Ammonia** Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 2/2

Equipment ID 4

Media ID 4

QC Data Summary

Time	Flow Rate	Comment
1246		Start
1303		✓
1319		✓
1330		✓
1345		✓

Start Time: 1246 Initial Flow Rate: 542 ml

Stop Time: 1345 Final Flow Rate:

Sample Time: Sample Volume:

Comments: 0.1 N H2SO4 Impinger solution

1 liter/min target flow

Integrated Sample Data Collection Form

Date ~~7/~~ 2/5/16 /2015 Project Burrtec WV Gore Compliance Sampler CE3/04

Location Bunker 6 Phase II Day 40 Loc #3/C

Sample Type **Ammonia** Calibration Equipment DC Lite Dry Cal

Sample ID: **A-** 213

Equipment ID 5

Media ID 5

QC Data Summary

Time	**Flow Rate**	**Comment**
1245		START
1304		✓
1317		✓
1331		✓
1345		✓

Start Time: 1245 Initial Flow Rate: 591 ol

Stop Time: 1345 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Integrated Sample Data Collection Form

Date 2/5/16 ~~7/ /2015~~ Project *Burrtec WV Gore Compliance* Sampler AS/DY

Location Bunker 6 Phase II Day 40 Loc #4/B

Sample Type ***Ammonia*** Calibration Equipment *DC Lite Dry Cal*

Sample ID: **A-** 214 Equipment ID 6

Media ID 6

QC Data Summary

Time	Flow Rate	Comment
1244		START
1305		✓
1317		✓
1332		✓
1345		STOP

Start Time: 1244 Initial Flow Rate: 547^{99}

Stop Time: 1345 Final Flow Rate:

Sample Time: Sample Volume:

Comments: *0.1 N H2SO4 Impinger solution*

1 liter/min target flow

Burrtec WV Gore Compliance Test
Sample Log

Ammonia

NH3 Log Day 2

Prepared by ____________

Station ID	Date	Pump Paramotors: Time: Start	Time: Stop	Time: Elapsed	Rate: Initial (ml/min)	Rate: Final (ml/min)	Rate: Average (ml/min)	Total Volume (liters)	Pump ID	Media ID	Sample ID	Comments
	2/5/16	852	949	57	577.43	580.10	579	33.0	1	1	A- 201	
	2/5/16	850	947	57	550.66	544.87	548	31.2	2	2	A- 202	
	2/5/16	852	952	60	518.40	554.01	536	32.2	3	3	A- 203	
	2/5/16	850	943	53	520.78	542.44	532	28.1	4	4	A- 204	
	2/5/16	850	943	53	589.09	571.07	580	30.7	5	5	A- 205	
	2/5/16	1046	1138	52	561.60	547.99	555	28.8	6	6	A- 206	
	2/5/16	1046	1144	58	594.63	571.99	583	33.8	7	7	A- 207	
	2/5/16	1044	1141	57	582.74	567.17	575	32.8	8	8	A- 208	
	2/5/16	1044	1142	58	580.10	570.58	575	33.4	1	1	A- 209	
	2/5/16	1044	1142	58	544.87	549.32	547	31.7	2	2	A- 210	
	2/5/16	1247	1343	56	554.01	556.39	555	31.1	3	3	A- 211	
	2/5/16	1246	1345	59	572.44	538.91	556	32.8	4	4	A- 212	
	2/5/16	1245	1345	60	571.07	575.07	573	34.4	5	5	A- 213	
	2/5/16	1244	1345	61	549.99	~~4~~547.21	548	33.4	6	6	A- 214	
		1415						34.0			215	

CE Schmidt, Ph.D.
Environmental Consultant

ATTACHMENT B

CHAIN OF CUSTODY

< 7922

Lot # A08

CE Schmidt, P , Environmental Consultant
Chain of Custody Record

SCAQMD 2 Day 1

Form Serial Number CES F1-02106 Client Name Burrtec WV Gore Compliance Test Project Manager Gary Koontz Requested Completion Date	For Information Regarding These Samples Please Contact: Dr. Charles E. Schmidt 19200 Live Oak Road, Red Bluff, CA 96080 530-529-4256 Fax:530-529-4878 E-Mail: SCHMIDTCE@aol.com	Client Address and Phone Number 9890 Cherry Ave Fontana, CA 92335 909-429-4200 Analysis Requested	Laboratory Name Atmega Environmental Laboratory Address 10602 Walker Street Cypress, CA 90630 Laboratory Phone 714-889-4000 Laboratory Contact Mr. John Phillips

Station Number/ID	Date	Time	COMP	GRAB	Can Label	Can ID Number	Vial Label	# OF CONTAINERS	Sample Container Vial	Sample Container Can	Sample Container Tube	SCAQMD 25.3	Helium Tracer		SF6 Tracer (EAS)	Can Pressure In (inches HG)	Can Pressure Out (inches HG)	Remarks
	2/4/2016	946		x	G- 101	22081	V- 101	2	x	x		x	x			-28.5	-5	
	2/4/2016	947		x	G- 102	5029	V- 102	2	x	x		x	x			-28.0	-5	
	2/4/2016	948		x	G- 103	5016	V- 103	2	x	x		x	x			-28	-5	
	2/4/2016	949		x	G- 104	E0022	V- 104	2	x	x		x	x			-28	-5	
	2/4/2016	1205		x	G- 105	E0015	V- 105	2	x	x		x	x			-28	-5	
	2/4/2016	1203		x	G- 106	A116	V- 106	2	x	x		x	x			-28	-6	
	2/4/2016	1204		x	G- 107	5027	V- 107	2	x	x		x	x			-28	-6	
	2/4/2016	1444		x	G- 108	301	V- 108	2	x	x		x	x			-28	-6	
	~~2/4/2016~~	~~1443~~		~~x~~	~~G- 109~~	~~22681~~	~~V- 109~~	~~2~~	~~x~~	~~x~~		~~x~~	~~x~~			~~-28~~	~~-5~~	Do not analyze
	2/4/2016	1443		x	G- 110	A119	V- 110	2	x	x		x	x			-28	-5	
	2/4/2016	1442		x	G- 111	A117	V- 111	2	x	x		x	x			-28	-4	
	2/4/2016	1441		x	G- 112	E0005	V- 112	2	x	x		x	x			-28	-4.5	
	~~2/4/2016~~	~~1441~~		~~x~~	~~G- 113~~	~~5004~~	~~V- 113~~	~~2~~	~~x~~	~~x~~		~~x~~	~~x~~			~~-28~~	~~-4~~	
	2/4/2016	1610		x	G- 114	5020	V- 114	2	x	x		x	x			-28	6	

Sampler CESchmidt	Date/Time 2/5/16 1330	Relinquished by CESchmidt	Date/Time 2/5/16 1330	HAZWRAP/NEESA Y N
Received by	Date/Time 02/05/16 1330	Relinquished by	Date/Time 02/05/16 16:10	QC Level 1 2 3
Received by	Date/Time	Relinquished by	Date/Time	COC
Received by Laboratory	Date/Time 2/5/16 16:20	Sample Shipped Via UPS FEDEX BJS [✓ Other]		Ana Req
				Cust Seal
				Sample Condition

Remarks Actual Pressure Reading Gauge 1/4" low

File: Burrtec WV Forms 25.3 72 00.xlsb Form: 25.3 COC Flux D1

C9922

Cct# AC8

CE Schmidt, F, Environmental Consultant
Chain of Custody Record

SCAQMD 2 Day 2

Form Serial Number CES F1-02106	For Information Regarding These Samples Please Contact: Dr. Charles E. Schmidt 19200 Live Oak Road, Red Bluff, CA 96080 530-529-4256 Fax 530-529-4878 E-Mail SCHMIDTCE@aol.com	Client Address and Phone Number 9890 Cherry Ave Fontana, CA 92335 909-479-4200	Laboratory Name Almega Environmental
Client Name Burrtec WV Gore Compliance Test		Analysis Requested	Laboratory Address 10502 Walker Street Cypress, CA 90630
Project Manager Gary Koontz			Laboratory Phone 714-889-4000
Requested Completion Date			Laboratory Contact Mr. John Phillips

Station Number/ID	Date	Time	COMP	GRAB	Can Label	Can ID Number	Vial Label	# OF CONTAINERS	Sample Container Vial	Sample Container Can	Sample Container [illegible]	SCAQMD 25.3	Helium Tracer		SF6 Tracer (EAS)	Can Pressure In (Inches HG)	Can Pressure Out (Inches HG)	Remarks
	2/5/2016	852		x	G- 201	C0298	V- 201	2	x	x		x	x			-28	-5	
	2/5/2016	850		x	G- 202	A116	V- 202	2	x	x		x	x			-28	-5	
	2/5/2016	852		x	G- 203	91190	V- 203	2	x	x		x	x			-29	-5	
	2/5/2016	850		x	G- 204	S017	V- 204	2	x	x		x	x			-28	-8	
	2/5/2016	850		x	G- 205	S037	V- 205	2	x	x		x	x			-28	-4	
	2/5/2016	1046		x	G- 206	91187	V- 206	2	x	x		x	x			-28	-5	
	2/5/2016	1046		x	G- 207	A174	V- 207	2	x	x		x	x			-28	-9	
	2/5/2016	1044		x	G- 208	C0021	V- 208	2	x	x		x	x			-28	-5.5	
	2/5/2016	1044		x	G- 209	A126	V- 209	2	x	x		x	x			-29	-10	
	2/5/2016	1044		x	G- 210	A107	V- 210	2	x	x		x	x			-28	~~-10~~	-5
	2/5/2016	1247		x	G- 211	C0002	V- 211	2	x	x		x	x			-28	-5	
	2/5/2016	1246		x	G- 212	91185	V- 212	2	x	x		x	x			-28	-5	
	2/5/2016	1245		x	G- 213	S036	V- 213	2	x	x		x	x			-28	-5	
	2/5/2016	1244		x	G- 214	22083	V- 214	2	x	x		x	x			-28	-6	
	6	1359			2/5	S011	2/5	2	✓	✓		✓	✓			-28	0	

Sampler CESchmidt	Date/Time 1430 2/5/16	Relinquished by CESchmidt	Date/Time 1430 2/5/16	HAZWRAP/NEESA Y N	
Recieved by	Date/Time 02/05/16 1430	Relinquished by	Date/Time 02/06/16 16:10	QC Level 1 2 3	
Recieved by	Date/Time	Relinquished by	Date/Time	COC	
Recieved by Laboratory	Date/Time 2/5/16 16:30	Sample Shipped Via UPS FEDEX BUS [✓ Other]		Ana Req	
Remarks				Cust Seal	
				Sample Condition	

File: Burrtec WV Forms 25.3 P2 00.xlsb Form: 25.3 COC Flux D2 c9922 Cat# A018

CE Schmidt, PhD, Environmental Consultant
Chain of Custody Record

Ammonia Day 1

Form Serial Number
CES F1-02106

Client Name
Burrtec WV
Gore Compliance Test

Project Manager
Gary [illegible]

Requested Completion Date

For Information Regarding These Samples Please Contact:

Dr. Charles E. Schmidt
19200 Live Oak Road, Red Bluff, CA 96080
530-529-4256 Fax:530-529-4878
E-Mail: SCHMIDTCE@aol.com

Client Address and Phone Number
1890 Cherry Ave
Fontana, CA 92335 909-429-4200

Laboratory Name
Almega Environmental

Laboratory Address
10892 Walker Street
Cypress, CA 90630

Laboratory Phone
714-899-4000

Laboratory Contact
Mr. John Phillips

Station Number/ID	Date	Time	COMP	GRAB	Sample ID Number	Media ID Number	# OF CONTAINERS	Sample Container Trap	Sample Container Vial	Sample Container Can	Sample Vol (liters)	SCAQMD Method 207.1	Field NH3 (ppmv)	Remarks
	2/4/2016	946		x	A- 101		1		X		35.3	X		
	2/4/2016	947		x	A- 102		1		X		31.0	X		
	2/4/2016	948		x	A- 103		1		X		30.7	X		
	2/4/2016	948		x	A- 104		1		X		30.3	X		
	2/4/2016	1205		x	A- 105		1		X		31.3	X		
	2/4/2016	1203		x	A- 106		1		X		32.2	X		
	2/4/2016	1204		x	A- 107		1		X		31.9	X		
	2/4/2016	1203		x	A- 108		1		X		30.6	X		
	~~2/4/2016~~	~~1444~~		~~x~~	~~A- 109~~		~~1~~		~~X~~		~~36.2~~	~~X~~		Do not analyze
	2/4/2016	1443		x	A- 110		1		X		34.1	X		
	2/4/2016	1442		x	A- 111		1		X		31.0	X		
	2/4/2016	1441		x	A- 112		1		X		30.3	X		
	~~2/4/2016~~	~~1441~~		~~x~~	~~A- 113~~		~~1~~		~~X~~		~~32.7~~	~~X~~		
	2/4/2016	1635		x	A- 114		1		X		35.0	X		

Sampler CESchmidt — Date/Time 2/5/16 1430 — Relinquished by CESchmidt — Date/Time 1430 2/5/16

Recieved by — Date/Time 02/05/16 1643 — Relinquished by — Date/Time 02/05/16 1640

Recieved by — Date/Time — Relinquished by — Date/Time

Received by Laboratory — Date/Time

Remarks — 2/5/16 16:30

Sample Shipped Via: UPS FEDEX BUS [✓ Other]

Air Bill No

HAZWRAP/NEESA Y N
QC Level 1 2 3
COC — Ice
Ana Req — Temp
Cust Seal — pH
Sample Condition

File: Burrtec WV Forms NH3 P2.xlsb Form: NH3 COC Flux D1 c9922 Gi#A018

CE Schmidt, PhD, Environmental Consultant

Chain of Custody Record

Ammonia Day 2

Form Serial Number CES F1-02195	For Information Regarding These Samples Please Contact Dr. Charles E. Schmidt 19200 Live Oak Road, Red Bluff, CA 96080 530-529-4256 Fax:530-529-4878 E-Mail: SCHMIDTCE@aol.com	Client Address and Phone Number 8980 Cherry Ave Fontana, CA 92335 909-429-4200	Laboratory Name Atmaa Environmental
Client Name Burrtec WV Gore Compliance Test		Analysis Requested	Laboratory Address 10602 Walker Street Cypress, CA 90630
Project Manager Gary Koontz			Laboratory Phone 714-828-4000
Requested Completion Date			Laboratory Contact Mr. John Phillips

Station Number/ID	Date	Time	COMP	GRAB	Sample ID Number	Media ID Number	# OF CONTAINERS	Sample Container: Trap	Sample Container: Vial	Sample Container: Can	Sample Vol.(liters)	SCAQMD Method 207.1	Field NHG (ppmv)	Remarks
	2/5/2016	852		x	A- 201		1		X		33.0	X		
	2/5/2016	850		x	A- 202		1		X		31.2	X		
	2/5/2016	852		x	A- 203		1		X		32.2	X		
	2/5/2016	850		x	A- 204		1		X		28.2	X		
	2/5/2016	850		x	A- 205		1		X		30.7	X		
	2/5/2016	1046		x	A- 206		1		X		28.8	X		
	2/5/2016	1046		x	A- 207		1		X		33.8	X		
	2/5/2016	1044		x	A- 208		1		X		32.8	X		
	2/5/2016	1044		x	A- 209		1		X		33.4	X		
	2/5/2016	1044		x	A- 210		1		X		31.7	X		
	2/5/2016	1247		x	A- 211		1		X		31.1	X		
	2/5/2016	1246		x	A- 212		1		X		32.8	X		
	2/5/2016	1245		x	A- 213		1		X		34	X		
	2/5/2016	1244		x	A- 214		1		X		33.4	X		
		BK		x	A-215		1		x		30.0			

Sampler CE Schmidt	Date/Time 2/5/16 1430	Relinquished by CE Schmidt	Date/Time 2/5/16 1430	HAZWRAP/NEESA Y N QC Level 1 2 3
Received by	Date/Time 02/05/16 1430	Relinquished by	Date/Time 02/05/16 1610	COC · Ice Ana Req · Temp Cust Seal · pH
Received by	Date/Time	Relinquished by	Date/Time	Sample Condition
Received by Laboratory	Date/Time 2/5/16 16:20	Sample Shipped Via UPS FEDEX BUS [✓ Other]		Air Bill No
Remarks				

File: Burrtec WV Forms NH3 F2.xlsb Form: NH3 COC Flux D2

CE Schmidt, Ph.D.
Environmental Consultant

ATTACHMENT C

LABORATORY REPORTS

19200 Live Oak Road   Red Bluff, CA 96080   (530) 529-4256   Fax- 4878

AIR ANALYSIS REPORT

NON METHANE NON-ETHANE ORGANIC COMPOUND EMISSIONS BY SCAQMD METHOD 25.3(TCA/FID)

Prepared for:

Mr. C.E. Schmidt
C. E. Schmidt
19200 Live Oak Road
Red Bluff, CA 96080

Sampling Date: 02/04/16
Report Date: 02/24/16

Prepared by:

Almega Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630

Report Number: c9922
100 Series

Prepared by: ____________________
Douglass Williams, Laboratory Manager

Reviewed by: ____________________
John Phillips, President

Almega
ENVIRONMENTAL

LABORATORY REPORT

Non-Methane Non-Ethane Organic compound Emissions by SCAQMD Method 25.3 (TCA/FID)

Client	CES
Project No	c9922
Unit Tested	Burner / Gore
Sampling Date	4-Feb-16
Analyzed Date	22-Feb-16
Lab No	A 018

Client Sample ID	Lab ID	Almega Sample ID		Total* NMNEO ppm	NMNEO ppm condensable	NMNEO ppm noncondensable	CH_4 ppm	C_2H_6 ppm	CO ppm	CO_2 ppm	O_2 % v/v by TCD	He % v/v by TCD
		Tank	Trap									
G - 101	A 018 - 101	22081	V - 101	471	111	360	6.19	ND	32.0	15772	17.8	6.73
G - 102	A 018 - 102	S029	V - 102	141	45.2	95.6	10.7	ND	18.6	6389	19.2	5.36
G - 103	A 018 - 103	S076	V - 103	136	45.8	90.5	12.1	ND	19.1	8025	19.9	1.61
G - 104	A 018 - 104	E0022	V - 104	86.2	33.1	53.1	41.4	ND	36.6	8325	19.2	4.30
G - 105	A 018 - 105	E0019	V - 105	5.13	3.79	1.34	20.9	ND	26.8	2729	20.5	1.81
G - 106	A 018 - 106	A106	V - 106	11.3	4.84	6.46	48.2	ND	18.5	5216	19.7	3.56
G - 107	A 129 - 107	S077	V - 107	25.6	15.8	9.76	21.9	ND	24.6	5112	20.0	2.68
G - 108	A 129 - 108	301	V - 108	6.68	4.88	1.80	14.6	ND	16.4	2331	19.6	4.72
G - 114	A 129 - 114	S070	V - 114	< 1.0	< 0.50	ND	ND	ND	11.6	2.29	18.7	9.94
Detection Limit					0.5	1	1	1	1	1	0.2	0.05

* NOTE - the BIAS FACTOR (of 1.086) is NOT applied in these results

ND Not Detected

Water Blank, ppmC 0.05

TGNMNEO concentration values are reported in ppm (v/v) as Methane (carbon# 1)

The sample cylinder is analyzed for NMNEO, CO, CH_4, CO_2 and C_2H_6. It is then directed to a separation column where all heavy organics (C_3+) separate from the light organics (CO, CO_2, CH_4 and C_2H_6). The light organics are then passed through a reduction catalyst to convert CO and CO_2 to CH_4, and are then directed to a FID for detection and quantification. The heavy organics are backflushed off the holding column, passed through an oxidation catalyst, which convert all organics to CO_2, then through a reduction catalyst to convert CO_2 to CH_4 and then to a FID for detection and quantification

Reviewed by: ____________

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 4-Feb-16
Date tested: 22-Feb-16

Parameter	Symbol	Units	Run # 1	Run # 2
Sample ID			G - 101	G - 102
Lab ID			A 018 - 101	A 018 - 102
<u>Sample Tank</u>				
Tank No			22081	S029
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	626	600
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	930	924
Dilution Factor	DF_T		1.50	1.55
Concentration Methane	C_{CH4}	ppm	4.14	6.87
NMNEO (noncond)	C_{SA}	ppm	**240.43**	**61.64**
Sample Volume	Vs	L	4.838	4.636
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**6.2**	**10.7**
NMNEO (noncond)	C_{SAT}	ppm	**359.55**	**95.56**
<u>Condensate Recovery - Trap</u>				
Sample ID			V - 101	V - 102
Trap No			V - 101	V - 102
Lab No.:			A 018 - 101	A 018 - 102
Sample Impinger Volume	V_{IMP}	ml	6.00	7.50
Sample Volume	V_S	L	4.838	4.636
TC Concentration	C_{TC}	mg/L	53.400	17.523
IC Concentration	C_{IC}	mg/L	7.889	3.368
TOC Concentration	C_{TOC}	mg/L	45.511	14.155
NMNEO, Condensable	C_T	ppm	**111.34**	**45.17**
TNMNEOC (Csa+C_T)	C	ppmC	**<u>470.89</u>**	**<u>140.73</u>**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$k_1 = (273+15.56)/760=0.3799$
$C_{SAT}= DF * C_{SA}$
$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$
V_{ID} =23.6902 L/mole

CALCULATIONS

Client:	CES	Lab No.: A 018
Project No.:	c9922	
Unit Tested:	Burrtec / Gore	
Sampling Date:	4-Feb-16	
Date tested:	22-Feb-16	

Parameter	Symbol	Units	Run # 3	Run # 4
Sample ID			G - 103	G - 104
Lab ID			A 018 - 103	A 018 - 104
Sample Tank				
Tank No			S076	E0022
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	602	612
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	296	294
Final Pressure	P_{TF}	mm Hg (abs)	924	922
Dilution Factor	DF_T		1.56	1.52
Concentration Methane	C_{CH4}	ppm	77.52	27.27
NMNEO (noncond)	C_{SA}	ppm	58.18	35.03
Sample Volume	Vs	L	4.620	4.729
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**120.6**	**41.4**
NMNEO (noncond)	C_{SAT}	ppm	**90.52**	**53.12**
Condensate Recovery - Trap				
Sample ID			V - 103	V - 104
Trap No			V - 103	V - 104
Lab No.:			A 018 - 103	A 018 - 104
Sample Impinger Volume	V_{IMP}	ml	8.00	7.75
Sample Volume	V_S	L	4.620	4.729
TC Concentration	C_{TC}	mg/L	17.013	14.810
IC Concentration	C_{IC}	mg/L	3.595	4.569
TOC Concentration	C_{TOC}	mg/L	13.419	10.241
NMNEO, Condensable	C_T	ppm	**45.83**	**33.10**
TNMNEOC (Csa+C_T)	C	ppmC	**136.35**	**86.23**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$

V_{ID} =23.6902 L/mole

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 4-Feb-16
Date tested: 22-Feb-16

Parameter	Symbol	Units	Run # 5	Run # 6
Sample ID			G - 105	G - 106
Lab ID			A 018 - 105	A 018 - 106
Sample Tank				
Tank No			E0019	A106
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	590	574
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	920	928
Dilution Factor	DF_T		1.57	1.63
Concentration Methane	C_{CH4}	ppm	13.34	29.63
NMNEO (noncond)	C_{SA}	ppm	**0.85**	**3.97**
Sample Volume	Vs	L	4.559	4.435
Methane in Tank(C_{CH4}*DFT)	C_{CH4T}	ppm	**20.94**	**48.23**
NMNEO (noncond)	C_{SAT}	ppm	**1.34**	**6.46**
Condensate Recovery - Trap				
Sample ID			V - 105	V - 106
Trap No			V - 105	V - 106
Lab No.:			A 018 - 105	A 018 - 106
Sample Impinger Volume	V_{IMP}	ml	8.25	9.00
Sample Volume	V_S	L	4.559	4.435
TC Concentration	C_{TC}	mg/L	3.186	3.95
IC Concentration	C_{IC}	mg/L	2.125	2.744
TOC Concentration	C_{TOC}	mg/L	1.061	1.21
NMNEO, Condensable	C_T	ppm	**3.79**	**4.84**
TNMNEOC (Csa+CT)	C	ppmC	**5.13**	**11.30**

Calculations

$V_S = k_1 * V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$k_1 = (273+15.56)/760 = 0.3799$
$C_{SAT} = DF * C_{SA}$
$C_{CH4T} = DF * C_{CH4}$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$C_T = (C_{TOC} * V_{IMP} * V_{ID})/(V_S * A_C)$
$V_{ID} = 23.6902$ L/mole

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 4-Feb-16
Date tested: 22-Feb-16

Parameter	Symbol	Units	Run # 7	Run # 8
Sample ID			G - 107	G - 108
Lab ID			A 018 - 107	A 018 - 108
Sample Tank				
Tank No			S077	301
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	552	604
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	924	924
Dilution Factor	DF_T		1.69	1.54
Concentration Methane	C_{CH4}	ppm	12.99	9.45
NMNEO (noncond)	C_{SA}	ppm	**5.79**	**1.17**
Sample Volume	Vs	L	4.264	4.667
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**21.9**	**14.6**
NMNEO (noncond)	C_{SAT}	ppm	**9.76**	**1.80**
Condensate Recovery - Trap				
Sample ID			V - 107	V - 108
Trap No			V - 107	V - 108
Lab No.:			A 018 - 107	A 018 - 108
Sample Impinger Volume	V_{IMP}	ml	8.00	7.75
Sample Volume	V_S	L	4.264	4.667
TC Concentration	C_{TC}	mg/L	6.726	3.159
IC Concentration	C_{IC}	mg/L	2.448	1.669
TOC Concentration	C_{TOC}	mg/L	4.278	1.490
NMNEO, Condensable	C_T	ppm	**15.83**	**4.88**
TNMNEOC (Csa+C_T)	C	ppmC	**25.60**	**6.68**

Calculations

$V_S = k_1 * V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760 = 0.3799$

$C_{SAT} = DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T = (C_{TOC} * V_{IMP} * V_{ID})/(V_S * A_C)$

V_{ID} = 23.6902 L/mole

CALCULATIONS

Client:	CES	Lab No.:	A 018
Project No.:	c9922		
Unit Tested:	Burrtec / Gore		
Sampling Date:	4-Feb-16		
Date tested:	22-Feb-16		

Parameter	Symbol	Units	Run # 14
Sample ID			G - 114
Lab ID			A 018 - 114
Sample Tank			
Tank No			S070
Sample Tank Volume	V_T	L	6.000
Barometric Pressure	P_b	mm Hg	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2
Pre-test Temperature	t_{TI}	°C	21
Abs. Pre-test Temperature	T_{TI}	°K	294
Post-test Pressure	P_{TS}	mm Hg (abs)	780
Post-test Temperature	t_{TS}	°C	21
Abs. Post-test Temperature	T_{TS}	°K	296
Final Pressure	P_{TF}	mm Hg (abs)	926
Dilution Factor	DF_T		1.20
Concentration Methane	C_{CH4}	ppm	ND
NMNEO (noncond)	C_{SA}	ppm	ND
Sample Volume	Vs	L	5.991
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**ND**
NMNEO (noncond)	C_{SAT}	ppm	**ND**
Condensate Recovery - Trap			
Sample ID			V - 114
Trap No			V - 114
Lab No.:			A 018 - 114
Sample Impinger Volume	V_{IMP}	ml	7.00
Sample Volume	V_S	L	5.991
TC Concentration	C_{TC}	mg/L	0.388
IC Concentration	C_{IC}	mg/L	0.175
TOC Concentration	C_{TOC}	mg/L	0.214
NMNEO, Condensable	C_T	ppm	**0.49**
TNMNEOC (Csa+C_T)	C	ppmC	**0.49**

Calculations

$V_S = k_1 * V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760 = 0.3799$

$C_{SAT} = DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T = (C_{TOC} * V_{IMP} * V_{ID})/(V_S * A_C)$

$V_{ID} = 23.6902$ L/mole

QA/QC SUMMARY

(Repeat Analysis)

Client Project No.:	c9922	Lab No.:	A 018
Sampling Date:	4-Feb-16	Analyzed Date:	22-Feb-16

Run # 1

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A018 - 101	39511	35355	10.52	22.6	20.2	**21.4**	11.10
CH4	A018 - 101	7544	7502	0.56	4.1	4.1	**4.1**	0.56
CO2	A018 - 101	18835578	18821216	0.08	10550.7	10542.6	**10546.7**	0.08
O2*	A018 - 101	2388129	2394520	-0.27	11.9	11.9	**11.9**	-0.27
He*	A018 - 101	5184300	5165399	0.36	4.5	4.5	**4.5**	0.37
C2H6	A018 - 101	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A018 - 101	417303	415261	0.49	241.0	239.8	**240.4**	0.49

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A018 - 101	52.99	53.51	53.70	**53.40**	0.70	DF=1
IC	A018 - 101	8.069	8.027	7.570	**7.889**	3.38	

Run # 2

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A018 - 102	21090	20945	0.69	12.0	12.0	**12.0**	0.69
CH4	A018 - 102	12341	12648	-2.49	6.8	7.0	**6.9**	-2.46
CO2	A018 - 102	7350003	7362717	-0.17	4117.1	4124.2	**4120.6**	-0.17
O2*	A018 - 102	2490618	2479152	0.46	12.4	12.4	**12.4**	0.46
He*	A018 - 102	3983788	3972487	0.28	3.5	3.5	**3.5**	0.28
C2H6	A018 - 102	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A018 - 102	104565	108868	-4.12	60.4	62.9	**61.6**	-4.03

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A018 - 102	17.74	17.40	17.43	**17.52**	1.07	DF=1
IC	A018 - 102	3.332	3.400	3.373	**3.368**	0.93	

Water blank

TC	0.000
IC	-0.050
TOC	**0.050**

* - by GC/TCD

Conc[illegible] in tank = MeanConc[illegible] * DF

Conc[illegible] in tank = MeanConc[illegible] * DF

Conc[illegible] in tank = MeanConc[illegible] * DF

Conc[illegible] in tank = MeanConc[illegible] * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	e9922	Lab No.:	A 018
Sampling Date:	4-Feb-16	Analyzed Date:	22-Feb-16

Run # 3

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 103	21776	21240	2.46	12.4	12.1	12.3	2.49
CH4	A 018 - 103	140937	141063	-0.09	77.49	77.56	77.52	-0.09
CO2	A 018 - 103	9209237	9208470	0.01	5158.5	5158.1	5158.3	0.01
O2*	A 018 - 103	2575610	2549139	1.03	12.8	12.7	12.8	1.03
He*	A 018 - 103	2161514	213670	90.11	1.9	0.2	1.0	164.02
C2H6	A 018 - 103	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 103	99530	101950	-2.43	57.5	58.9	58	-2.40

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 103	17.06	16.99	16.99	17.01	0.23	DF=1
IC	A 018 - 103	3.644	3.539	3.601	3.595	1.37	

Run # 4

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 104	43324	41136	5.05	24.8	23.5	24.1	5.18
CH4	A 018 - 104	46598	52589	-12.86	25.62	28.91	27.27	-12.08
CO2	A 018 - 104	9773483	9826397	-0.54	5474.6	5504.2	5489.4	-0.54
O2*	A 018 - 104	2538204	2542476	-0.17	12.7	12.7	12.7	-0.17
He*	A 018 - 104	3255473	3259118	-0.11	2.8	2.8	2.8	-0.11
C2H6	A 018 - 104	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 104	60452	60845	-0.65	34.9	35.1	35.0	-0.65

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 104	14.95	14.86	14.62	14.81	1.11	DF=1
IC	A 018 - 104	4.678	4.45	4.579	4.569	2.37	

Water blank	
TC	0.000
IC	-0.050
TOC	0.050

Conc_{TC} in tank = MeanConc_{TC} * DF

$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF

Conc_{IC} in tank = MeanConc_{IC} * DF

$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF

* - by GC/TCD

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	e9922	Lab No.:	A 018
Sampling Date:	4-Feb-16	Analyzed Date:	22-Feb-16

Run # 5

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 105	30802	28864	6.29	17.6	16.5	**17.0**	6.50
CH4	A 018 - 105	24246	24265	-0.08	13.3	13.3	**13.3**	-0.08
CO2	A 018 - 105	3108480	3097464	0.35	1741.2	1735.0	**1738.1**	0.36
O2*	A 018 - 105	2623514	2613575	0.38	13.1	13.0	**13.1**	0.38
He*	A 018 - 105	1324097	1322304	0.14	1.2	1.2	**1.2**	0.14
C2H6	A 018 - 105	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 105	1486	1465	1.41	0.9	0.8	**0.9**	1.42

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 105	3.175	3.147	3.236	**3.186**	1.33	DF=1
IC	A 018 - 105	2.063	2.193	2.118	**2.125**	2.91	

Run # 6

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 106	21250	18596	12.49	12.1	10.6	**11.4**	13.32
CH4	A 018 - 106	54313	53456	1.58	29.9	29.4	**29.6**	1.59
CO2	A 018 - 106	5719748	5720239	-0.01	3203.9	3204.2	**3204.0**	-0.01
O2*	A 018 - 106	2428394	2430228	-0.08	12.1	12.1	**12.1**	-0.08
He*	A 018 - 106	2513731	2518153	-0.18	2.2	2.2	**2.2**	-0.18
C2H6	A 018 - 106	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 106	6852	6884	-0.47	3.96	3.98	**3.97**	-0.47

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 106	3.893	3.989	3.977	**3.953**	1.24	DF=1
IC	A 018 - 106	2.745	2.738	2.748	**2.744**	0.17	

Water blank

TC	0.000
IC	-0.050
TOC	0.050

Conc_{TC} in tank = MeanConc_{TC} * DF

Conc_{IC} in tank = MeanConc_{IC} * DF

Conc_{TOC} in tank = MeanConc_{TOC} * DF

Conc_{gas} in tank = MeanConc_{gas} * DF

* - by GC/TCD

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	e9922	Lab No.:	A 018
Sampling Date:	4-Feb-16	Analyzed Date:	22-Feb-16

Run # 7

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 107	24928	26100	-4.70	14.2	14.9	**14.6**	-4.59
CH4	A 018 - 107	22981	24280	-5.65	12.6	13.3	**13.0**	-5.50
CO2	A 018 - 107	5412715	5414285	-0.03	3031.9	3032.8	**3032.4**	-0.03
O2*	A 018 - 107	2361427	2357461	0.17	11.9	11.8	**11.9**	0.17
He*	A 018 - 107	1827824	1819996	0.43	1.6	1.6	**1.6**	0.43
C2H6	A 018 - 107	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 107	9962	10096	-1.35	5.8	5.8	**5.8**	-1.34
Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%		
Trap Analysis								
TC	A 018 - 107	6.784	6.696	6.698	**6.726**	0.72	DF=1	
IC	A 018 - 107	2.498	2.460	2.385	**2.448**	2.24		

Run # 8

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 108	17902	19339	-8.03	10.2	11.0	**10.6**	-7.72
CH4	A 018 - 108	16805	17583	-4.63	9.2	9.7	**9.5**	-4.52
CO2	A 018 - 108	2706111	2696940	0.34	1515.8	1510.7	**1513.3**	0.34
O2*	A 018 - 108	2551383	2560410	-0.35	12.7	12.7	**12.7**	-0.35
He*	A 018 - 108	3514178	3513238	0.03	3.1	3.1	**3.1**	0.03
C2H6	A 018 - 108	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 108	2003	2046	-2.15	1.2	1.2	**1.2**	-2.12
Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%		
Trap Analysis								
TC	A 018 - 108	3.180	3.164	3.133	**3.159**	0.70	DF 1	
IC	A 018 - 108	1.624	1.726	1.657	**1.669**	2.89		

Water blank	
TC	0.000
IC	-0.050
TOC	**0.00**

* - by GC/TCD

$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF

$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF

$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF

$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c9922	Lab No.:	A 018
Sampling Date:	4-Feb-16	Analyzed Date:	22-Feb-16

Run # 14

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 114	16594	17035	-2.66	9.5	9.7	9.6	-2.62
CH4	A 018 - 114	ND	ND	ND	ND	ND	ND	ND
CO2	A 018 - 114	3562	3244	8.93	2.0	1.8	1.9	9.34
O2*	A 018 - 214	3126042	3115826	0.33	15.6	15.5	15.5	0.33
He*	A 018 - 214	9493069	9483706	0.10	8.3	8.3	8.3	0.10
C2H6	A 018 - 214	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 214	ND	ND	ND	ND	ND	ND	ND

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 315	0.366	0.405	0.394	**0.388**	3.22	DF=1
IC	A 018 - 154	0.186	0.158	0.180	**0.175**	4.97	

Water Blank	
TC	0.000
IC	-0.050
TOC	**0.050**

$Conc_{TC}$ in tank = $MeanConc_{TC}$ * DF

$Conc_{IC}$ in tank = $MeanConc_{IC}$ * DF

$Conc_{TOC}$ in tank = $MeanConc_{TOC}$ * DF

$Conc_{TGNMO}$ in tank = $MeanConc_{TGNMO}$ * DF

* - by GC/TCD

SAMPLE INVENTORY REPORT

Method 25.3 Sampling Train

Project No.:	c9922	Lab No.:	A 018
Client:	CES	Sampling Date:	4-Feb-16

Laboratory ID	**Client ID**	**Component ID**	
Run # 1			
A 018 - 101	G - 101	Tank #	22081
A 018 - 101	V - 101	Impinger	V - 101
Run # 2			
A 018 - 102	G - 102	Tank #	S029
A 018 - 102	V - 102	Impinger	V - 102
Run # 3			
A 018 - 103	G - 103	Tank #	S076
A 018 - 103	V - 103	Impinger	V - 103
Run # 4			
A 018 - 104	G - 104	Tank #	E0022
A 018 - 104	V - 104	Impinger	V - 104
Run # 5			
A 018 - 105	G - 105	Tank #	E0019
A 018 - 105	V - 105	Impinger	V - 105
Run # 6			
A 018 - 106	G - 106	Tank #	A106
A 018 - 106	V - 106	Impinger	V - 106

SAMPLE INVENTORY REPORT

Method 25.3 Sampling Train

Project No.:	c9922	Lab No.:	A 018
Client:	CES	Sampling Date:	4-Feb-16

Laboratory ID	**Client ID**	**Component ID**	
Run # 7			
A 018 - 107	G - 107	Tank #	S077
A 018 - 107	V - 107	Impinger	V - 107
Run # 8			
A 018 - 108	G - 108	Tank #	301
A 018 - 108	V - 108	Impinger	V - 108
Run # 14			
A 018 - 114	G - 114	Tank #	S070
A 018 - 114	V - 114	Impinger	V - 114

< 7922

Lot # A08

CE Schmidt, PhD, Environmental Consultant
Chain of Custody Record

SCAQMD 25.3 Day 1

Form Serial Number CES F1-02106	For Information Regarding These Samples Please Contact: Dr. Charles E. Schmidt 19200 Live Oak Road, Red Bluff, CA 96080 530-529-4256 Fax:530-529-4878 E-Mail: SCHMIDTCE@aol.com	Client Address and Phone Number 9890 Cherry Ave Fontana, CA 92335 909-429-4200	Laboratory Name Almega Environmental
Client Name Burrtec WV Gore Compliance Test		Analysis Requested	Laboratory Address 10602 Walker Street Cypress, CA 90630
Project Manager Gary Koontz			Laboratory Phone 714-889-4000
Requested Completion Date			Laboratory Contact Mr. John Phillips

Station Number/ID	Date	Time	COMP	GRAB	Can Label	Can ID Number	Vial Label	# OF CONTAINERS	Sample Container Vial	Sample Container Can	Sample Container Tube	SCAQMD 25.3	Helium Tracer		SF6 Tracer (EAS)	Can Pressure In (inches HG)	Can Pressure Out (inches HG)	Remarks
	2/4/2016	946		x	G- 101	22081	V- 101	2	x	x		x	x			-28.5	-5	
	2/4/2016	947		x	G- 102	5029	V- 102	2	x	x		x	x			-28.0	-5	
	2/4/2016	948		x	G- 103	5016	V- 103	2	x	x		x	x			-28	-5	
	2/4/2016	949		x	G- 104	E0022	V- 104	2	x	x		x	x			-28	-5	
	2/4/2016	1205		x	G- 105	E0015	V- 105	2	x	x		x	x			-28	-5	
	2/4/2016	1203		x	G- 106	A116	V- 106	2	x	x		x	x			-28	-6	
	2/4/2016	1209		x	G- 107	5027	V- 107	2	x	x		x	x			-28	-6	
	2/4/2016	1444		x	G- 108	301	V- 108	2	x	x		x	x			-28	-6	
	~~2/4/2016~~	~~1443~~		~~x~~	~~G- 109~~	~~22681~~	~~V- 109~~	~~2~~	~~x~~	~~x~~		~~x~~	~~x~~			~~-28~~	~~-5~~	Do not analyze
	2/4/2016	1443		x	G- 110	A119	V- 110	2	x	x		x	x			-28	-5	
	2/4/2016	1442		x	G- 111	A119	V- 111	2	x	x		x	x			-28	-4	
	2/4/2016	1441		x	G- 112	E0019	V- 112	2	x	x		x	x			-28	-4.5	
	~~2/4/2016~~	~~1441~~		~~x~~	~~G- 113~~	~~5034~~	~~V- 113~~	~~2~~	~~x~~	~~x~~		~~x~~	~~x~~			~~-28~~	~~-4~~	
	2/4/2016	1610		x	G- 114	5020	V- 114	2	x	x		x	x			-28	6	

Sampler CESchmidt	Date/Time 2/5/16 1330	Relinquished by CESchmidt	Date/Time 2/5/16 1330	HAZWRAP/NEESA Y N
Received by	Date/Time 02/05/16 1330	Relinquished by	Date/Time 02/05/16 16:10	QC Level 1 2 3
Received by	Date/Time	Relinquished by	Date/Time	COC
Received by Laboratory	Date/Time 2/5/16 16:20	Sample Shipped Via UPS FEDEX BJS [✓ Other]		Ana Req Cust Seal Sample Condition
Remarks Actual Pressure Reading Gauge 1/4" low				

File: Burrtec WV Forms 25.3 72 00.xlsb Form: 25.3 COC Flux D1

Almega
ENVIRONMENTAL

Standard Receipt
Sample LOG in Checklist

Project No: c9922

Lab ID: A018

Method: m25.3/He m207.1

Sampling Date: 2/4 - 2/5/16

Location: CES Int:

Date & Time Rc'd: 2/5/16

Location: LAB Int:

Arrived By: (circle) FedEx UPS Drop Off (Int) Other

Condition of Package(s): (comment): ok

Package Type: Box [✓ Cooler] Other:

Number of Sample Container(s):

Correct Containers (per Method): [✓ Y] N

Preservation: (circle) [✓ ICE] DryICE ICEPacks None

Sample Conditions:

Sample Temp (C): 4.1

Ambient Temp (C): 21

Sample Temp (C): 4.1

Filter Condition: —

PH : <2.0

Components Sealed: [✓ Y] N

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other

Silica Gel Condition:

Tedlar Bags -
Condensation: Y N

Comments:

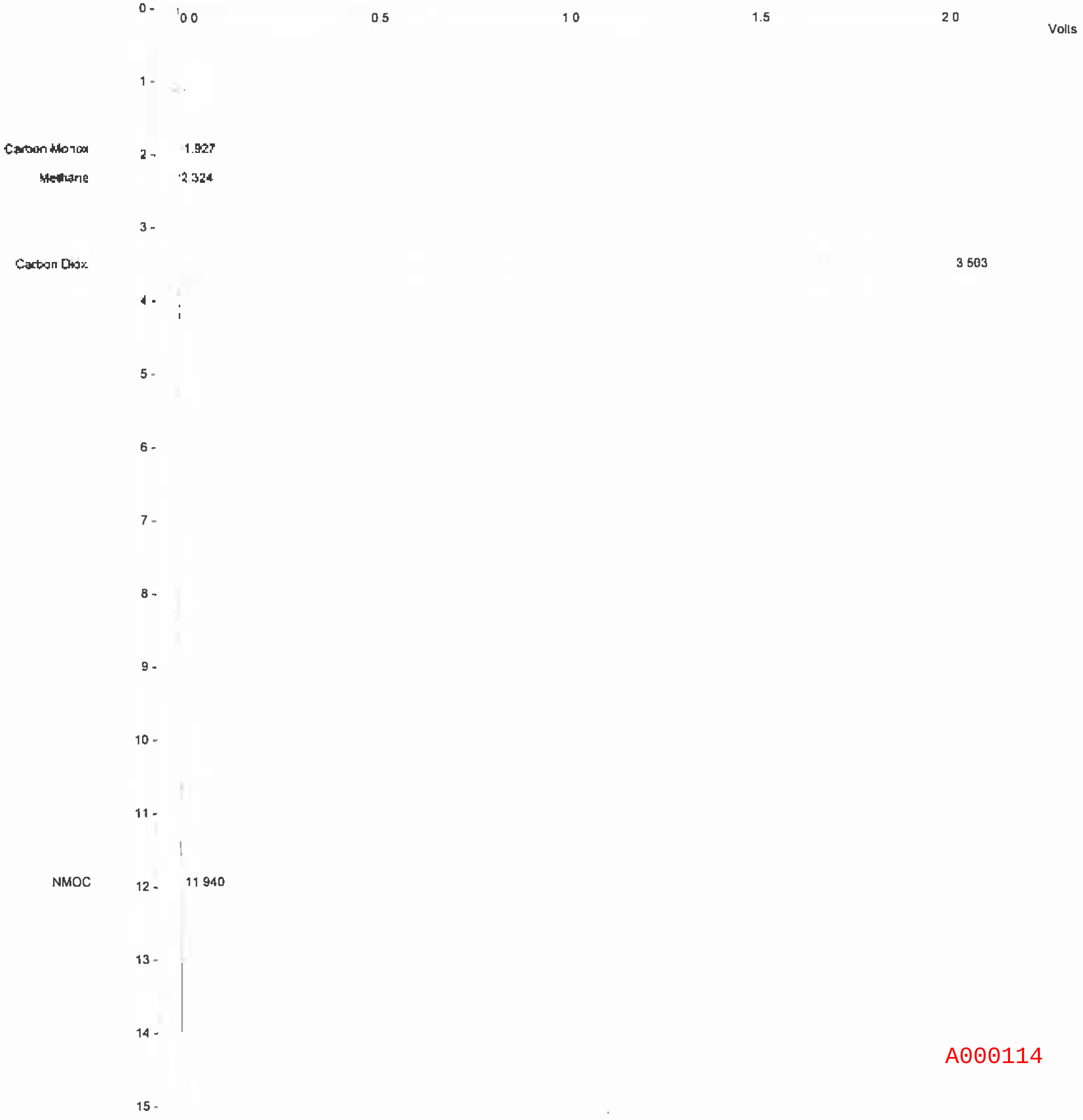
Container(s) Requested: Glass Plastic

Additional Comments:

CHROMATOGRAM
TEST SAMPLES

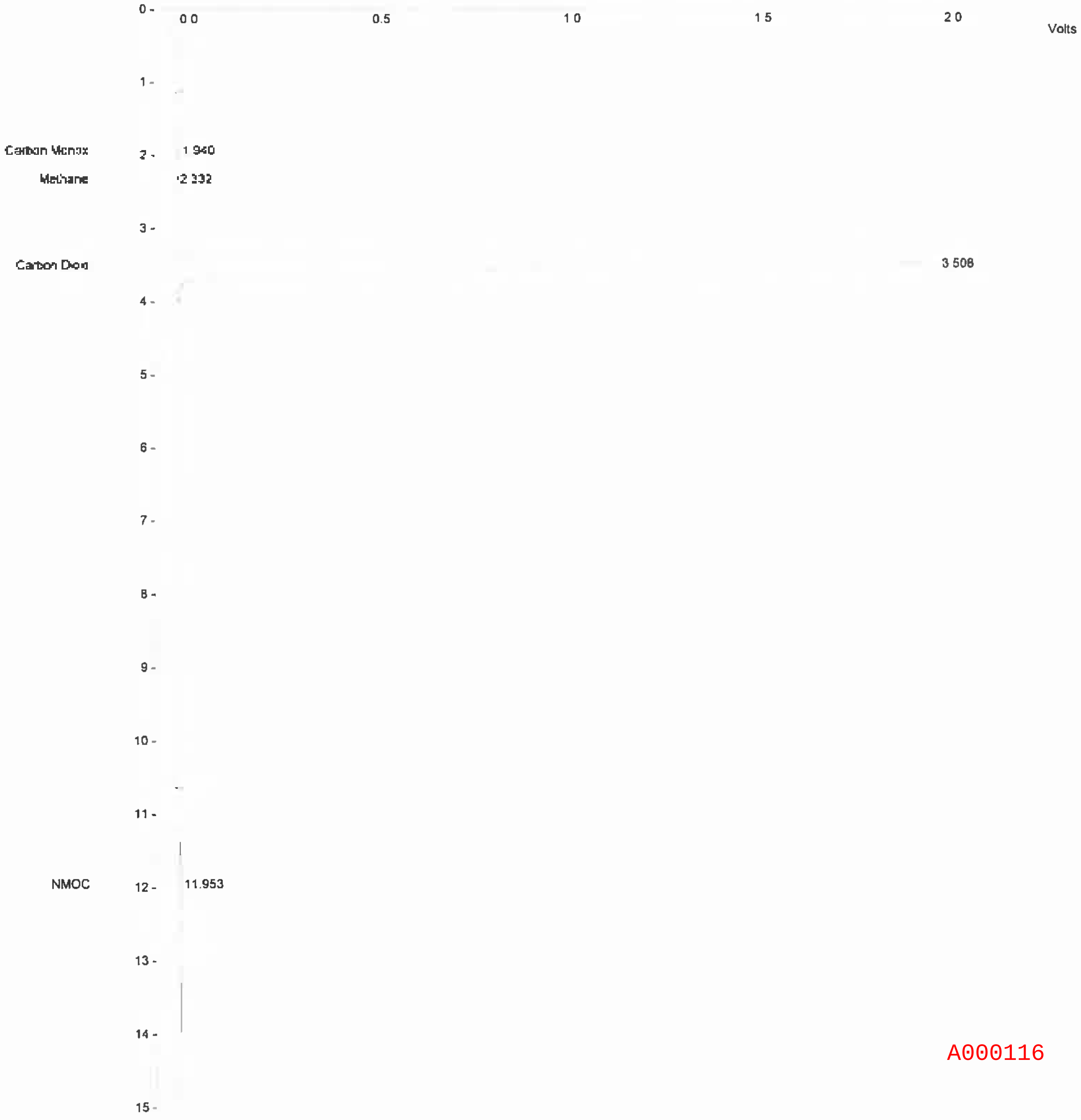
```
Print Date: Mon Feb 22 09:12:33 2016                 Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-19-2016, 16;02;17, a 018 - 101.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 101

Injection Date: 2/19/2016 16:02     Calculation Date: 2/22/2016 09:12

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument : Varian Star #1            Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.     Time                           Width
 Peak      Peak           Result     Time    Offset        Area     Sep.   1/2     Status
  No.      Name           (ppmC)     (min)    (min)      (counts)   Code  (sec)    Codes
 ---- ------------ ----------- ------- -------- ----------- ---- -----  ------
     1 Carbon Monox      21.8204    1.927   -0.003        39511    BB    3.4
     2 Methane            4.2339    2.324    0.006         7544    BB    3.5
     3 Carbon Dioxi 10597.5820    3.503    0.001     18835578    BB    8.3    C
     4 Ethane                        7.541                                       M
     5 NMOC             243.1946   11.940   -0.293       417303    BB   80.2
 ---- ------------ ----------- ------- -------- ----------- ---- -----  ------
       Totals:        10866.8309           -0.289     19299936

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -188 microVolts          LSB:      1 microVolts

Noise (used): 30 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

      c9922 CES

Appended Notes:

       c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 16;02;17, a 018 - 101.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 101

Injection Date: 2/19/2016 16:02    Calculation Date: 2/22/2016 09:12

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 997          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



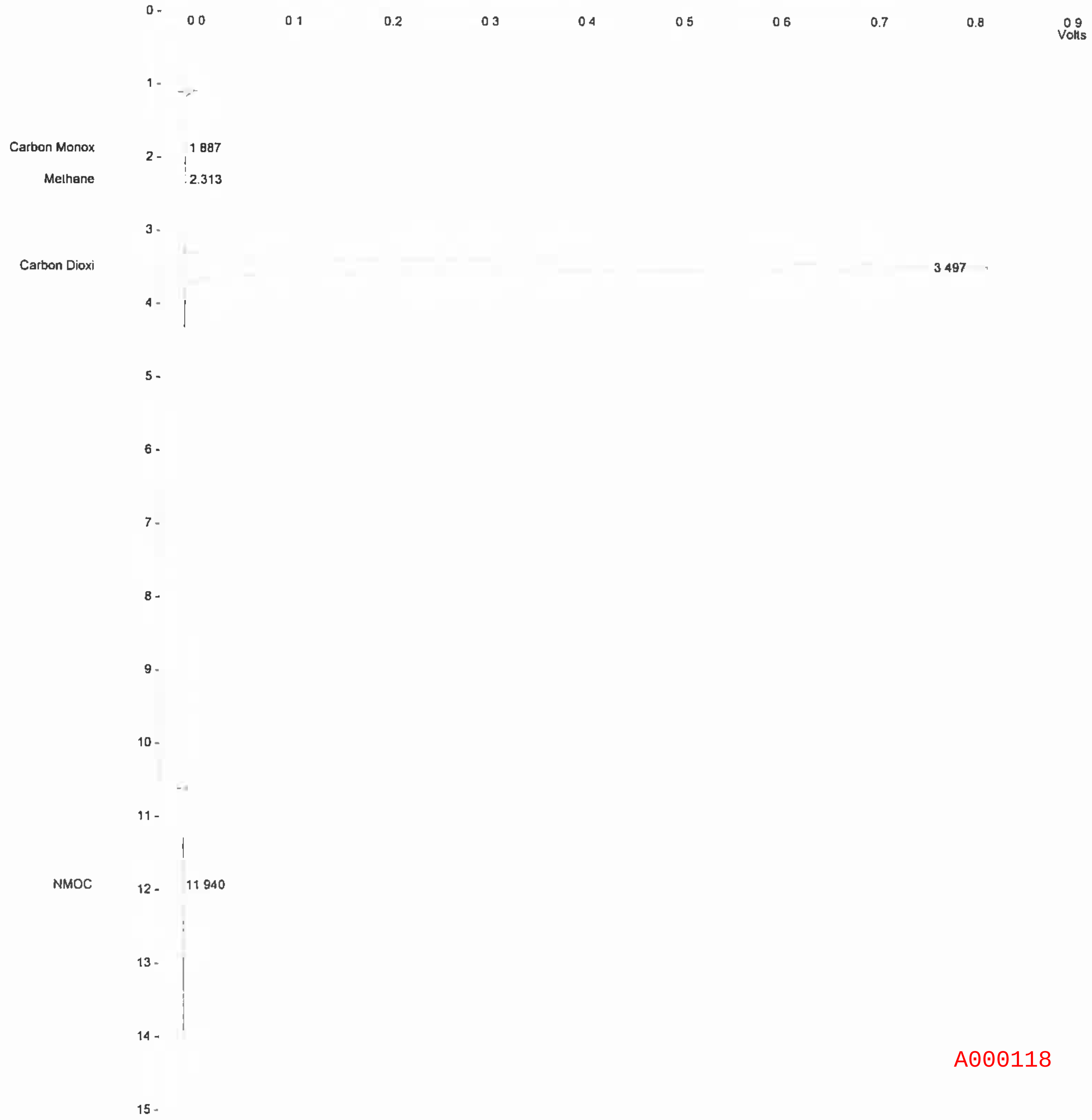
```
Print Date: Mon Feb 22 09:12:56 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-19-2016, 16;26;30, a 018 - 101 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 101 dup

Injection Date: 2/19/2016 16:26    Calculation Date: 2/22/2016 09:12

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3589-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                     Width
 Peak      Peak          Result        Time   Offset       Area     Sep.  1/2    Status
 No.       Name          (ppmC)        (min)   (min)     (counts)   Code (sec)   Codes
 ---- ------------ ----------        ------- -------  ----------   ---- -----   ------
    1 Carbon Monox     19.5252        1.940   0.010       35355     BB   3.1
    2 Methane           4.2099        2.332   0.014        7502     BB   3.5
    3 Carbon Dioxi 10589.5010         3.508   0.006    18821216     BB   8.3   C
    4 Ethane                          7.541                                    M
    5 NMOC            242.0048       11.953  -0.280      415261     BB  78.2
 ---- ------------ ==========        ------- =======  ==========   ---- -----   ------
      Totals:      10855.2409                -0.250    19279334

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -199 microVolts          LSB:      1 microVolts

Noise (used): 42 microVolts - monitored before this run

Stream: 1        Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9972 CES

Appended Notes:

        c9972 CES
**********************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 16;26;30, a 018 - 101 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 101 dup

Injection Date: 2/19/2016 16:26    Calculation Date: 2/22/2016 09:12

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =   1.32 cm/min   Attenuation = 993          Zero Offset = 2%
Start Time  =  0.000   min     End Time    = 15.013  min   Min / Tick   = 1.00
```



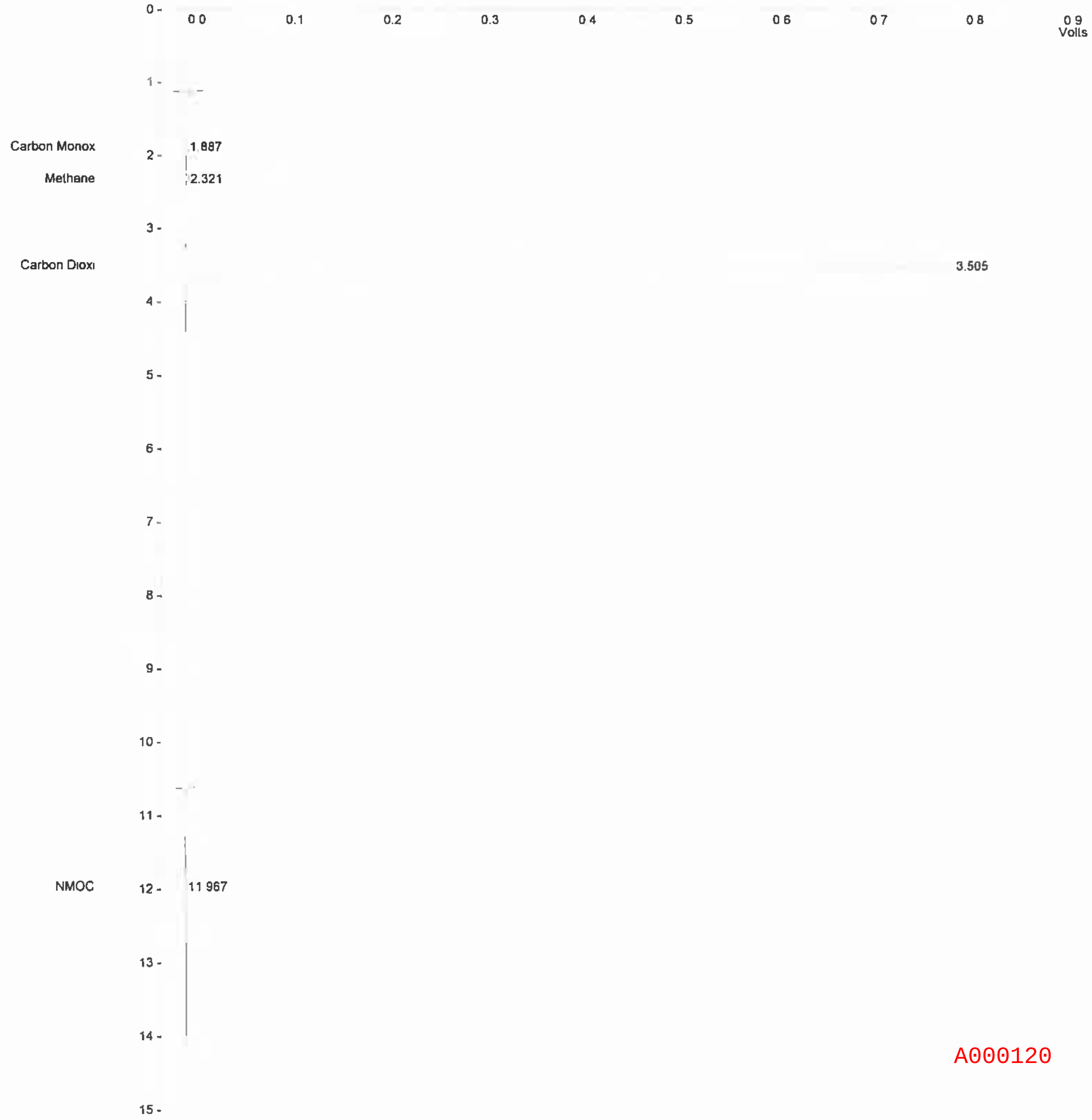
```
Print Date: Mon Feb 22 09:15:02 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 16;54;29, a 018 - 102.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 102

Injection Date: 2/19/2016 16:54    Calculation Date: 2/22/2016 09:12

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                         Width
 Peak      Peak          Result       Time   Offset       Area      Sep.   1/2    Status
  No.      Name          (ppmC)       (min)   (min)     (counts)    Code  (sec)   Codes
 ----  ------------  ----------    -------  -------  ----------    ----  -----   ------
    1  Carbon Monox     11.6474      1.887   -0.043       21090      BB    6.0
    2  Methane           6.9256      2.313   -0.005       12341      BB    3.5
    3  Carbon Dioxi  4135.3789      3.497   -0.005     7350003      BB    8.2   C
    4  Ethane                        7.541                                      M
    5  NMOC             60.9382     11.940   -0.293      104565      BB   97.9
 ----  ------------  ----------    -------  -------  ----------    ----  -----   ------
       Totals:       4214.8901             -0.346     7487999

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -131 microVolts           LSB:     1 microVolts

Noise (used): 42 microVolts - monitored before this run

Stream: 1       Injection Number: 1      Sampling Time:   0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*****************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 16;54;29, a 018 - 102.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 102

Injection Date: 2/19/2016 16:54    Calculation Date: 2/22/2016 09:12

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 390          Zero Offset = 2%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



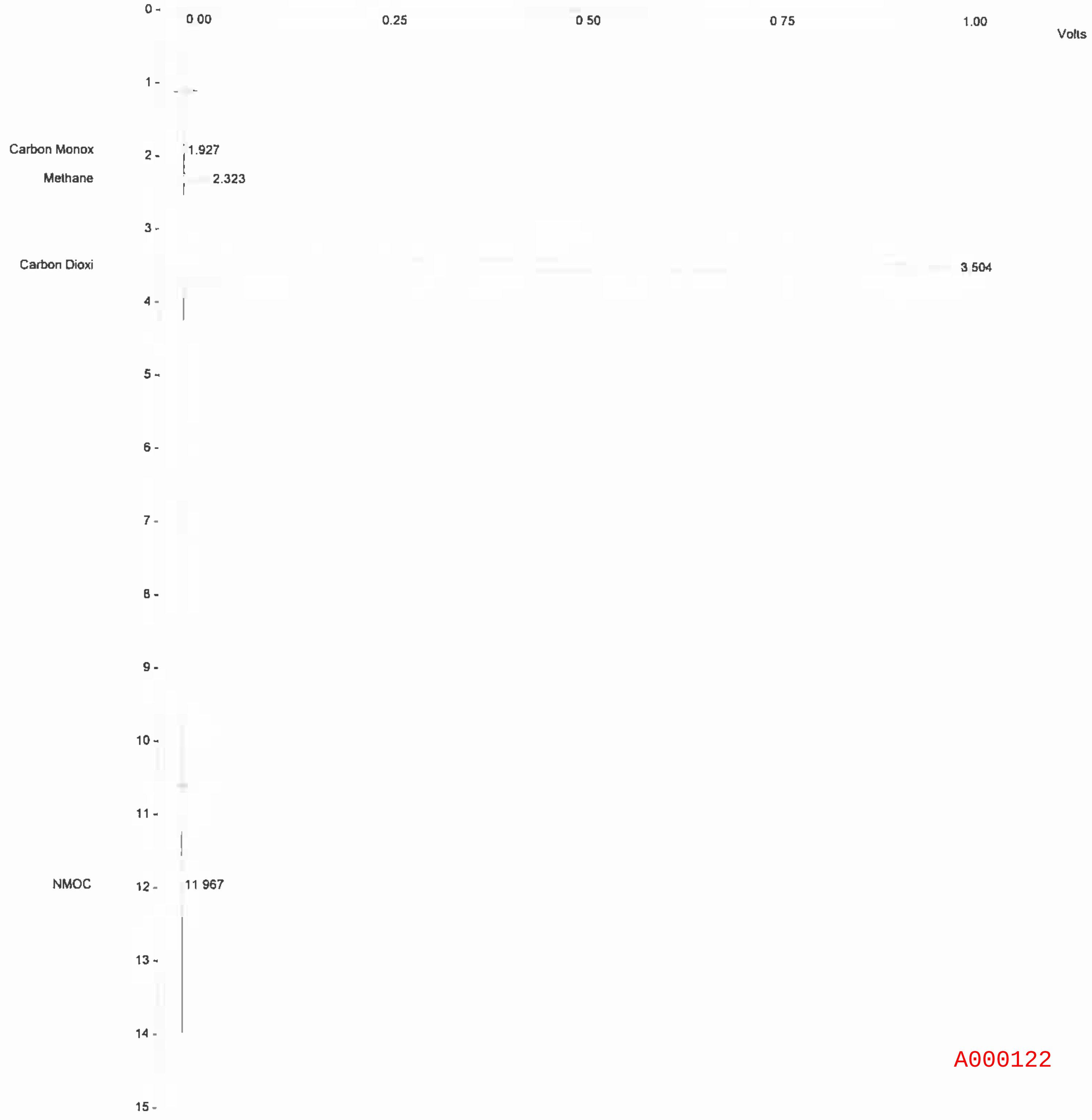
```
Print Date: Mon Feb 22 09:15:15 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 17;18;56, a 018 - 102 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 102 dup

Injection Date: 2/19/2016 17:18     Calculation Date: 2/22/2016 09:12

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument : Varian Star #1            Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10          Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.0D ** 00299-3588-d6b 21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                         Width
 Peak      Peak           Result       Time   Offset       Area      Sep.    1/2   Status
  No.      Name           (ppmC)       (min)   (min)     (counts)    Code   (sec)  Codes
 ----  ------------  -----------  -------- --------  -----------   ----  -----  ------
    1  Carbon Monox      11.5669     1.887   -0.043        20945     BB     6.0
    2  Methane            7.0980     2.321    0.003        12648     AB     3.6
    3  Carbon Dioxi    4142.5327     3.505    0.003      7362717     BB     8.2   C
    4  Ethane                        7.541                                         M
    5  NMOC              63.4456    11.967   -0.266       108868     BB    56.2
 ----  ------------  ===========  -------- ========  ===========   ----  -----  ------
       Totals:         4224.6432             -0.303      7505178

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1            Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -35 microVolts           LSB:     1 microVolts

Noise (used): 38 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 17;18;56, a 018 - 102 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 102 dup

Injection Date: 2/19/2016 17:18    Calculation Date: 2/22/2016 09:12

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 391          Zero Offset = 2%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



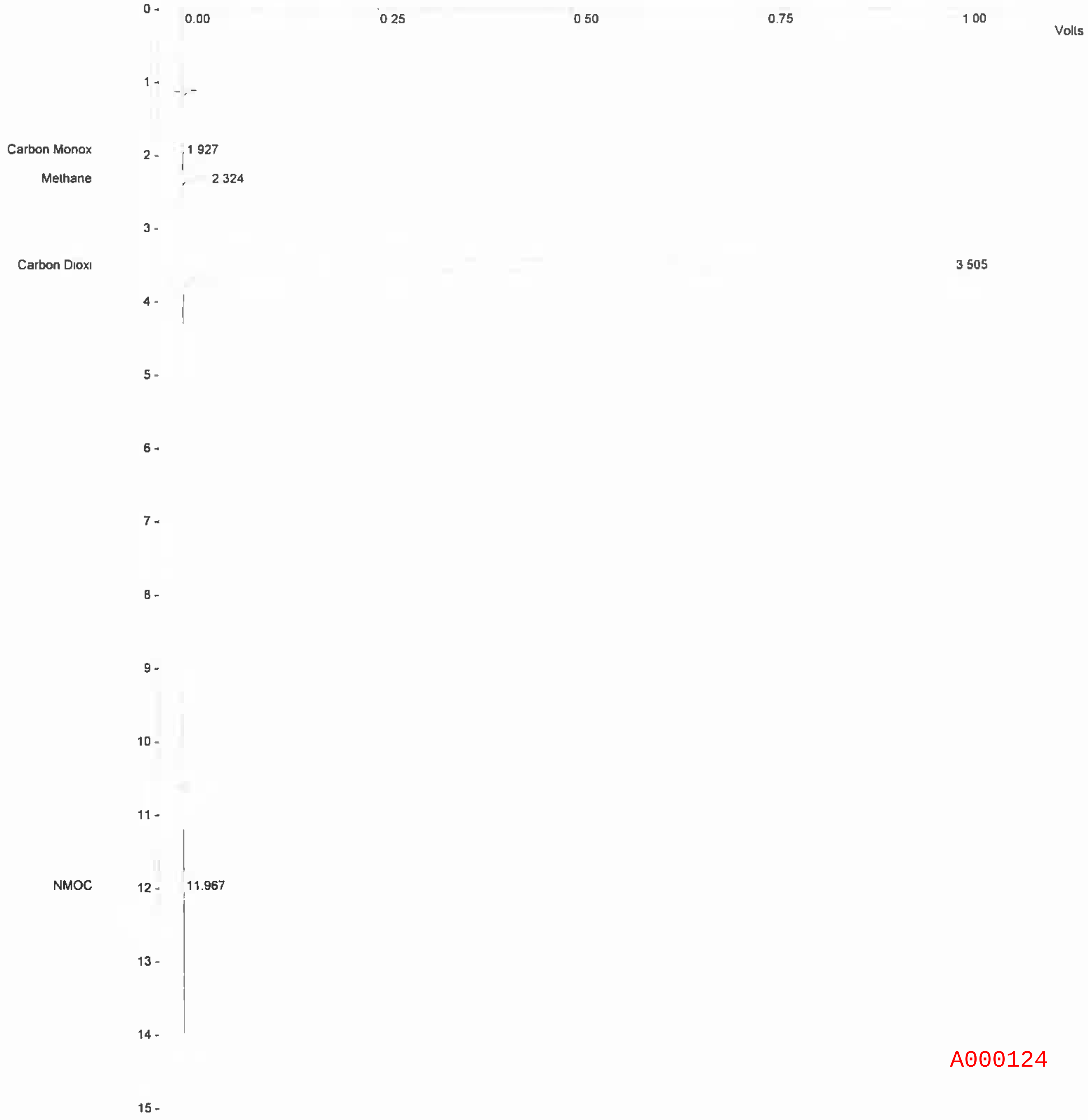
```
Print Date: Mon Feb 22 09:18:39 2016              Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-19-2016, 17;46;54, a 018 - 103.run
Method File   : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 103

Injection Date: 2/19/2016 17:46     Calculation Date: 2/22/2016 09:18

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                       Width
 Peak       Peak           Result     Time    Offset       Area     Sep.   1/2     Status
 No.        Name           (ppmC)     (min)    (min)     (counts)   Code  (sec)    Codes
 ----  ------------  -- -------    -------  -------  -----------  ----  -----    ------
    1  Carbon Monox      12.0260     1.927   -0.003        21776    BB    5.6
    2  Methane           79.0934     2.323    0.005       140937    BB    3.7
    3  Carbon Dioxi    5181.4521     3.504    0.002      9209237    BB    8.2     C
    4  Ethane                        7.541                                         M
    5  NMOC              58.0036    11.967   -0.266        99530    BB  167.6
 ----  ------------  ==========  -------  =======  ===========  ----  -----    ------
       Totals:         5330.5751             -0.262      9471480

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :            0 counts

Detected Peaks: 4            Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 47 microVolts          LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 2       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 17;46;54, a 018 - 103.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 103

Injection Date: 2/19/2016 17:46    Calculation Date: 2/22/2016 09:18

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 490          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



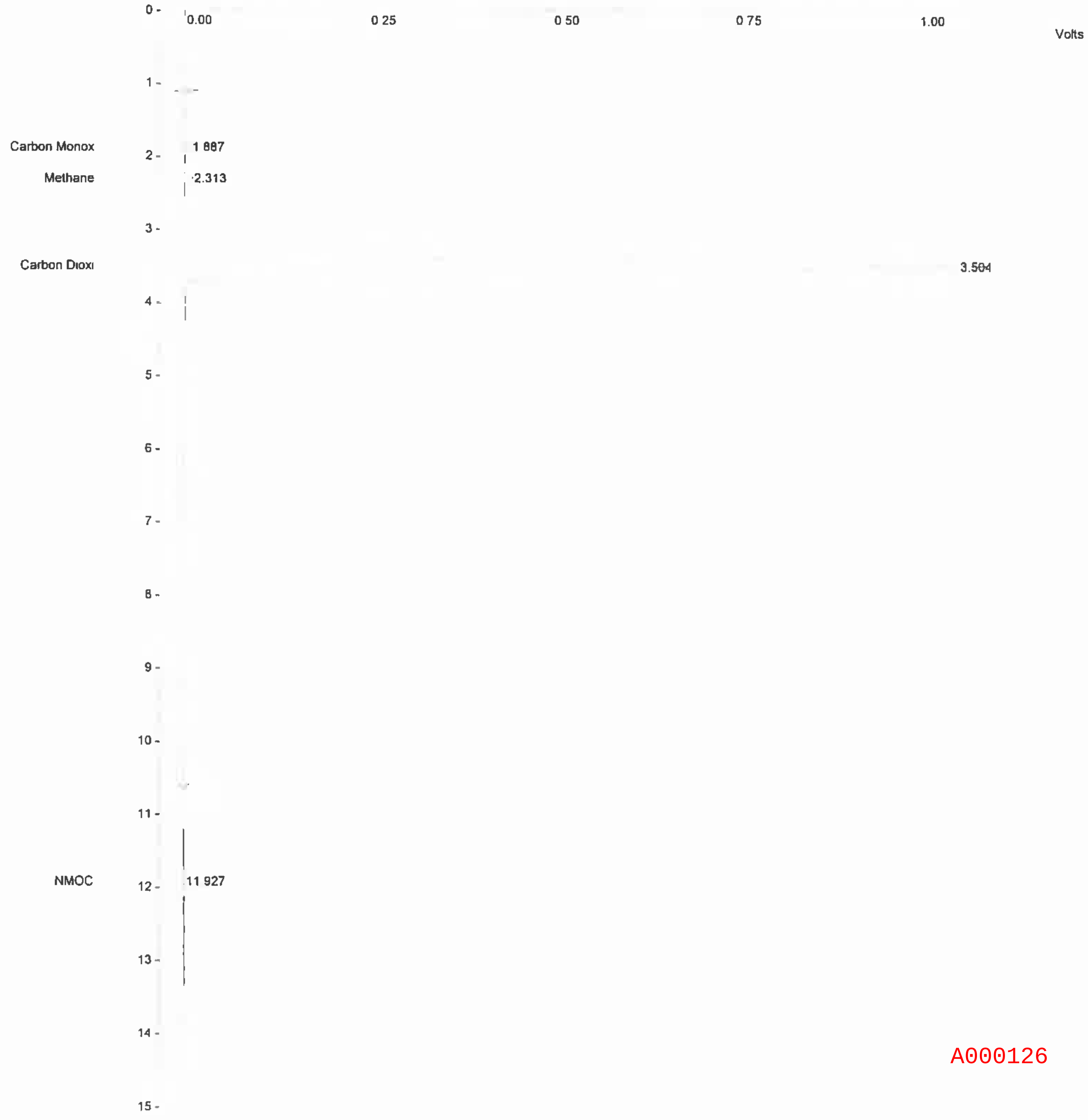
```
Print Date: Mon Feb 22 09:17:46 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 18;10;11, a 018 - 103 dup.run
Method File  : c:\documo~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 103 dup

Injection Date: 2/19/2016 18:10    Calculation Date: 2/22/2016 09:15

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-2)e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area    Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------  -------- ------- ----------- ---- -----  ------
    1 Carbon Monox    11.7300    1.927  -0.003      21240    BB   5.8
    2 Methane         79.1643    2.324   0.006     141063    BB   3.6
    3 Carbon Dioxi  5181.0205    3.505   0.003    9208470    BB   8.2  C
    4 Ethane                     7.541                                  M
    5 NMOC            59.4139   11.967  -0.266     101950    BB  48.2
 ---- ------------ ----------  -------- ------- ----------- ---- -----  ------
      Totals:       5331.3287           -0.260    9472723

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -58 microVolts          LSB:     1 microVolts

Noise (used): 33 microVolts - monitored before this run

Stream: 2       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-19-2016, 18;10;11, a 018 - 103 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 103 dup

Injection Date: 2/19/2016 18:10    Calculation Date: 2/22/2016 09:15

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 489          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick   = 1.00
```



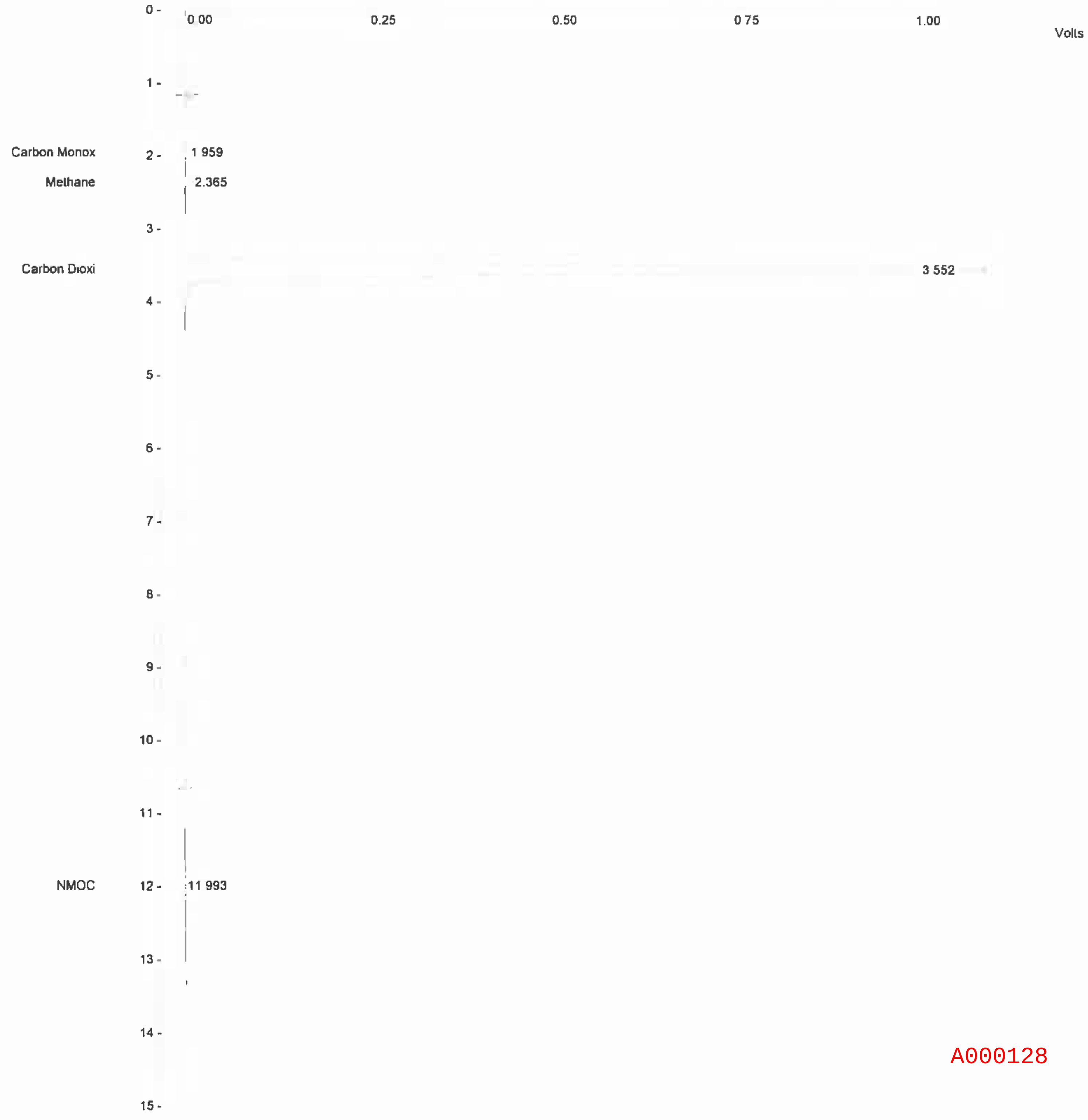
```
Print Date: Mon Feb 22 13:43:16 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-22-2016, 12;11;30, a 018 - 104.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 104

Injection Date: 2/22/2016 12:11    Calculation Date: 2/22/2016 13:43

Operator   : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel    : 2 - Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area   Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------  -------  -------- ----------- ---- ------ ------
    1 Carbon Monox    23.9261     1.887  -0.043      43324   BB    4.3
    2 Methane         26.1507     2.313  -0.005      46598   BB    3.6
    3 Carbon Dioxi  5498.9175     3.504   0.002    9773483   BB    8.2 C
    4 Ethane                      7.541                                M
    5 NMOC            35.2303    11.927  -0.306      60452   BB   43.1
 ---- ------------ ----------  -------  -------- ----------- ---- ------ ------
      Totals:       5584.2246            -0.352    9923857

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -347 microVolts          LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 1    Sampling Time:   0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CRS

Appended Notes:

        c9922 CRS
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 12;11;30, a 018 - 104.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 104

Injection Date: 2/22/2016 12:11    Calculation Date: 2/22/2016 13:43

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 518         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



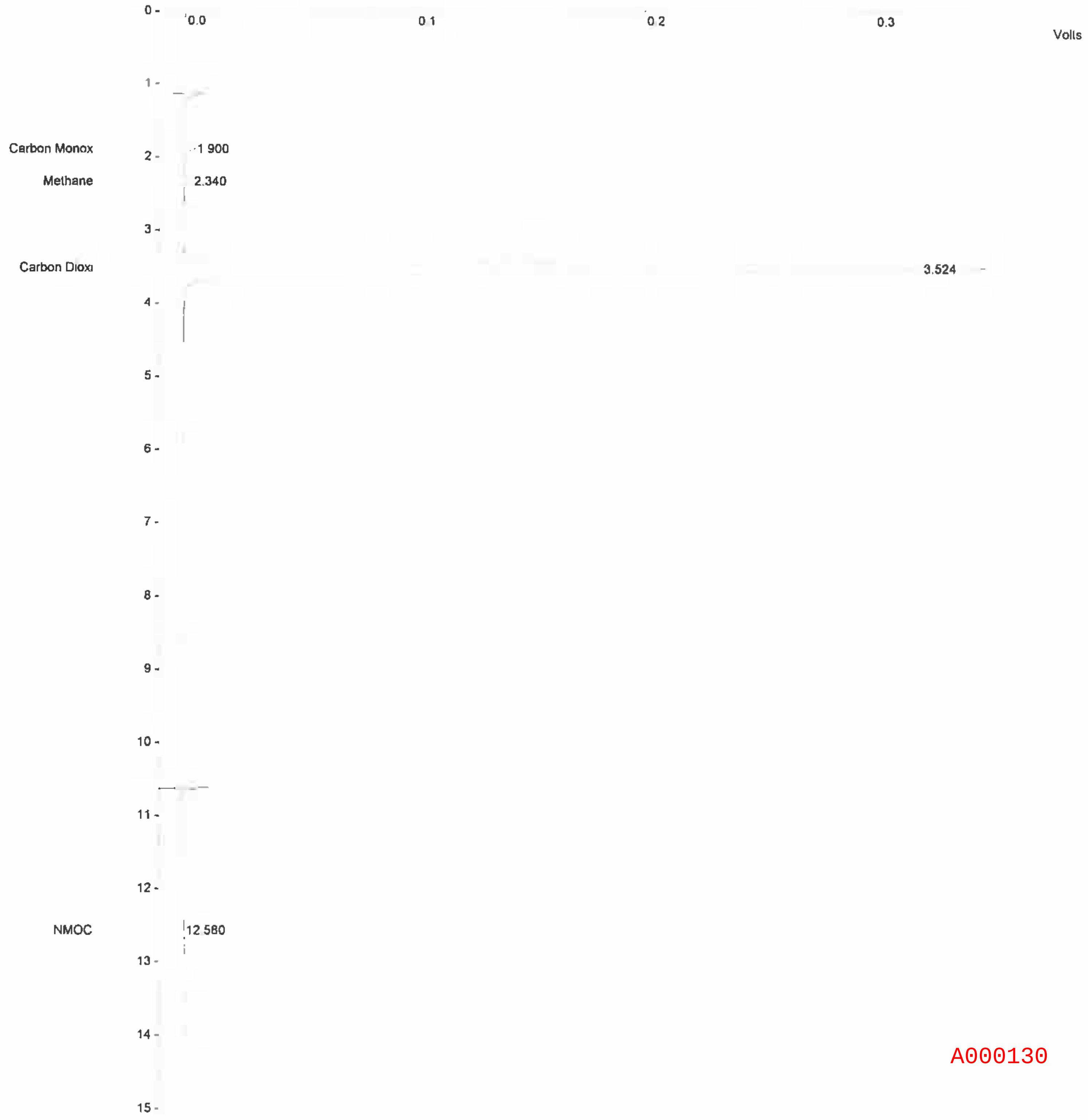
```
Print Date: Mon Feb 22 13:41:26 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 12;39;22, a 018 - 104 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 104 dup

Injection Date: 2/22/2016 12:39    Calculation Date: 2/22/2016 13:40

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-71e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area    Sep.  1/2   Status
 No.      Name       (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------- -------- -------- ---------- ---- ----- ------
    1 Carbon Monox    22.7177    1.959   0.029      41136    BV   5.0
    2 Methane         29.5128    2.365   0.047      52589    VB   3.8
    3 Carbon Dioxi  5528.6805    3.552   0.050    9826397    BB   8.2  C
    4 Ethane                     7.541                                  M
    5 NMOC            35.4590   11.993  -0.240      60845    BB  40.7
 ---- ------------ ----------- -------- -------- ---------- ---- ----- ------
      Totals:       5616.3780           -0.114    9980967

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -348 microVolts          LSB:     1 microVolts

Noise (used): 49 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 12;39;22, a 018 - 104 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 104 dup

Injection Date: 2/22/2016 12:39    Calculation Date: 2/22/2016 13:40

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 521            Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



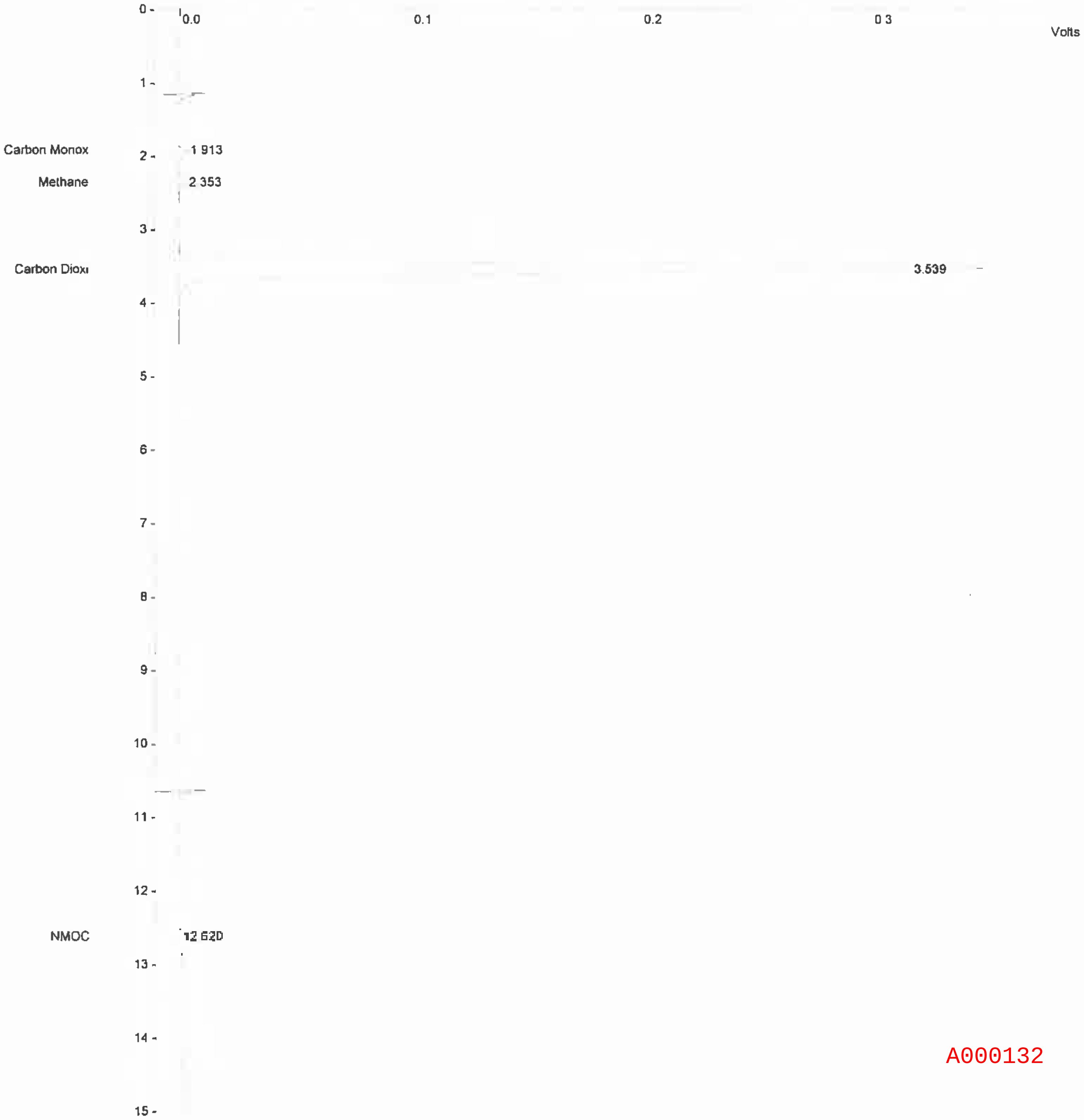
```
Print Date: Mon Feb 22 13:45:02 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 13:07:23, a 018 - 105.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 105

Injection Date: 2/22/2016 13:07    Calculation Date: 2/22/2016 13:44

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                       Width
 Peak      Peak          Result       Time   Offset       Area     Sep.   1/2    Status
  No.      Name          (ppmC)       (min)   (min)     (counts)   Code  (sec)   Codes
 ----  ------------  ----------    -------  -------  ----------   ----  -----   ------
    1  Carbon Monox     17.0109      1.900   -0.030       30802     BB    3.2
    2  Methane          13.6066      2.340    0.022       24246     BB    3.6
    3  Carbon Dioxi   1748.9437      3.524    0.022     3108480     BB    8.2
    4  Ethane                        7.541                                           M
    5  NMOC              0.8662     12.580    0.347        1486     BB   46.4
 ----  ------------  ==========    -------  =======  ==========   ----  -----   ------
       Totals:        1780.4274              0.361     3165014

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -311 microVolts          LSB:     1 microVolts

Noise (used): 28 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 13;07;23, a 018 - 105.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 105

Injection Date: 2/22/2016 13:07    Calculation Date: 2/22/2016 13:44

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 165          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



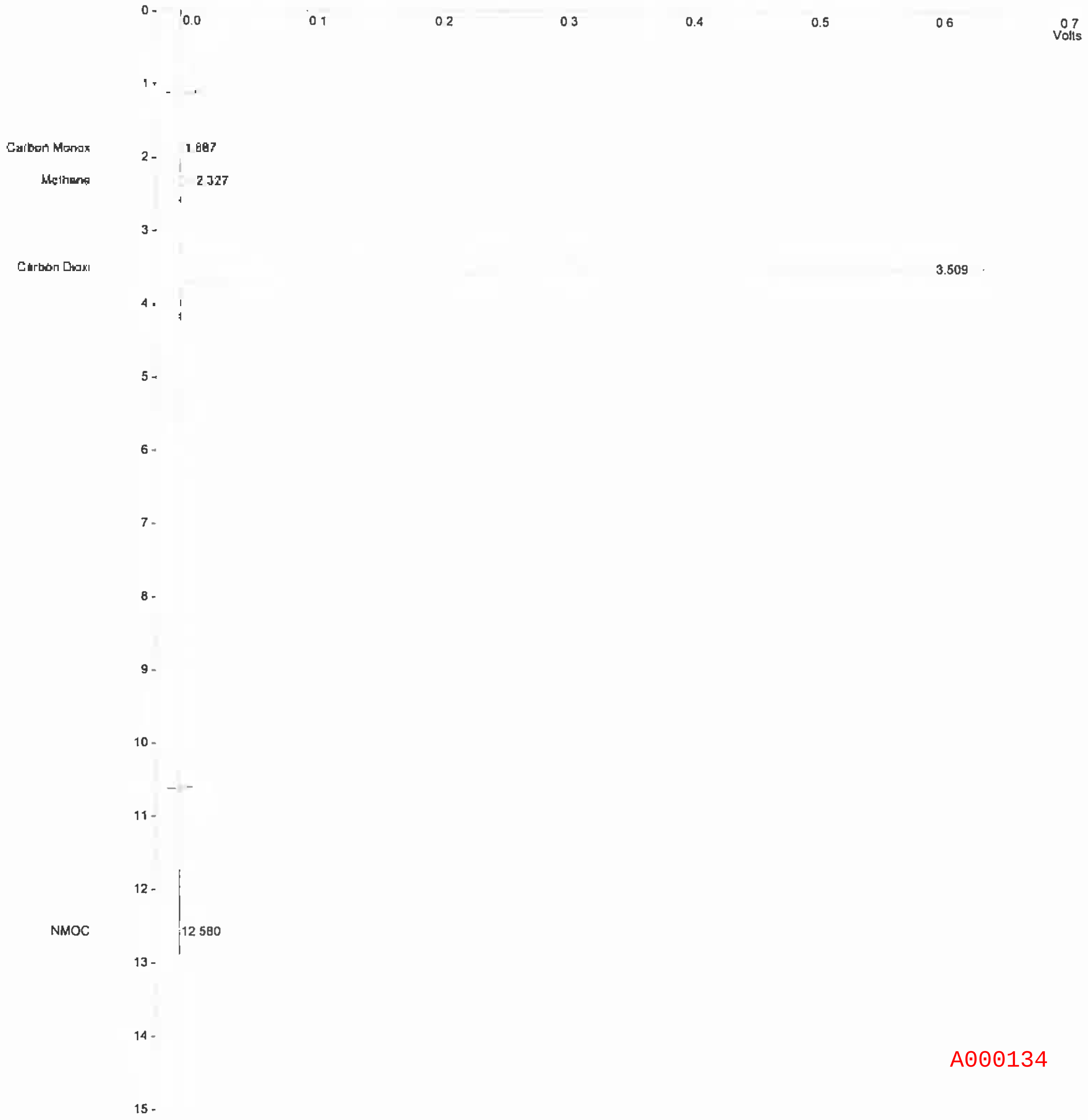
```
Print Date: Mon Feb 22 13:54:06 2016             Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb 16\2-22-2016, 13;35;27, a 018 - 105 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 105 dup

Injection Date: 2/22/2016 13:35    Calculation Date: 2/22/2016 13:53

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address   : 88
Instrument : Varian Star #1            Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                         Width
 Peak      Peak         Result        Time    Offset      Area      Sep.   1/2    Status
  No.      Name         (ppmC)        (min)    (min)    (counts)    Code  (sec)   Codes
 ----  ------------  ----------   -------  -------  ----------   ----  -----   ------
    1  Carbon Monox     15.9402     1.913   -0.017       28864     BB    3.5
    2  Methane          13.6173     2.353    0.035       24265     BB    3.6
    3  Carbon Dioxi   1742.7460     3.539    0.037     3097464     BB    8.2
    4  Ethane                       7.541                                        M
    5  NMOC              0.8537    12.620    0.387        1465     BB   17.6
 ----  ------------  ==========   -------  =======  ==========   ----  -----   ------
       Totals:        1773.1572              0.442     3152058

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4            Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -306 microVolts          LSB:      1 microVolts

Noise (used): 40 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*************************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 13;35;27, a 018 - 105 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 105 dup

Injection Date: 2/22/2016 13:35    Calculation Date: 2/22/2016 13:53

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 165          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



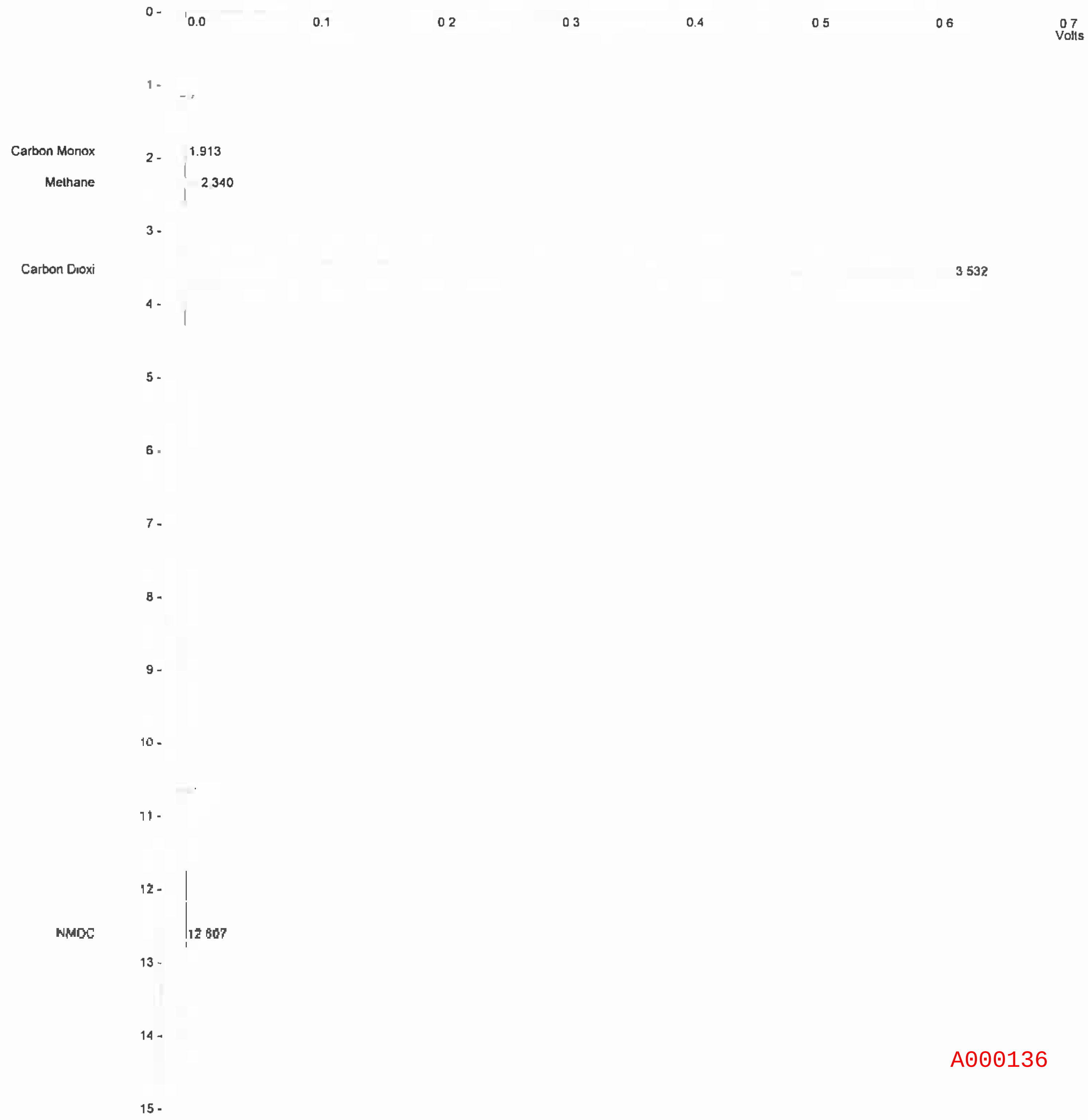
```
Print Date: Mon Feb 22 14:45:52 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 13;59;21, a 018 - 106.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 106

Injection Date: 2/22/2016 13:59    Calculation Date: 2/22/2016 14:44

Operator     : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10     Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                   Ret.    Time                     Width
 Peak      Peak          Result    Time   Offset       Area   Sep.   1/2   Status
 No.       Name          (ppmC)    (min)   (min)    (counts)  Code  (sec)  Codes
 ----  ------------  ----------  ------- -------  ----------  ----  -----  ------
    1  Carbon Monox     11.7357    1.887  -0.043       21250    BB    4.9
    2  Methane          30.4802    2.327   0.009       54313    BB    3.6
    3  Carbon Dioxi   3218.1384    3.509   0.007     5719748    BB    8.2  C
    4  Ethane                      7.541                                   M
    5  NMOC              3.9930   12.580   0.347        6852    BB  133.6
 ----  ------------  ----------  ------- -------  ----------  ----  -----  ------
       Totals:        3264.3473            0.320     5802163

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -232 microVolts          LSB:     1 microVolts

Noise (used): 28 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*****************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 13;59;21, a 018 - 106.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 106

Injection Date: 2/22/2016 13:59    Calculation Date: 2/22/2016 14:44

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 303          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min  Min / Tick  = 1.00
```



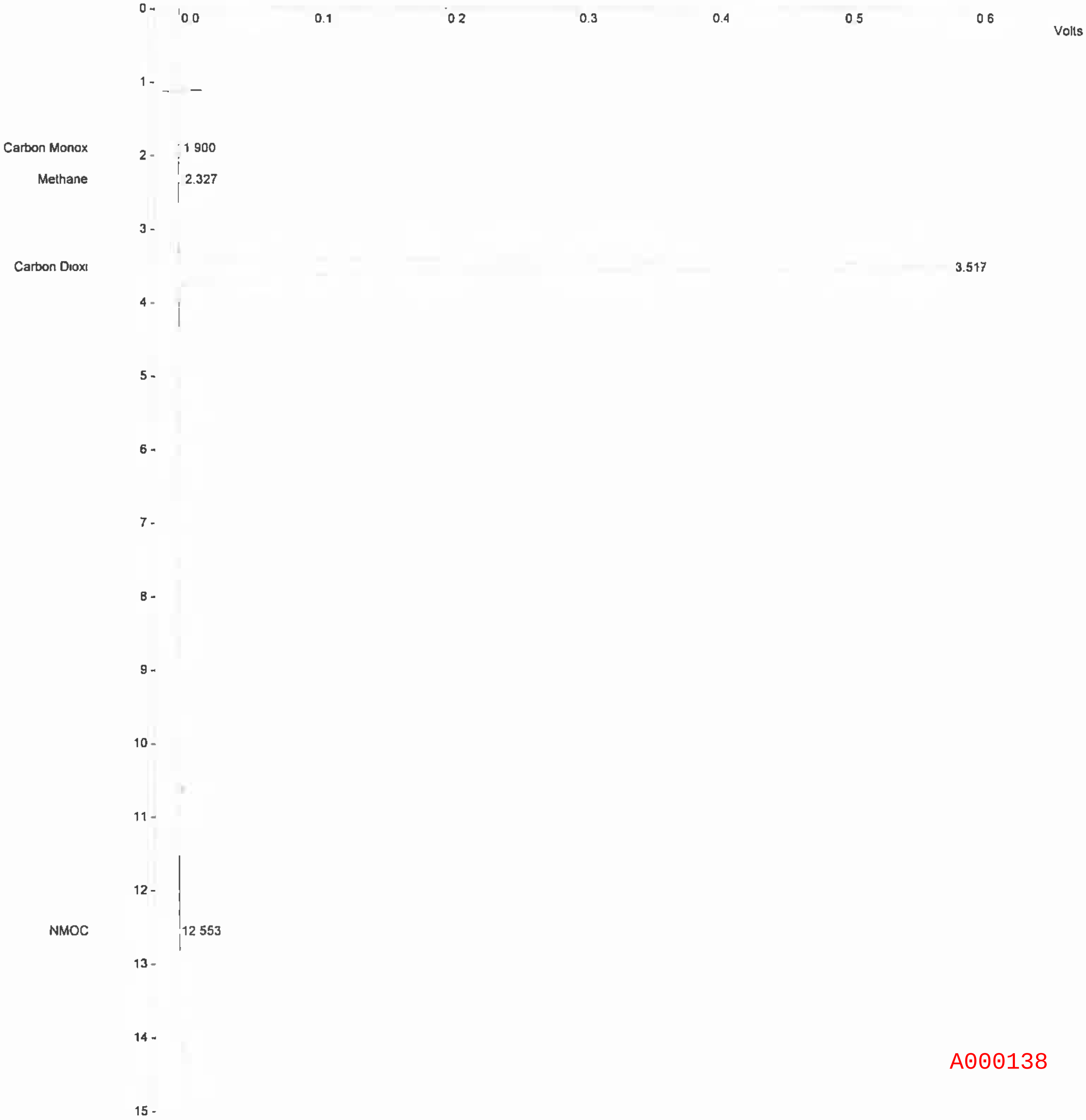
```
Print Date: Mon Feb 22 14:47:08 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 14;23;12, a 018 - 106 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 106 dup

Injection Date: 2/22/2016 14:23    Calculation Date: 2/22/2016 14:47

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 08
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                  Ret.     Time                     Width
 Peak      Peak         Result    Time    Offset       Area    Sep.  1/2    Status
  No.      Name         (ppmC)    (min)    (min)     (counts)  Code (sec)   Codes
 ---- ------------ ----------- -------- -------- ----------- ---- -----  ------
    1 Carbon Monox     10.2698    1.913   -0.017       18596   BB    6.3
    2 Methane          29.9996    2.340    0.022       53456   BB    3.6
    3 Carbon Dioxi   3218.4143    3.532    0.030     5720239   BB    8.2   C
    4 Ethane                      7.541                                     M
    5 NMOC              4.0118   12.607    0.374        6884   BB   72.8
 ---- ------------ =========== -------- ======== =========== ---- -----  ------
      Totals:        3262.6955             0.409     5799175

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1            Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -224 microVolts          LSB:     1 microVolts

Noise (used): 18 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 14;23;12, a 018 - 106 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 106 dup

Injection Date: 2/22/2016 14:23    Calculation Date: 2/22/2016 14:47

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 304          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



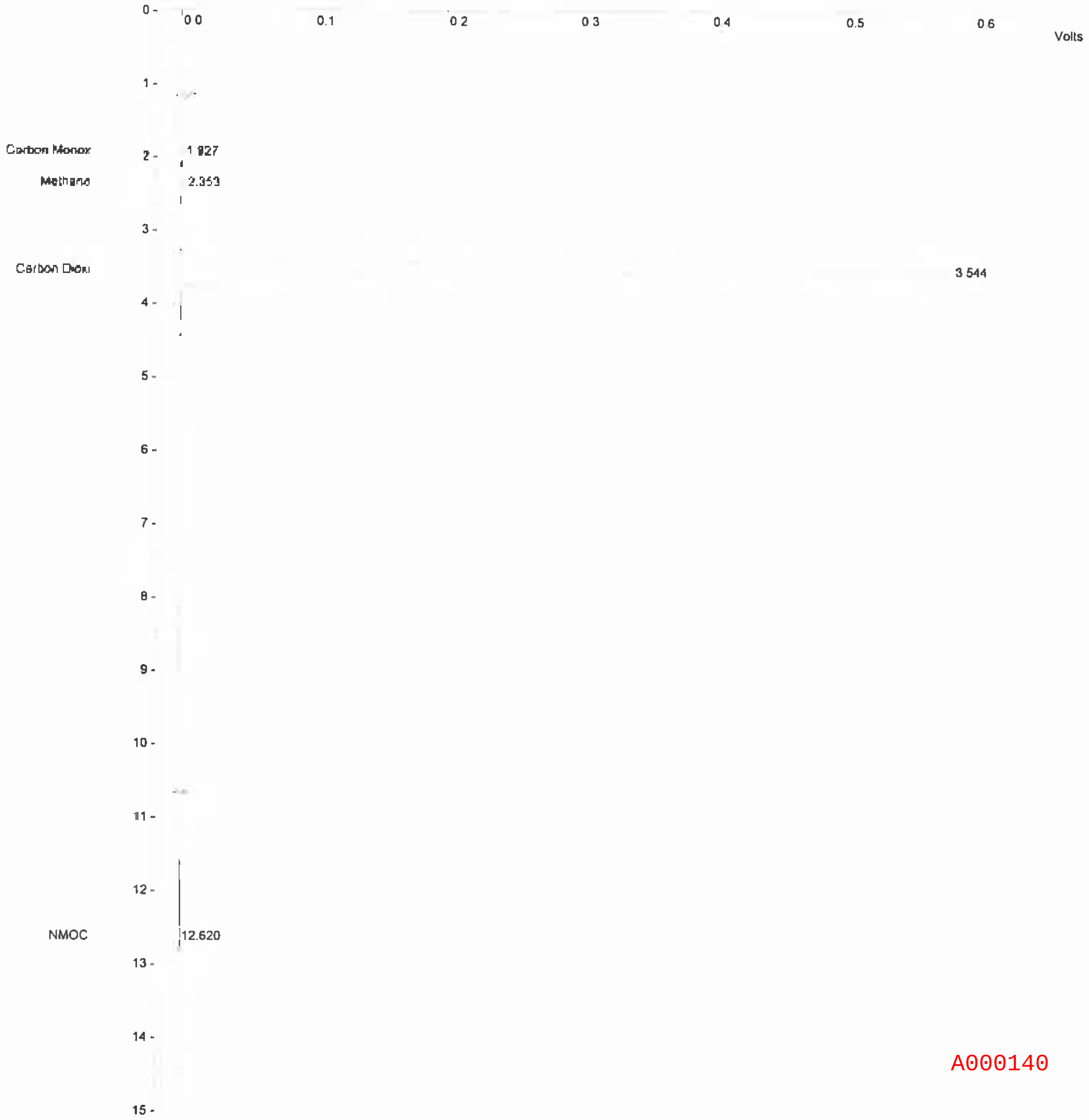
```
Print Date: Mon Feb 22 15:37:49 2016               Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 14;50;03, a 018 - 107.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 107

Injection Date: 2/22/2016 14:50    Calculation Date: 2/22/2016 15:37

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                        Width
 Peak      Peak           Result     Time   Offset        Area      Sep.  1/2     Status
  No.      Name           (ppmC)     (min)   (min)      (counts)    Code (sec)    Codes
 ---- ------------ ----------   -------  -------  ----------  ---- -----   ------
    1 Carbon Monox    13.7665   1.900   -0.030       24928    BB    5.5
    2 Methane         12.8968   2.327    0.009       22981    BB    3.5
    3 Carbon Dioxi  3045.3904   3.517    0.015     5412715    BB    8.2   C
    4 Ethane                    7.541                                     M
    5 NMOC             5.8059  12.553    0.320        9962    BB  111.7
 ---- ------------ ----------   -------  -------  ----------  ---- -----   ------
      Totals:       3077.8596            0.314     5470586

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -282 microVolts          LSB:     1 microVolts

Noise (used): 48 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 14;50;03, a 018 - 107.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 107

Injection Date: 2/22/2016 14:50    Calculation Date: 2/22/2016 15:37

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 288          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



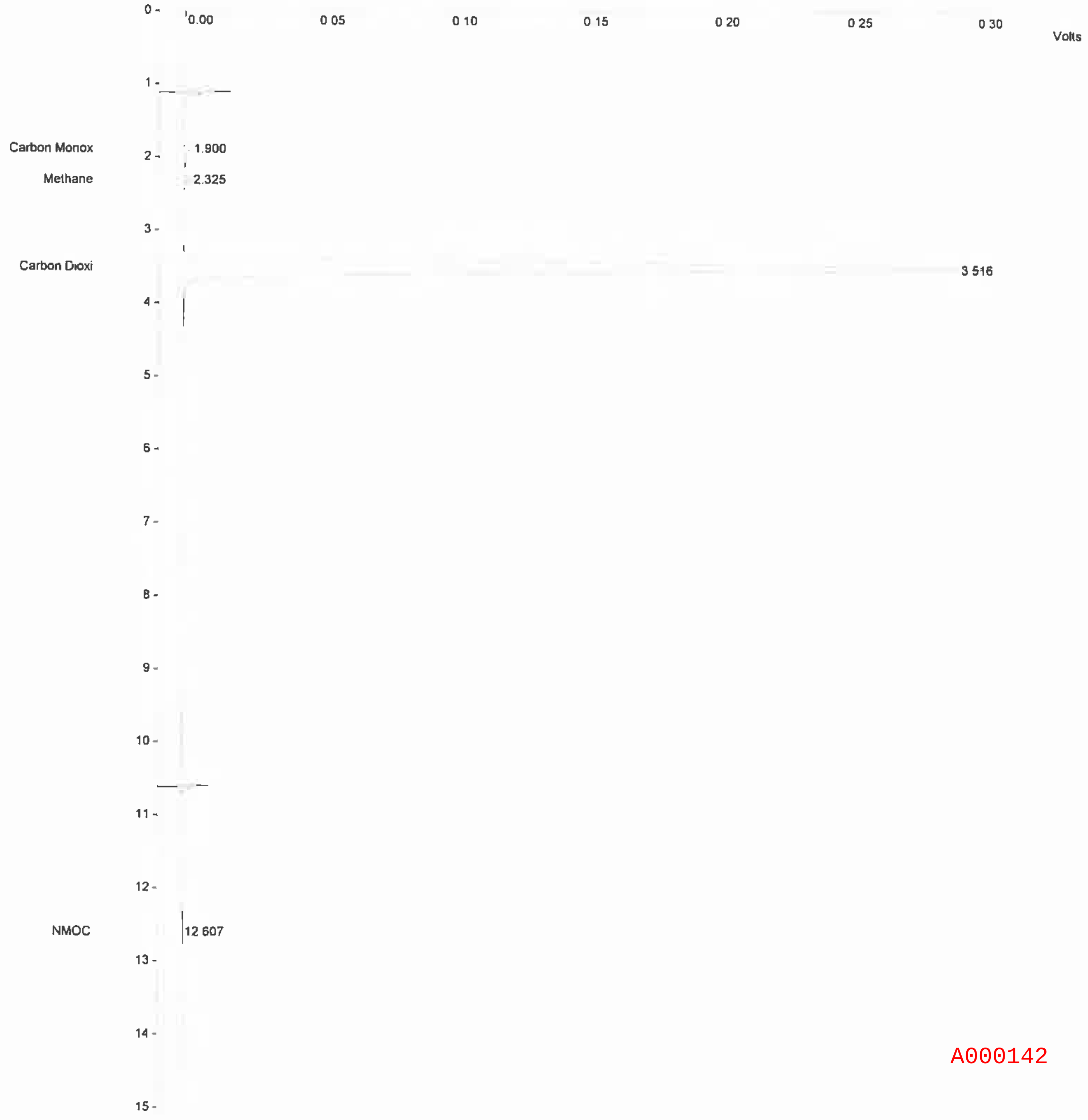
```
Print Date: Mon Feb 22 15:38:00 2016                    Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 15;17;09, a 018 - 107 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 107 dup

Injection Date: 2/22/2016 15:17     Calculation Date: 2/22/2016 15:37

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument   : Varian Star #1        Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.    Time                          Width
 Peak      Peak           Result        Time    Offset      Area       Sep.   1/2    Status
  No.      Name           (ppmC)        (min)   (min)     (counts)     Code   (sec)  Codes
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
    1  Carbon Monox     14.4137    1.927   -0.003       26100    BB    5.2
    2  Methane          13.6256    2.353    0.035       24280    BB    3.6
    3  Carbon Dioxi   3046.2737    3.544    0.042     5414285    BB    8.2   C
    4  Ethane                      7.541                                     M
    5  NMOC              5.8837   12.620    0.387       10096    BB   73.6
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
       Totals:        3080.1967             0.461     5474761

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -233 microVolts           LSB:      1 microVolts

Noise (used): 27 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
**********************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 15;17;09, a 018 - 107 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 107 dup

Injection Date: 2/22/2016 15:17    Calculation Date: 2/22/2016 15:37

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 288         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick   = 1.00
```



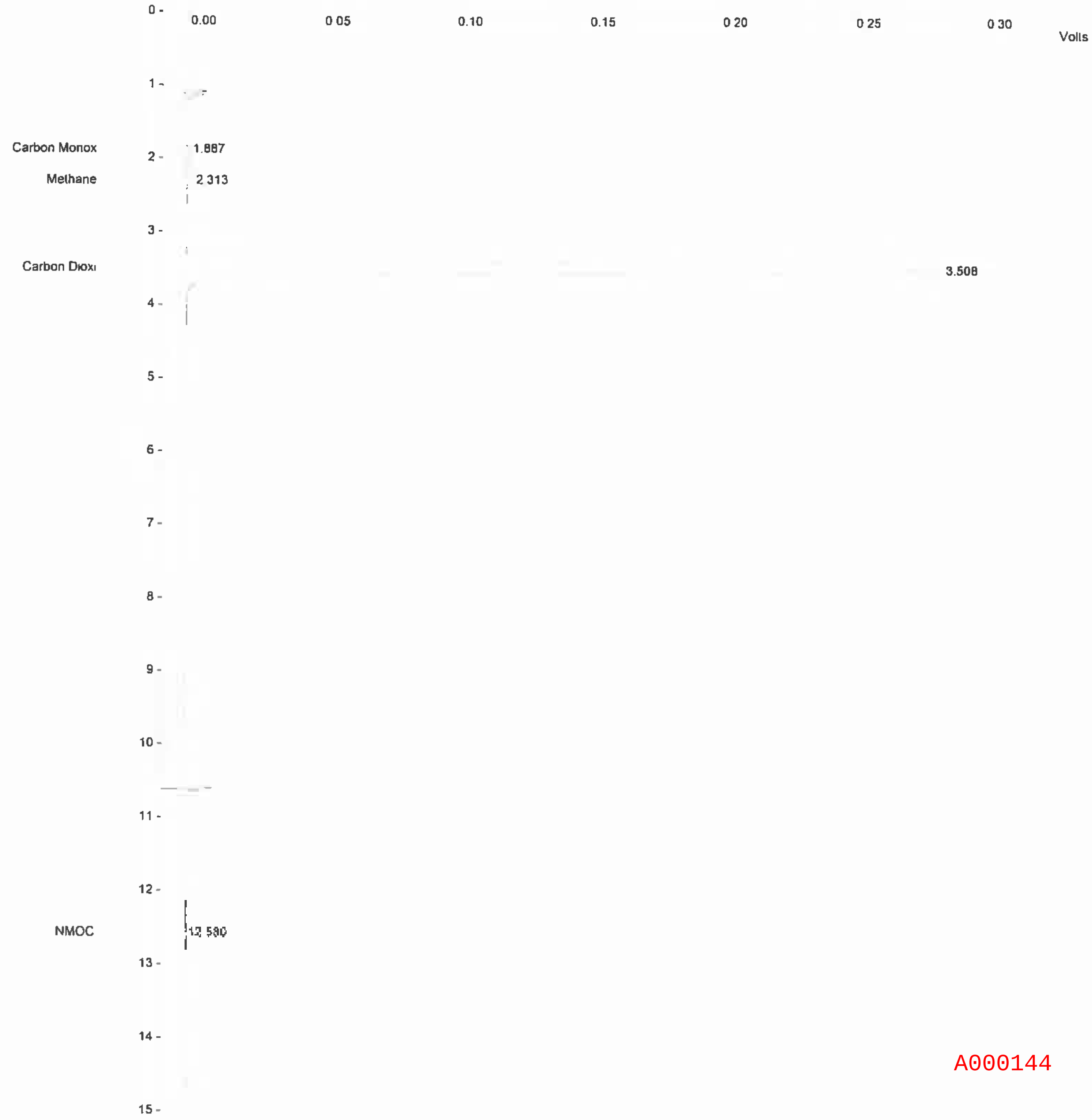
```
Print Date: Tue Feb 23 09:54:37 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 15:44:43, a 018 - 108.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID   : A 018 - 108

Injection Date: 2/22/2016 15:44    Calculation Date: 2/23/2016 09:54

Operator   : Douglass               Detector Type: 0800 (10 Volts]
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak          Result     Time  Offset       Area    Sep.  1/2   Status
  No.     Name          (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------- ------- -------- ----------- ---- ----- ------
    1 Carbon Monox      9.8868    1.900  -0.030      17902   BB    4.3
    2 Methane           9.4310    2.325   0.007      16805   BB    3.6
    3 Carbon Dioxi   1522.5566    3.516   0.014    2706111   BB    8.2
    4 Ethane                      7.541                                 M
    5 NMOC              1.1672   12.607   0.437       2003   BB   17.2
 ---- ------------ ----------- ------- -------- ----------- ---- ----- ------
      Totals:        1543.0416            0.428    2742821

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -264 microVolts          LSB:     1 microVolts

Noise (used): 38 microVolts - monitored before this run

Stream: 1      Injection Number: 1    Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 15;44;43, a 018 - 108.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 108

Injection Date: 2/22/2016 15:44    Calculation Date: 2/23/2016 09:54

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 143         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min  Min / Tick  = 1.00
```



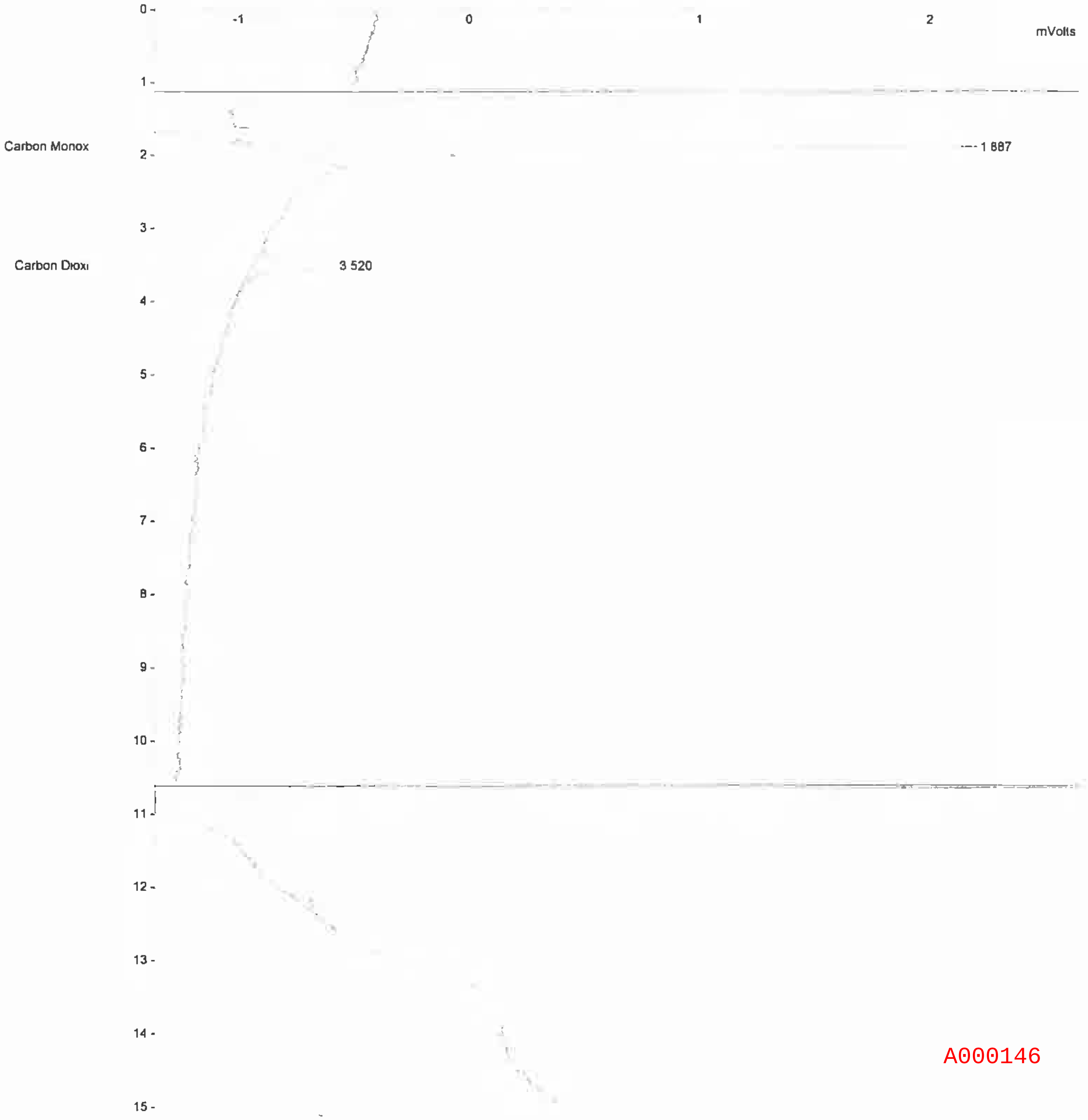
```
Print Date: Tue Feb 23 09:11:04 2016             Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 16:08:04, a 018 - 108 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 108 dup

Injection Date: 2/22/2016 16:08    Calculation Date: 2/23/2016 09:10

Operator     : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel      : 2 - Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                         Width
 Peak       Peak          Result      Time    Offset       Area      Sep.    1/2    Status
  No.       Name          (ppmC)     (min)     (min)     (counts)    Code   (sec)   Codes
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
     1 Carbon Monox     10.6800    1.887   -0.043       19339    BB    8.4
     2 Methane           9.8676    2.313   -0.005       17583    BB    3.5
     3 Carbon Dioxi   1517.3966    3.508    0.006     2696940    BB    8.2
     4 Ethane                      7.541                                       M
     5 NMOC              1.1924   12.580    0.347        2046    BB   37.7
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
       Totals:        1539.1366             0.305     2735908

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 5           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -282 microVolts          LSB:    1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1       Injection Number: 1    Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 16;08;04, a 018 - 108 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 108 dup

Injection Date: 2/22/2016 16:08    Calculation Date: 2/23/2016 09:10

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 143         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



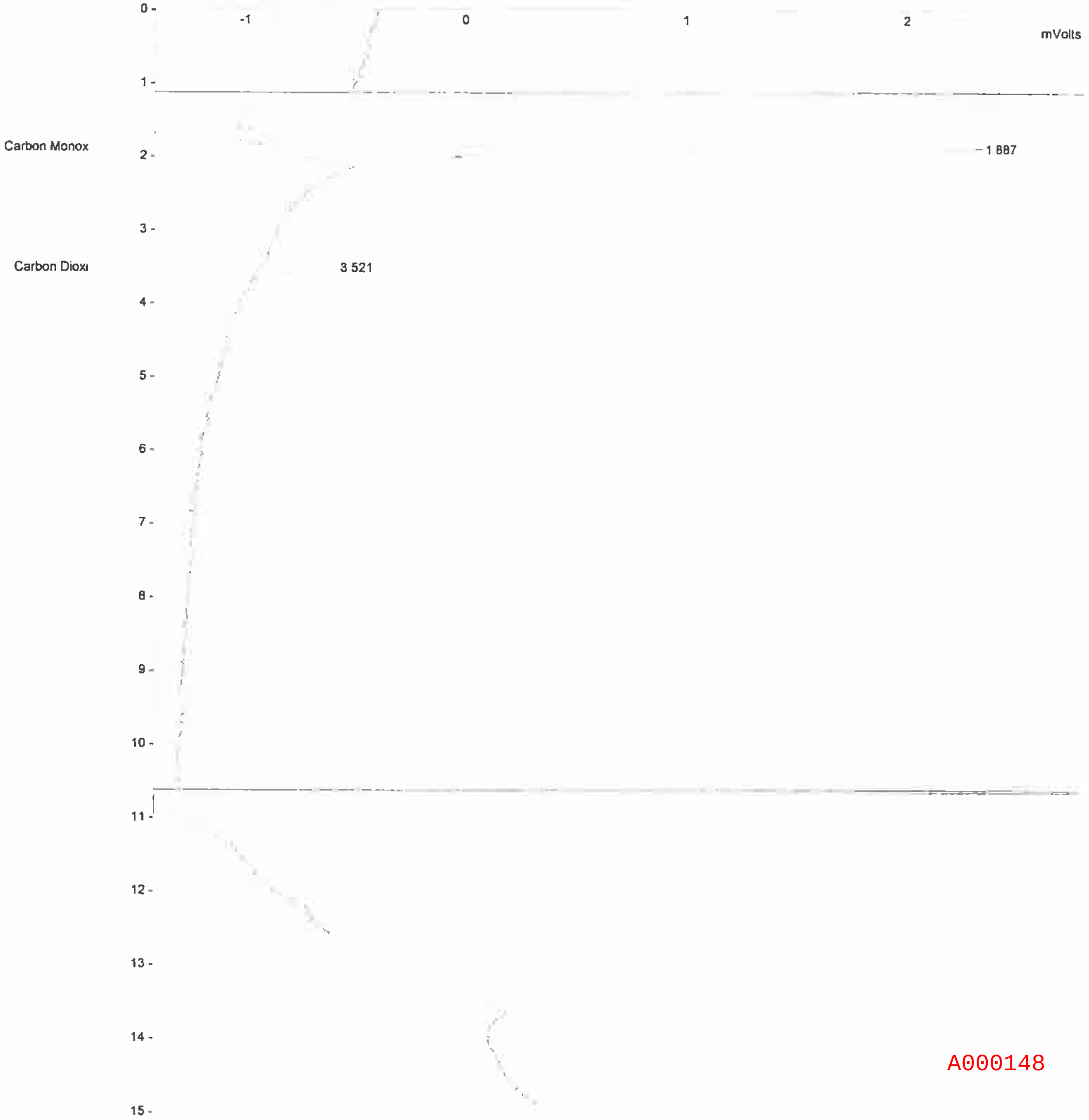
```
Print Date: Tue Feb 23 09:13:09 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-22-2016, 16;36;09, a 018 - 114 .run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 114

Injection Date: 2/22/2016 16:36      Calculation Date: 2/23/2016 09:13

Operator     : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument   : Varian Star #1          Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b 21e1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.     Time                          Width
 Peak      Peak         Result       Time    Offset       Area      Sep.   1/2    Status
 No.       Name         (ppmC)       (min)    (min)     (counts)    Code  (sec)   Codes
 ----  ------------  ----------   -------  -------  ----------    ----  -----   ------
    1  Carbon Monox      9.1640     1.887   -0.043       16594      BB    3.7
    2  Methane                      2.318                                         M
    3  Carbon Dioxi      2.0039     3.520    0.018        3562      BB    7.8
    4  Ethane                       7.541                                         M
    5  NMOC                        12.170                                         M
 ----  ------------  ----------   -------  -------  ----------    ----  -----   ------
       Totals:          11.1679            -0.025       20156

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 3            Rejected Peaks: 1        Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -368 microVolts           LSB:      1 microVolts

Noise (used): 33 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

        c9922 CRS

Appended Notes:

         c9922 CRS
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 16;36;09, a 018 - 114 .run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 114

Injection Date: 2/22/2016 16:36    Calculation Date: 2/23/2016 09:13

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1            Zero Offset = 54%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```

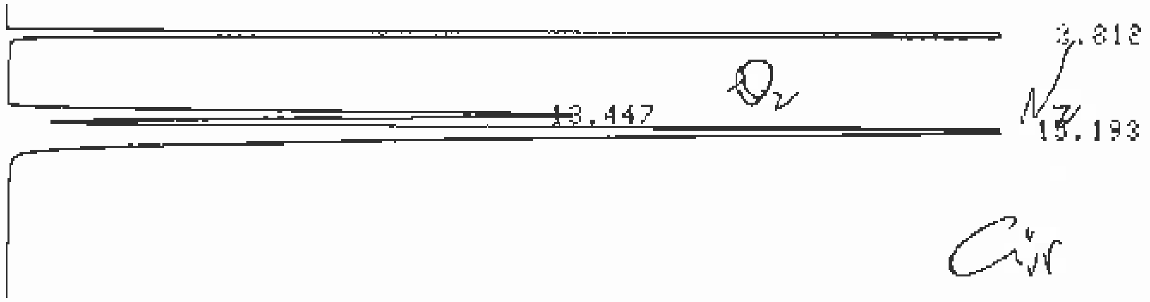


```
Print Date: Tue Feb 23 09:13:18 2016                 Page 1 of 1

Title           : SCAQMD Methods 25.x
Run File        : g:\2016\feb_16\2-22-2016, 17;04;13, a 018 - 114 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID      : A 018 - 114 dup

Injection Date: 2/22/2016 17:04     Calculation Date: 2/23/2016 09:13

Operator     : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address   : 88
Instrument  : Varian Star #1           Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10         Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                        Width
 Peak       Peak          Result     Time   Offset        Area     Sep.   1/2    Status
  No.       Name          (ppmC)     (min)   (min)      (counts)   Code  (sec)   Codes
 ---- ------------ ----------- ------- ------- ---------- ---- ----- ------
    1 Carbon Monox      9.4078   1.887  -0.043      17035   BB   3.8
    2 Methane                    2.318                                  M
    3 Carbon Dioxi      1.8250   3.521   0.019       3244   BB   7.8
    4 Ethane                     7.541                                  M
    5 NMOC                      12.170                                  M
 ---- ------------ ----------- ------- ------- ---------- ---- ----- ------
      Totals:          11.2328          -0.024      20279

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4          Rejected Peaks: 2       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -364 microVolts          LSB:      1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

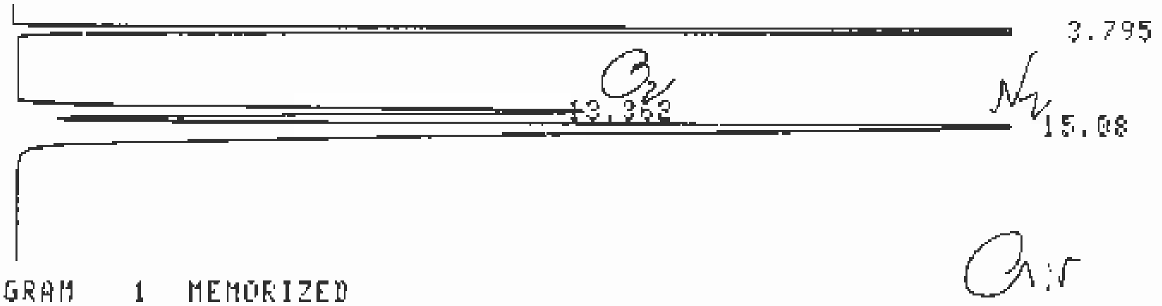
```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 17;04;13, a 018 - 114 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 114 dup

Injection Date: 2/22/2016 17:04     Calculation Date: 2/23/2016 09:13

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min    Attenuation = 1            Zero Offset = 56%
Start Time  =   0.000   min      End Time    = 15.013  min   Min / Tick  = 1.00
```



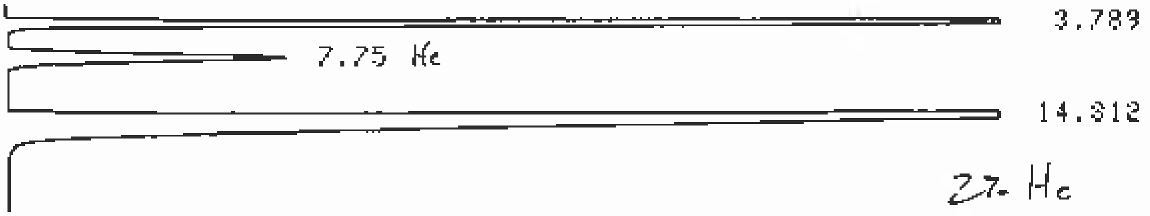
2/8



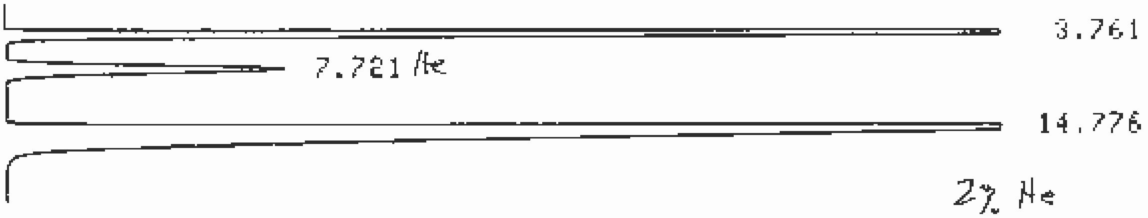
```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD         41
REPORT NO    151

PKNO        TIME        AREA  MK  IDNO       CONC         NAME

   1       3.812    8919579                   35.3257
   2      13.447    4159041                   16.4717
   3      15.193   12170924   V               48.2025
                  ----------            --------------
          TOTAL    25249544                 100
```



```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD         41
REPORT NO    152

PKNO        TIME        AREA  MK  IDNO       CONC         NAME

   1       3.795    8902833                   35.629
   2      13.362    4104789                   16.4273
   3      15.08    11979982   V               47.9437
                  ----------            --------------
          TOTAL    24987604                 100
```



```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                         FILE          0
SAMPLE NO    0                         METHOD          41
REPORT NO    157

PKNO       TIME        AREA  MK  IDNO      CONC        NAME

   1      3.789    9464463                 35.1163
   2      7.75     2340116                  8.6826
   3     14.812   15147216                 56.2011
                 ----------            -------------
         TOTAL    26951794               100
```



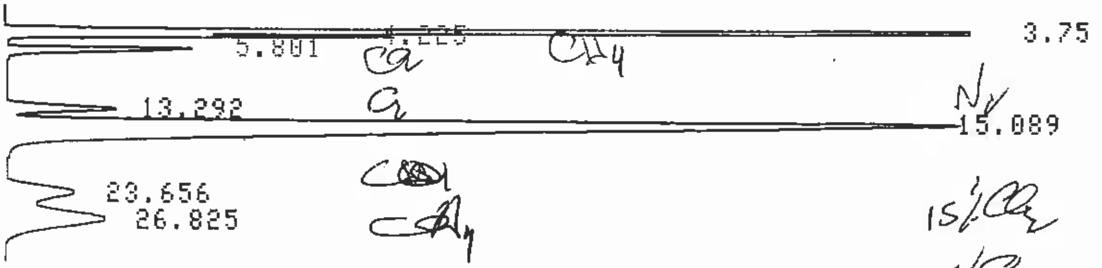
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                         FILE          0
SAMPLE NO    0                         METHOD          41
REPORT NO    158

PKNO       TIME        AREA  MK  IDNO      CONC        NAME

   1      3.761    9509387                 35.3726




   2      7.721    2334459                  8.6836
   3     14.776   15039600                 55.9437
                 ----------            -------------
         TOTAL    26883446               100
```

078

223-02037-02

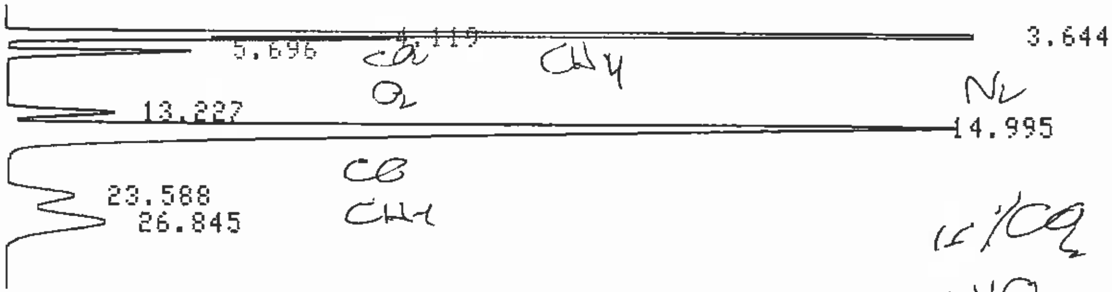
131215

Shimadzu



15% CO2
4% O2

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD          41
REPORT NO    153

PKNO        TIME        AREA   MK   IDNO       CONC        NAME



    1      3.75     6963007                  29.5121
    2      4.225    1063810   V                4.5089
    3      5.801     890254   V                3.7733
    4     13.292     804321                    3.409
    5     15.089   10926177   V              46.3097
    6     23.656    1032760                    4.3773
    7     26.825    1913386   V                8.1097
                  ---------           -------------
        TOTAL     23593712                 100
```

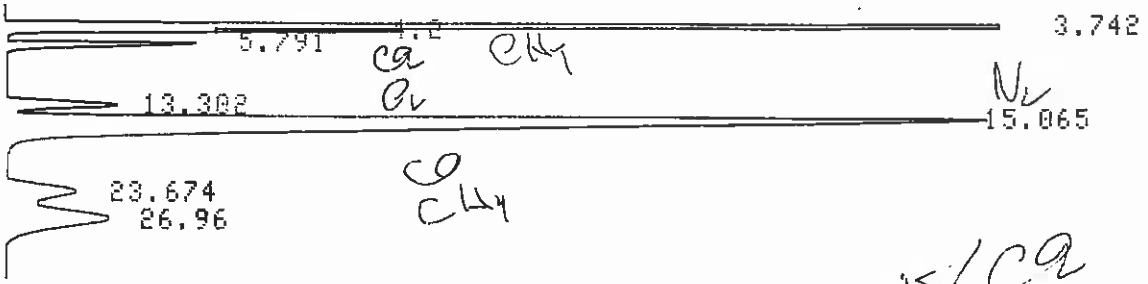


15% CO2
4% O2

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD          41
REPORT NO    154

PKNO        TIME        AREA   MK   IDNO       CONC        NAME

    1      3.644    6910781                  29.3509
    2      4.119    1081567   V                4.5935
    3      5.696     884500   V                3.7566
    4     13.227     803281                    3.4116
    5     14.995   10917834   V              46.3693
    6     23.588    1028995                    4.3703
    7     26.845    1918418   V                8.1477
                  ---------           -------------
        TOTAL     23545374                 100
```

⊕ Shimadzu

077



15% CO2

4/92

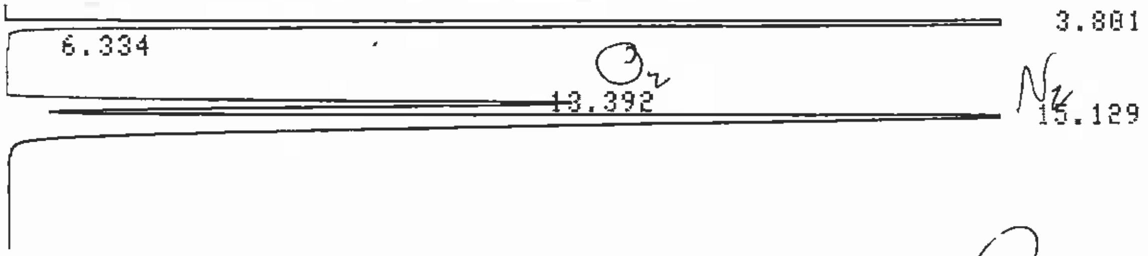
2037-02

131215

⊕ Shimadzu

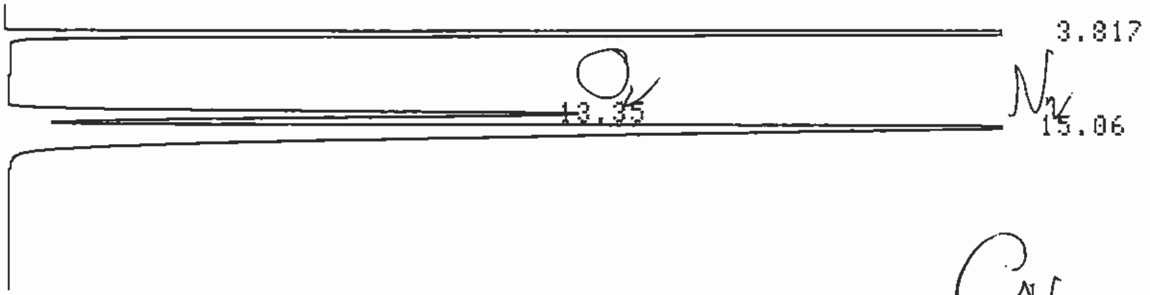
```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   172

PKNO       TIME        AREA   MK  IDNO      CONC         NAME

   1      3.742    6891961                   29.2221
   2      4.2      1088197    V               4.614
   3      5.791     882316    V               3.741
   4     13.302     802293                    3.4017
   5     15.065   10939394    V              46.3833
   6     23.674    1053030                    4.4649



   7     26.96     1927563    V               8.1729
                 ---------          -------------
         TOTAL    23584750                100
```

2/9



Air

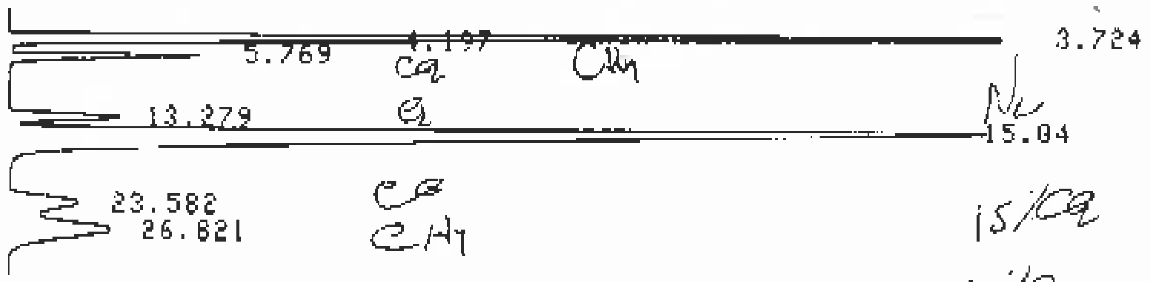
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                         FILE         0
SAMPLE NO    0                         METHOD        41
REPORT NO    174

PKNO        TIME        AREA   MK   IDNO       CONC         NAME

   1       3.801    8929050                   35.4332
   2       6.334       7412                    0.0294
   3      13.392    4127181                   16.3779
   4      15.129   12136036    V              48.1595
                  ----------             -------------
          TOTAL    25199678                  100
```



Air

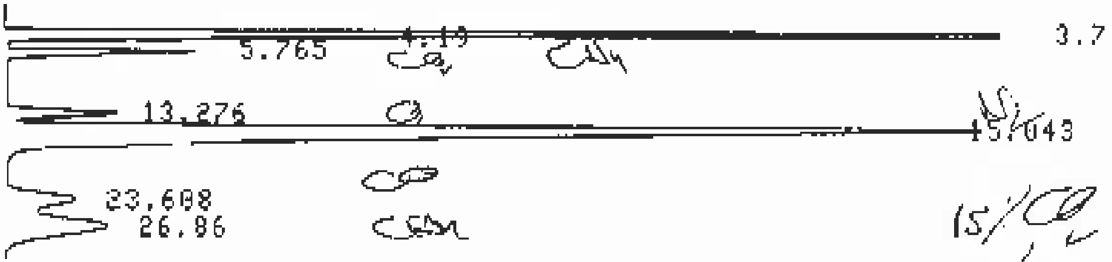
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                         FILE         0
SAMPLE NO    0                         METHOD        41
REPORT NO    175




PKNO        TIME        AREA   MK   IDNO       CONC         NAME

   1       3.817    8913127                   35.6442
   2      13.35     4103764                   16.4112
   3      15.06    11988923    V              47.9445
                  ----------             -------------
          TOTAL    25005814                  100
```

23-02037-02 131215



15/CO2
4/O2

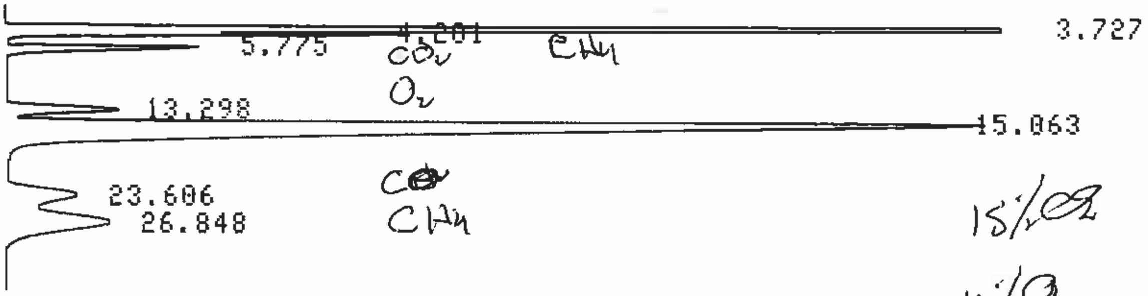
```
CHROMATOGRAM    1  MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE        0
SAMPLE NO    0                          METHOD        41
REPORT NO    176

PKNO       TIME        AREA   MK   IDNO      CONC        NAME

   1       3.724    6897602                 29.4631
   2       4.197    1068135   V              4.5625
   3       5.769     878551                  3.7527
   4      13.279     796705                  3.4031
   5      15.04    10848033   V             46.3374
   6      23.582    1023389                  4.3714
   7      26.821    1898565   V              8.1097
                  ---------           ------------
         TOTAL    23410980                100
```



15/CO2
4/O2

```
CHROMATOGRAM    1  MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE        0
SAMPLE NO    0                          METHOD        41
REPORT NO    177

PKNO       TIME        AREA   MK   IDNO      CONC        NAME

   1       3.7      6856302                 29.3629
   2       4.19     1065926   V              4.565
   3       5.765     874005   V              3.743
   4      13.276     799335                  3.4232
   5      15.043   10842092   V             46.4325
   6      23.688    1021561                  4.375
   7      26.86     1890999   V              8.0984
                  ---------           ------------
         TOTAL    23350216                100
```

085
223-02037-02
131215
⊕ Shimadzu



15% O2

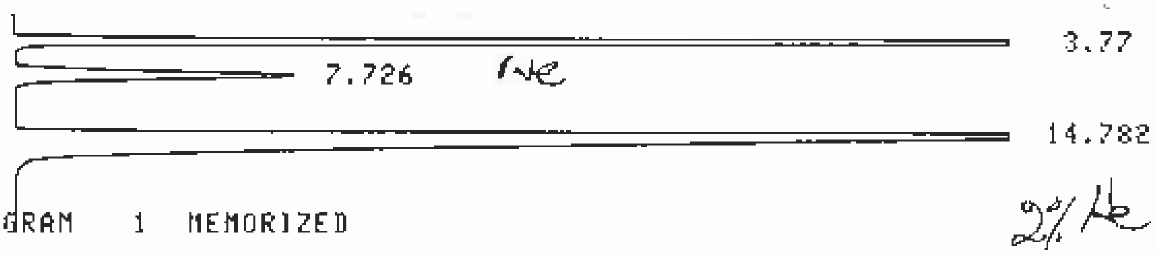
4% O2

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE       0
SAMPLE NO    0                    METHOD       41
REPORT NO    197

PKNO       TIME       AREA   MK  IDNO       CONC        NAME

   1      3.727    6976819                29.6736
   2      4.201    1070814   V             4.5544
   3      5.775     888659   V             3.7796
   4     13.298     805435                 3.4257
   5     15.063   10853461   V            46.1617
   6     23.606    1025427                 4.3613
   7     26.848    1891231   V             8.0437
                 ---------          -------------
         TOTAL    23511842              100
```

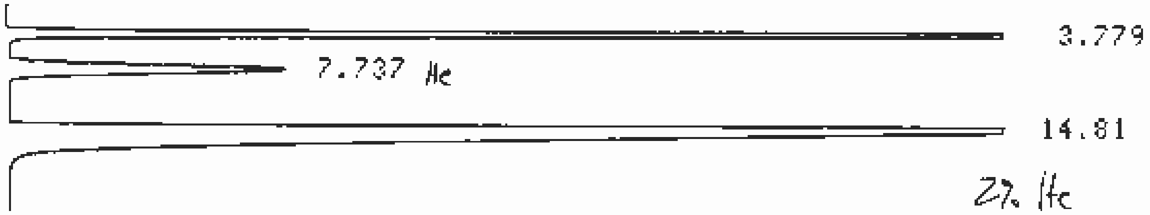
223-02037-02

131215

⊕ Shimadzu



```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                      FILE         0
SAMPLE NO    0                      METHOD          41
REPORT NO    178

PKNO       TIME        AREA   MK   IDNO       CONC         NAME

   1       3.77     9450667                   35.1257
   2      7.726     2340457                    8.6989
   3     14.782    15114126                   56.1754
                  ---------            -------------
          TOTAL    26905248                  100
```

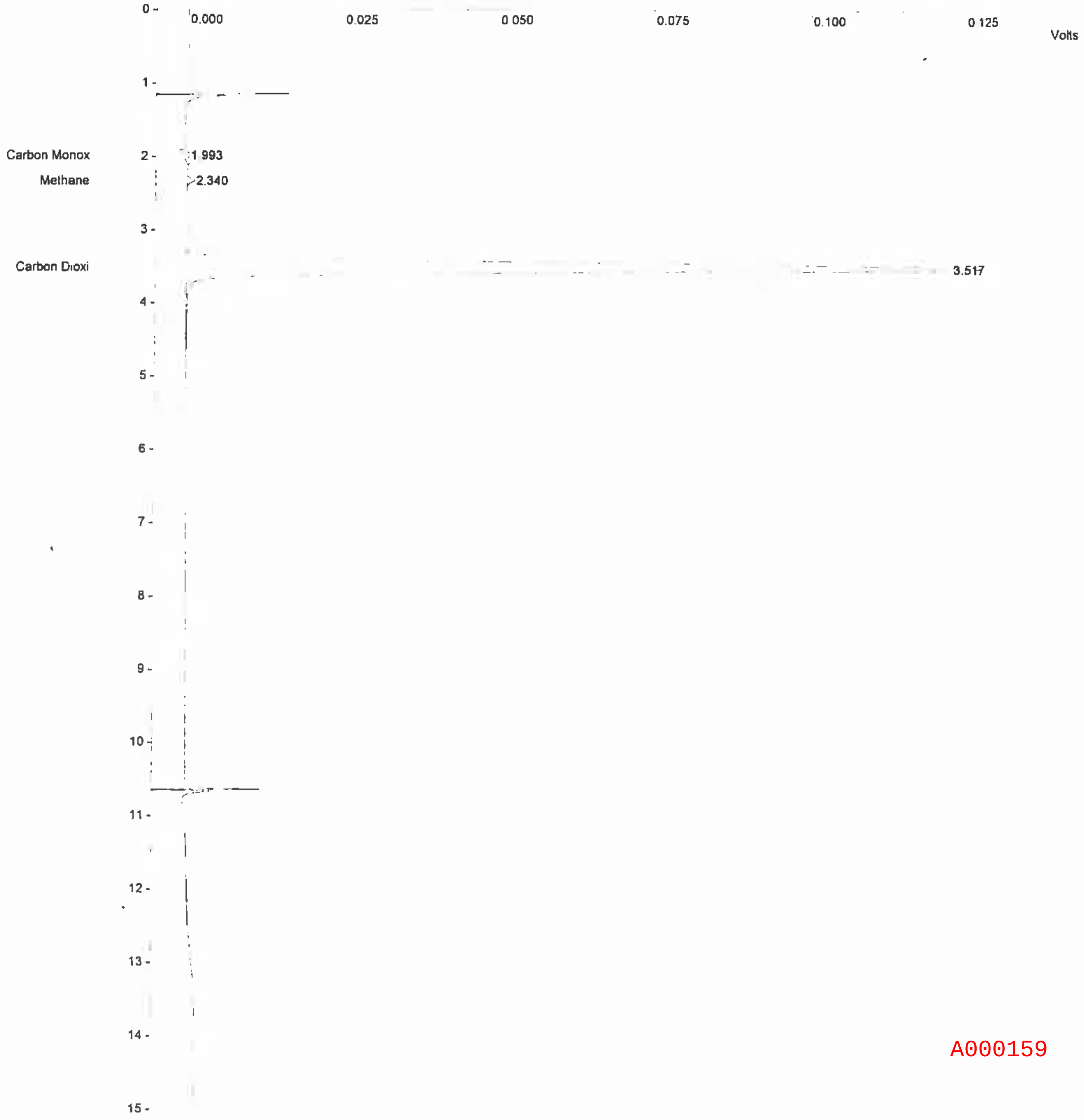


```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                      FILE         0
SAMPLE NO    0                      METHOD          41
REPORT NO    179

PKNO       TIME        AREA   MK   IDNO       CONC         NAME

   1      3.779     9387826                   35.0923
   2      7.737     2326104                    8.6951
   3      14.81    15037862                   56.2125
                  ---------            -------------
          TOTAL    26751792                  100
```

QAQC

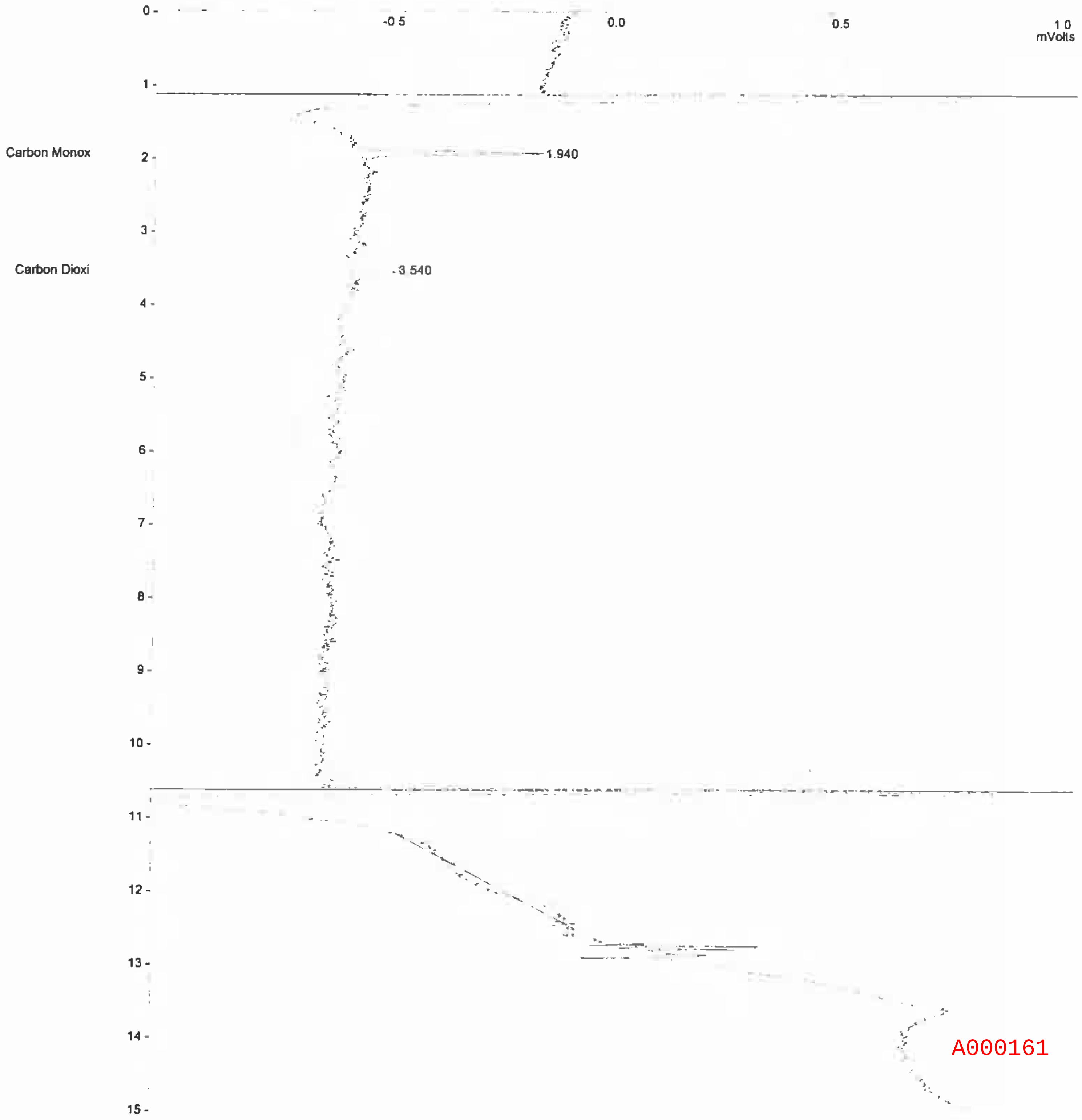
```
Print Date: Fri Feb 19 11:42:46 2016                 Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-19-2016, 08:50:05, lab air.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/19/2016 08:50      Calculation Date: 2/19/2016 11:42

Operator     : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                            Bus Address   : 08
Instrument : Varian Star #1             Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10         Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.     Time                           Width
 Peak      Peak           Result        Time    Offset        Area      Sep.     1/2     Status
  No.      Name           (ppmC)        (min)    (min)      (counts)    Code    (sec)    Codes
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
    1  Carbon Monox       4.4847    1.993    0.063        8155    BB   28.7
    2  Methane            2.5424    2.340    0.022        4526    BB    3.5
    3  Carbon Dioxi     635.2827    3.517    0.015     1127696    BB    8.2
    4  Ethane                       7.541                                        M
    5  NMOC                        12.233                                        M
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
       Totals:          642.3098             0.100     1140377

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 6           Rejected Peaks: 3       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -59 microVolts          LSB:      1 microVolts

Noise (used): 23 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-19-2016, 08;50;05, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : lab air

Injection Date: 2/19/2016 08:50    Calculation Date: 2/19/2016 11:42

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 61          Zero Offset = 3%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



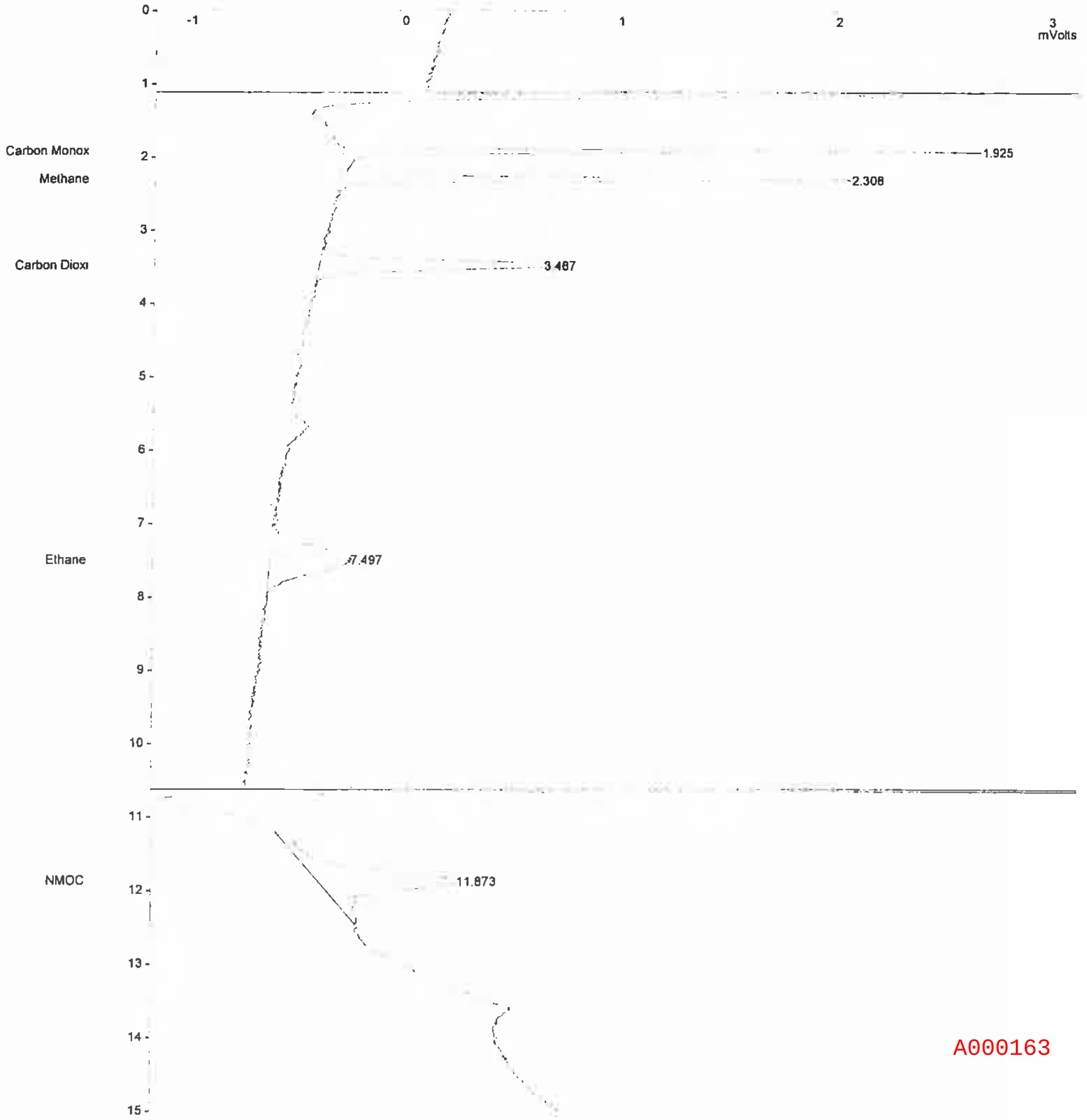
```
Print Date: Fri Feb 19 11:43:29 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 09;17;38, n2 blank a129.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank A129

Injection Date: 2/19/2016 09:17      Calculation Date: 2/19/2016 11:43

Operator    : Douglass                   Detector Type: 0800 (10 Volts)
Workstation:                             Bus Address  : 88
Instrument : Varian Star #1              Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10           Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                          Width
 Peak      Peak          Result       Time    Offset        Area      Sep.    1/2    Status
  No.      Name          (ppmC)      (min)    (min)       (counts)    Code   (sec)   Codes
 ----  ------------  -----------  -------  -------  -----------   ----   -----   ------
    1  Carbon Monox       0.7017    1.940    0.010         1276     BB     2.8
    2  Methane                      2.318                                          M
    3  Carbon Dioxi       0.6089    3.540    0.038         1081     BB     8.2
    4  Ethane                       7.541                                          M
    5  NMOC                        12.233                                          M
 ----  ------------  -----------  -------  -------  -----------   ----   -----   ------
       Totals:            1.3106             0.048         2357

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4          Rejected Peaks: 2        Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -59 microVolts           LSB:     1 microVolts

Noise (used): 80 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

******************************************************************************
```

```
Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-19-2016, 09;17;38, n2 blank a129.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : n2 blank A129

Injection Date: 2/19/2016 09:17     Calculation Date: 2/19/2016 11:43

Operator     : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                            Bus Address  : 88
Instrument  : Varian Star #1            Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 40%
Start Time  =   0.000    min     End Time    = 15.013  min   Min / Tick  = 1.00
```



```
Print Date: Fri Feb 19 11:44:25 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 10;10;05, 5ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/19/2016 10:10    Calculation Date: 2/19/2016 11:44

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                        Width
 Peak      Peak          Result       Time   Offset      Area       Sep.   1/2    Status
  No.      Name          (ppmC)       (min)   (min)     (counts)    Code  (sec)   Codes
 ----  ------------  -----------  -------  -------  -----------  ----  -----  ------
    1  Carbon Monox       5.0599    1.925   -0.005         9201    BV    2.7
    2  Methane            5.4206    2.308   -0.010         9649    VB    3.7
    3  Carbon Dioxi       5.7621    3.487   -0.015        10228    BB    8.2
    4  Ethane             5.2658    7.497   -0.044         9322    PB   21.7
    5  NMOC               7.9709   11.873   -0.360        13672    BB   21.3
 ----  ------------  -----------  -------  -------  -----------  ----  -----  ------
       Totals:           29.4793            -0.434        52072

Total Unidentified Counts :           0 counts

Detected Peaks: 6           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 227 microVolts          LSB:      1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*********************************************************************************
```

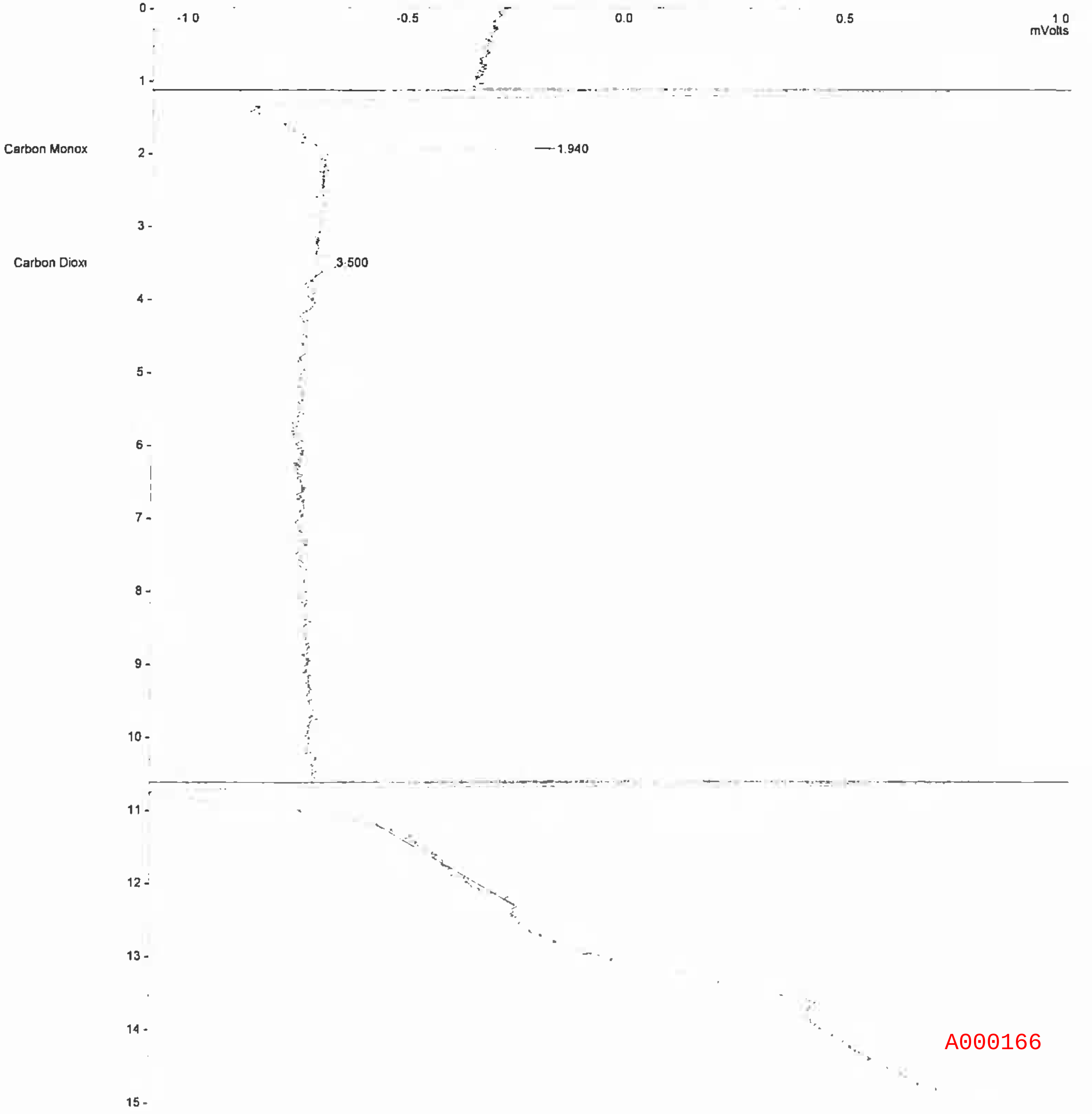
```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 10;10;05, 5ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/19/2016 10:10    Calculation Date: 2/19/2016 11:44

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 46%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



```
Print Date: Fri Feb 19 11:45:20 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 10:33:53, 5ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/19/2016 10:33    Calculation Date: 2/19/2016 11:45

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 08
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                    Ret.    Time                       Width
 Peak      Peak         Result     Time   Offset       Area     Sep.   1/2    Status
 No.       Name         (ppmC)     (min)   (min)     (counts)   Code  (sec)   Codes
 ---- ------------- ----------- ------- ------- ----------- ---- -----  ------
    1 Carbon Monox      4.8866   1.927  -0.003        8886   BB    2.8
    2 Methane           5.1117   2.300  -0.018        9099   BB    3.7
    3 Carbon Dioxi      5.6199   3.492  -0.010        9976   BB    8.2
    4 Ethane            4.9631   7.527  -0.014        8786   BB   21.7
    5 NMOC              8.1570  11.887  -0.346       13991   BB   21.8
 ---- ------------- =========== ======= ======= =========== ---- -----  ------
      Totals:          28.7383          -0.391       50738

Total Unidentified Counts :            0 counts

Detected Peaks: 5            Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -129 microVolts          LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 3     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

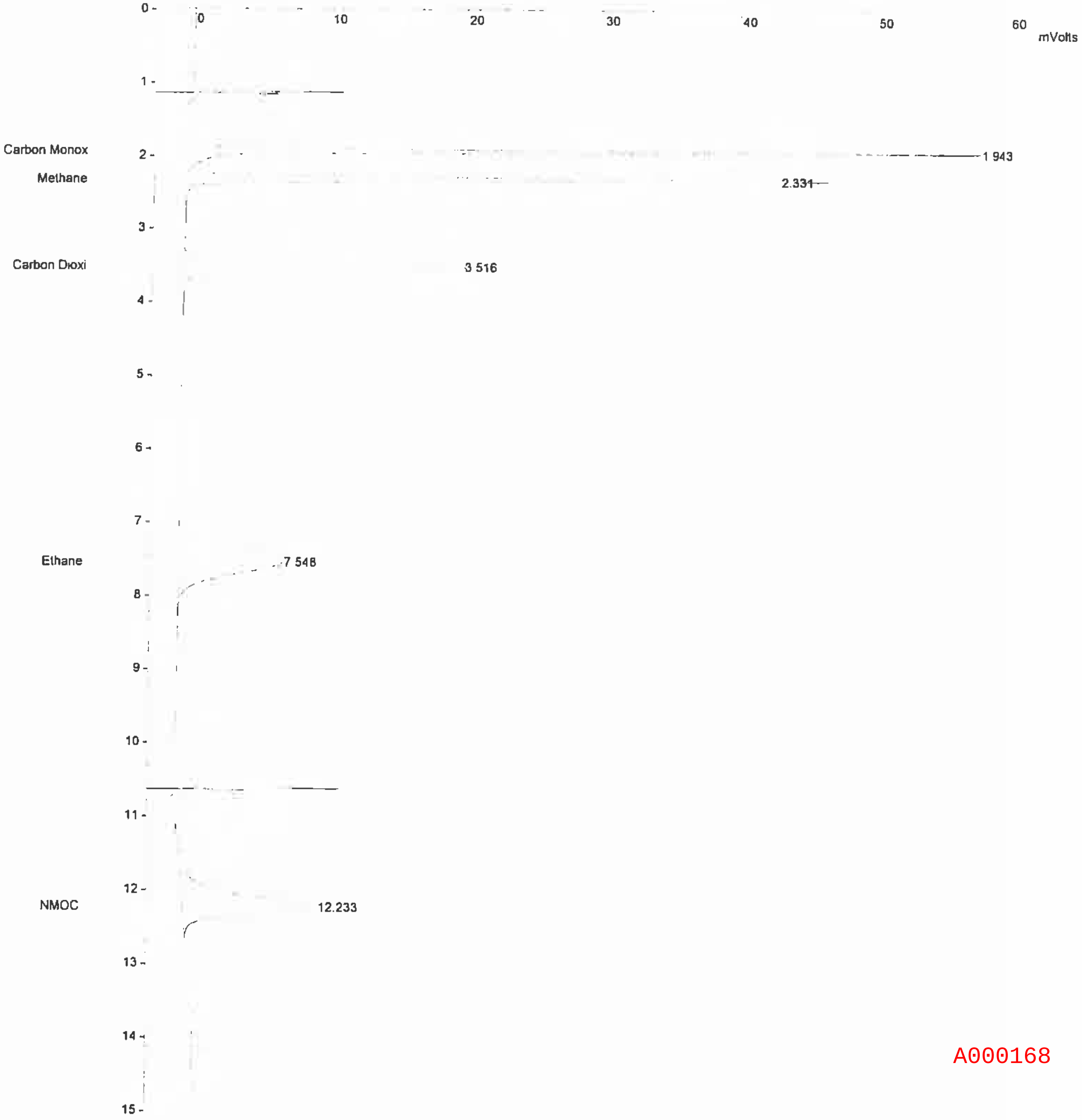
```
Print Date: Fri Feb 19 11:43:50 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 10;57;12, n2 blank 91189.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank 91189

Injection Date: 2/19/2016 10:57     Calculation Date: 2/19/2016 11:43

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 1D        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                        Width
 Peak      Peak           Result     Time    Offset       Area     Sep.   1/2    Status
 No.       Name           (ppmC)     (min)   (min)      (counts)   Code  (sec)   Codes
 ---- ------------- ----------- ------- ------- ----------- ---- ----- ------
    1 Carbon Monox       0.8812   1.940   0.010        1602   BB    2.8
    2 Methane                      2.318                                 M
    3 Carbon Dioxi       0.3069   3.500  -0.002         545   BB    8.2
    4 Ethane                       7.541                                 M
    5 NMOC                        12.233                                 M
 ---- ------------- ----------- ------- ------- ----------- ---- ----- ------
      Totals:            1.1881           0.008        2147

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 2       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -238 microVolts          LSB:     1 microVolts

Noise (used): 28 microVolts - monitored before this run

Stream: 1      Injection Number: 1     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*****************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-19-2016, 10;57;12, n2 blank 91189.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : n2 blank 91189

Injection Date: 2/19/2016 10:57    Calculation Date: 2/19/2016 11:43

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 42%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



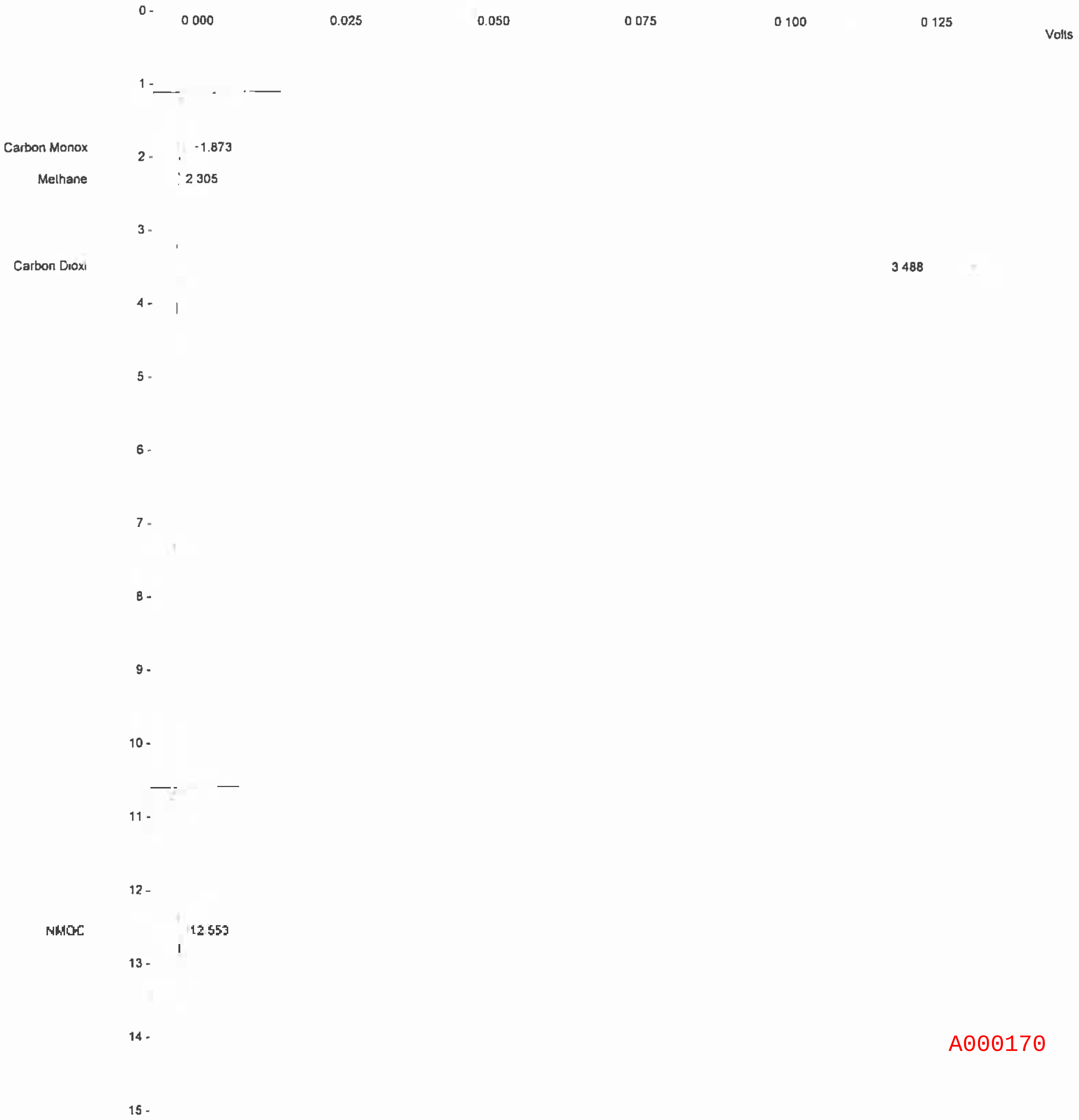
```
Print Date: Mon Feb 22 09:19:27 2016             Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 18:58:43, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/19/2016 18:58    Calculation Date: 2/22/2016 09:19

Operator    : Douglass                Detector Type: 08D0 (10 Volts)
Workstation:                          Bus Address   : 88
Instrument : Varian Star #1           Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                    Ret.    Time                        Width
 Peak      Peak         Result      Time   Offset       Area      Sep.  1/2    Status
  No.      Name         (ppmC)      (min)   (min)     (counts)    Code  (sec)  Codes
 ---- ------------- ----------  ------- -------  ----------  ----  -----  ------
    1 Carbon Monox    96.5492    1.943   0.013      174826    BV    2.6
    2 Methane        105.4752    2.331   0.013      187947    VB    3.6
    3 Carbon Dioxi   105.8441    3.516   0.014      188122    BB    8.2
    4 Ethane         104.4768    7.548   0.007      184990    BB   22.5
    5 NMOC           105.5107   12.233   0.000      181048    BB   16.3
 ---- ------------- ----------  ------- -------  ----------  ----  -----  ------
      Totals:        517.8560            0.047      916933

Total Unidentified Counts :           0 counts

Detected Peaks: 5           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 81 microVolts           LSB:      1 microVolts

Noise (used): 19 microVolts - monitored before this run

Stream: 3      Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-19-2016, 18;58;43, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/19/2016 18:58    Calculation Date: 2/22/2016 09:19

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27          Zero Offset = 4%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick   = 1.00
```



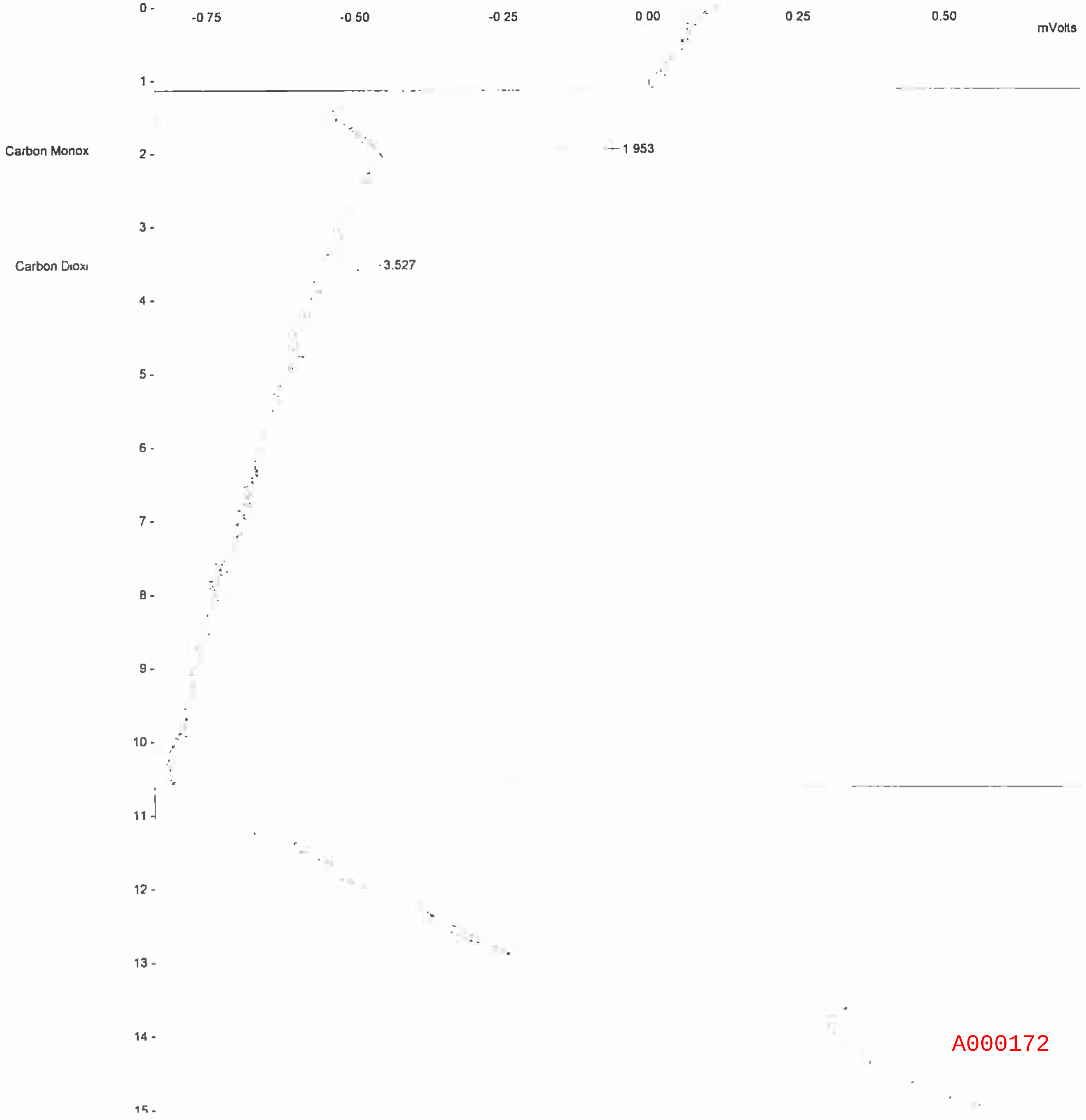
```
Print Date: Mon Feb 29 13:40:19 2016                    Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 09;35;12, lab air.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/22/2016 09:35     Calculation Date: 2/29/2016 13:40

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                         Width
 Peak       Peak         Result       Time    Offset        Area      Sep.   1/2    Status
  No.       Name         (ppmC)       (min)    (min)      (counts)    Code  (sec)   Codes
 ---- ------------ ----------- -------- -------- ----------- ---- -----  ------
    1 Carbon Monox      6.6068    1.873   -0.057       11963   BB    2.0
    2 Methane           2.2919    2.305   -0.013        4084   BB    3.5
    3 Carbon Dioxi    672.4500    3.488   -0.014     1195177   BB    8.2
    4 Ethane                      7.541                                     M
    5 NMOC              8.9687   12.553    0.320       15390   BB    8.8
 ---- ------------ ----------- -------- -------- ----------- ---- -----  ------
      Totals:         690.3174              0.236     1226614

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 329 microVolts          LSB:      1 microVolts

Noise (used): 16 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 09;35;12, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : lab air

Injection Date: 2/22/2016 09:35    Calculation Date: 2/29/2016 13:40

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 64          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



```
Print Date: Mon Feb 29 13:40:26 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 09:58:26, n2 blank e0009.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank e0009

Injection Date: 2/22/2016 09:58    Calculation Date: 2/29/2016 13:40

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                          Width
 Peak      Peak         Result        Time   Offset       Area      Sep.   1/2     Status
  No.      Name         (ppmC)        (min)   (min)     (counts)    Code   (sec)   Codes
 ----  ------------  -----------   -------  -------  -----------   ----   -----   ------
    1  Carbon Monox       0.6579     1.953    0.023         1191     BB     2.8
    2  Methane                       2.318                                         M
    3  Carbon Dioxi       0.5307     3.527    0.025          943     BB     9.2
    4  Ethane                        7.541                                         M
    5  NMOC                         12.233                                         M
 ----  ------------  -----------   -------  -------  -----------   ----   -----   ------
       Totals:            1.1886              0.048         2134

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 3           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 144 microVolts          LSB:      1 microVolts

Noise (used): 23 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 09;58;26, n2 blank e0009.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : n2 blank e0009

Injection Date: 2/22/2016 09:58    Calculation Date: 2/29/2016 13:40

Operator    : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                       Bus Address  : 88
Instrument : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10     Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1            Zero Offset = 33%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```

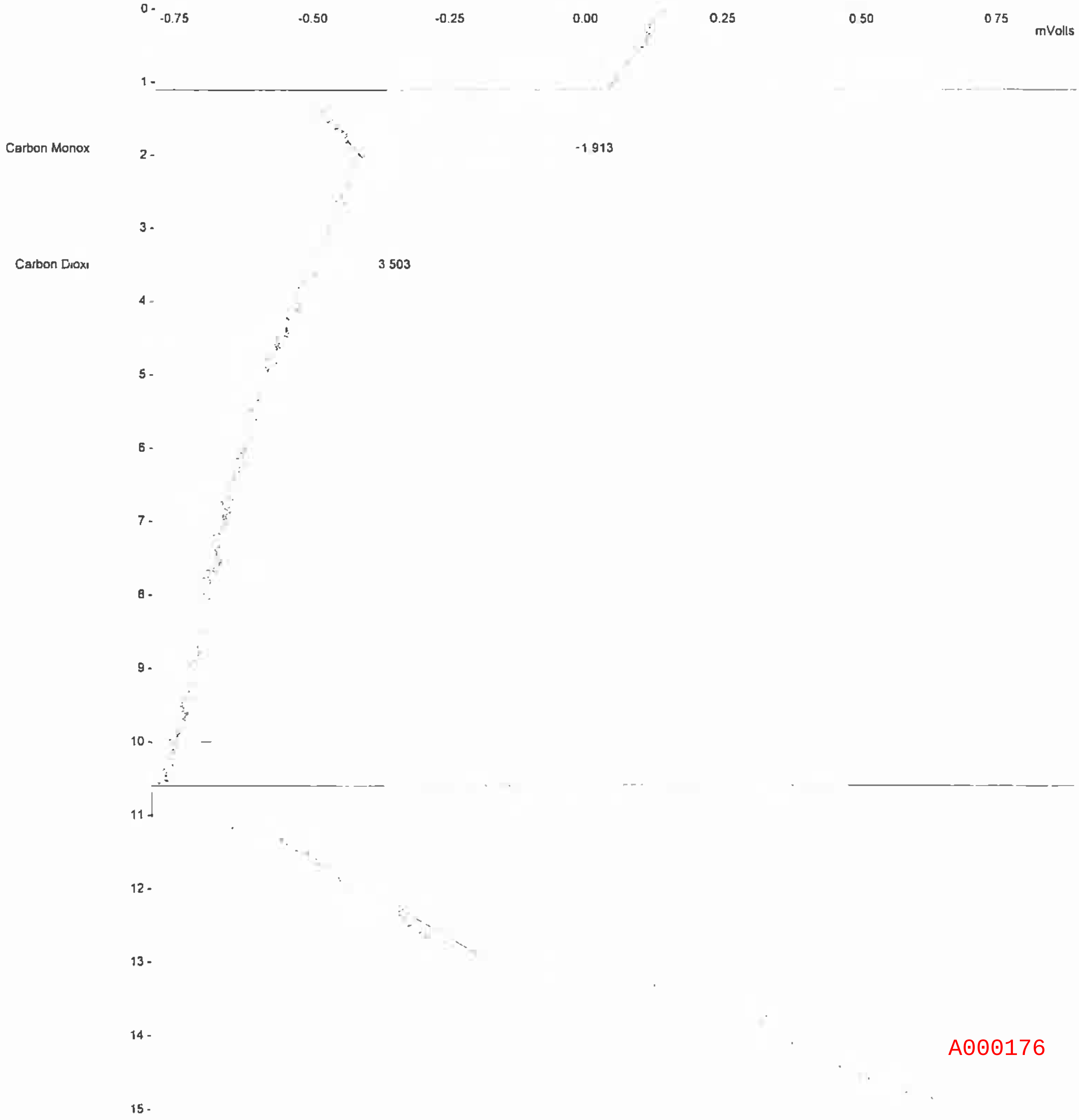


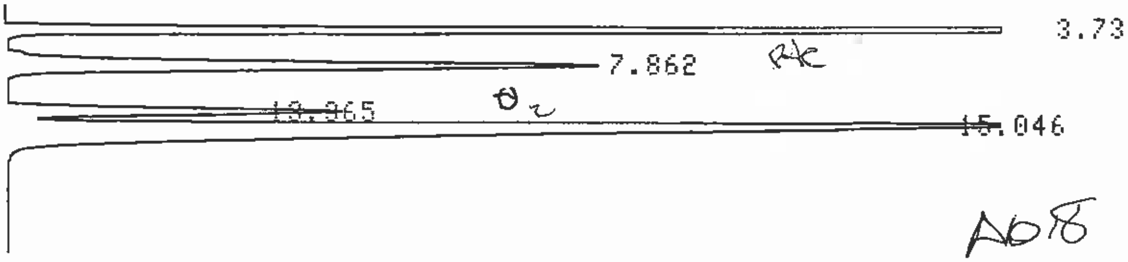
```
Print Date: Mon Feb 29 13:41:02 2016                    Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-22-2016, 11:20:40, 100ppm mix.run
Method File   : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : 100ppm mix

Injection Date: 2/22/2016 11:20    Calculation Date: 2/29/2016 13:40

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 89
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                   Ret.    Time                      Width
 Peak      Peak         Result     Time   Offset      Area     Sep.   1/2    Status
 No.       Name         (ppmC)     (min)   (min)    (counts)   Code  (sec)   Codes
 ----  ------------- ----------- ------- -------  ----------   ----  -----  ------
    1  Carbon Monox     97.7355    1.936   0.006     176974     BV     2.7
    2  Methane         107.3887    2.324   0.006     191356     VB     3.7
    3  Carbon Dioxi    105.9413    3.507   0.005     188294     BB     8.2
    4  Ethane          106.2411    7.532  -0.009     188114     BB    22.6
    5  NMOC            104.3470   12.247   0.014     179051     BB    16.2
 ----  ------------- =========== ------- =======  ==========   ----  -----  ------
       Totals:         521.6536            0.022     923789

Total Unidentified Counts :            0 counts

Detected Peaks: 5          Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 99 microVolts          LSB:      1 microVolts

Noise (used): 36 microVolts - monitored before this run

Stream: 1      Injection Number: 3     Sampling Time:    0.00 min

Original Notes:


Appended Notes:
*****************************************************************************
```

```
Print Date: Mon Feb 29 13:41:10 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-22-2016, 10:52:58, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/22/2016 10:52     Calculation Date: 2/29/2016 13:40

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument : Varian Star #1            Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.     Time                        Width
 Peak       Peak           Result      Time    Offset       Area      Sep.   1/2    Status
  No.       Name           (ppmC)      (min)    (min)     (counts)    Code  (sec)   Codes
 ---- ------------ ----------  -------  -------  ----------  ----  -----   ------
    1 Carbon Monox    97.1536    1.907   -0.023      175921    BV    2.7
    2 Methane        106.6070    2.296   -0.022      189963    VB    3.6
    3 Carbon Dioxi   105.5047    3.483   -0.019      187518    BB    8.2
    4 Ethane         106.2638    7.517   -0.024      188155    BB   22.6
    5 NMOC           102.9488   12.207   -0.026      176652    BB   16.0
 ---- ------------ ==========  -------  -------  ----------  ----  -----   ------
      Totals:        518.4779            -0.114      918209

Total Unidentified Counts :            0 counts

Detected Peaks: 6          Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -32 microVolts          LSB:     1 microVolts

Noise (used): 20 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Print Date: Mon Feb 29 13:40:33 2016               Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-22-2016, 11;43;26, n2 blank 91184.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID     : n2 blank 91184

Injection Date: 2/22/2016 11:43     Calculation Date: 2/29/2016 13:40

Operator    : Douglass                    Detector Type: 0800 (10 Volts)
Workstation:                              Bus Address   : BB
Instrument : Varian Star #1               Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10            Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588 d6b-21e1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.    Time                          Width
 Peak      Peak            Result       Time    Offset         Area     Sep.   1/2    Status
 No.       Name            (ppmC)       (min)    (min)       (counts)   Code  (sec)   Codes
 ----  ------------  -----------  -------  -------  -----------  ----  -----  ------
    1  Carbon Monox       0.7193    1.913   -0.017         1302    BB    3.0
    2  Methane                      2.318                                        M
    3  Carbon Dioxi       0.7391    3.503    0.001         1314    BB    8.9
    4  Ethane                       7.541                                        M
    5  NMOC                        12.233                                        M
 ----  ------------  -----------  -------  -------  -----------  ----  -----  ------
       Totals:            1.4584            -0.016         2616

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 3            Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 175 microVolts          LSB:      1 microVolts

Noise (used): 14 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

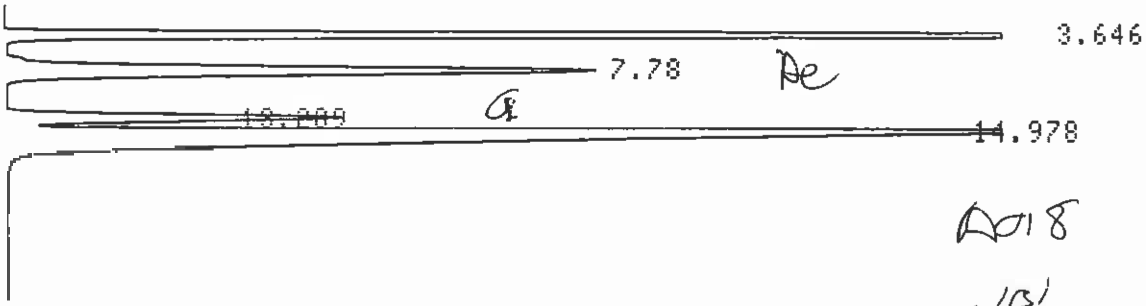
```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 11;43;26, n2 blank 91184.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank 91184

Injection Date: 2/22/2016 11:43    Calculation Date: 2/29/2016 13:40

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 30%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```





A018
-101

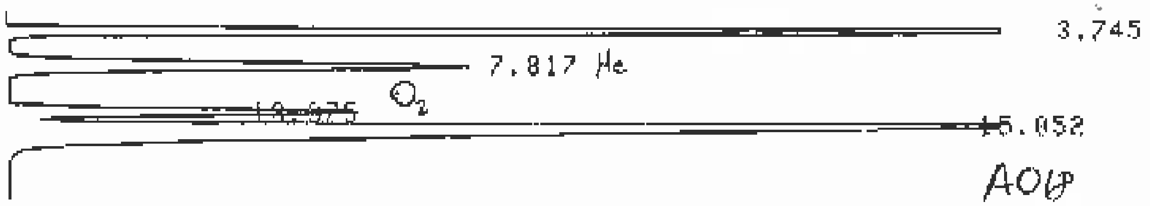
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                            FILE         0
SAMPLE NO    0                            METHOD        41
REPORT NO    155

PKNO        TIME         AREA   MK   IDNO       CONC         NAME

   1       3.73    10840849                    35.1141
   2       7.862    5184300                    16.7922
   3      13.365    2388129                     7.7353
   4      15.046   12459899   V                40.3583
                  ----------              --------------
          TOTAL    30873174                  100

CHROMATOGRAM    1   MEMORIZED




WARNING NO PEAK
```



A018
-101
dy

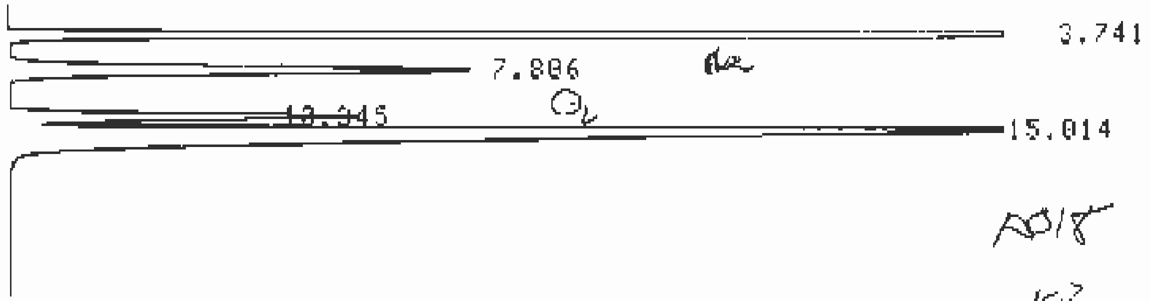
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                            FILE         0
SAMPLE NO    0                            METHOD        41
REPORT NO    156

PKNO        TIME         AREA   MK   IDNO       CONC         NAME

   1       3.646   10856757                    35.1
   2       7.78     5165399                    16.6998
   3      13.289    2394520                     7.7415
   4      14.978   12514249   V                40.4587
                  ----------              --------------
          TOTAL    30930924                  100
```

3-02037-02 131215 ⊕ Shimadzu



A018
– 102

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD        41
REPORT NO    159

PKNO        TIME        AREA   MK  IDNO      CONC        NAME

   1       3.745   10490215                35.2972
   2       7.817    3983788                13.4045
   3      13.375    2490618                 8.3804
   4      15.052   12755094    V            42.918
                  ----------           ------------

           TOTAL    29719712                100
```



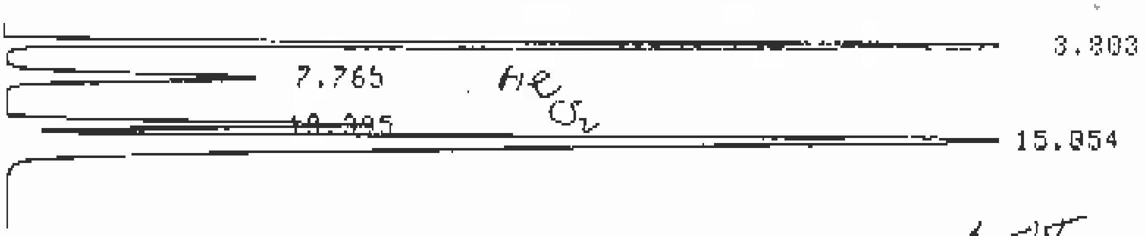
A018
– 102

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD        41
REPORT NO    160

PKNO        TIME        AREA   MK  IDNO      CONC        NAME

   1       3.741   10457312                35.359
   2       7.806    3972487                13.432
   3      13.345    2479152                 8.3827
   4      15.014   12665750    V            42.8263
                  ----------           ------------

           TOTAL    29574700                100
```

079

223-02037-02

131215

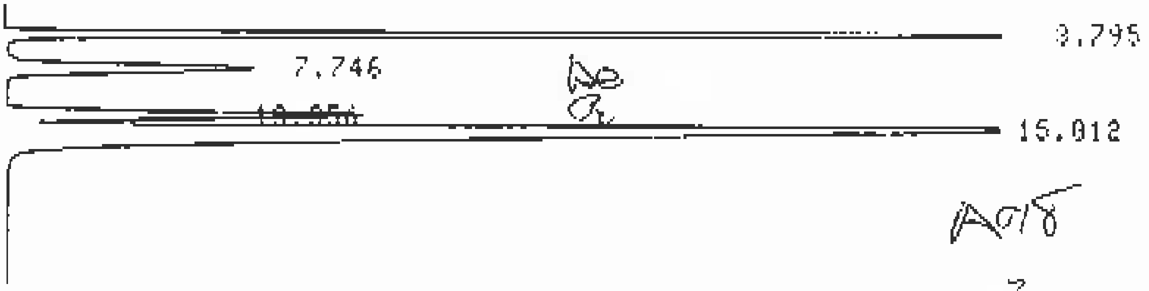


He O2

⊕ Shimadzu

A018
-103

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE          0
SAMPLE NO    0                        METHOD          41
REPORT NO    161



PKNO       TIME        AREA   MK   IDNO       CONC          NAME

   1      3.803    9681165                   35.2763
   2      7.765    2161514                    7.8761
   3     13.395    2575610                    9.385
   4     15.054   13025569   V               47.4626
                 ----------            -------------
       TOTAL      27443856                  100
```

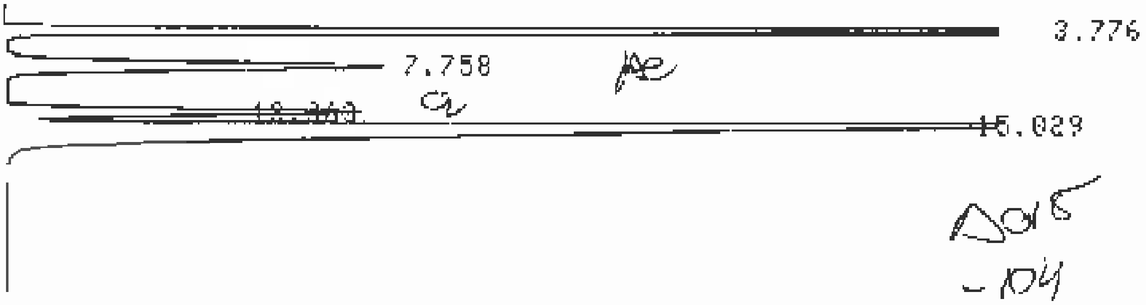


He O2

A018
-103
dup

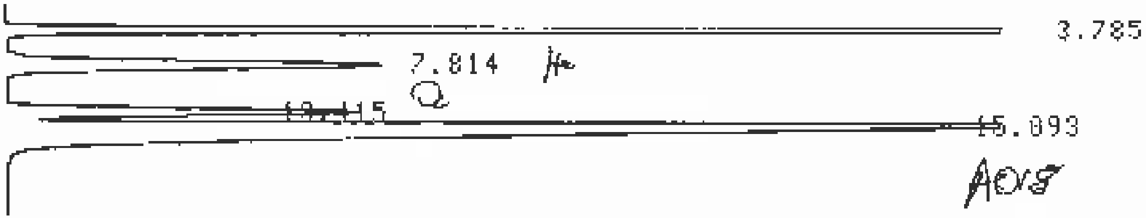
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE          0
SAMPLE NO    0                        METHOD          41
REPORT NO    162

PKNO       TIME        AREA   MK   IDNO       CONC          NAME

   1      3.795    9614687                   35.3123
   2      7.746    2136701                    7.8477
   3     13.356    2549139                    9.3625
   4     15.012   12926643   V               47.477
                 ----------            -------------
       TOTAL      27227168                  100
```

080



A018
-104

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD         41
REPORT NO    163

PKNO        TIME         AREA   MK   IDNO       CONC         NAME

   1       3.776   10078268                      35.1526
   2       7.758    3255473                      11.3549
   3      13.363    2538204                       8.8531
   4      15.029   12798136   V                  44.6393
                 ----------            -------------
        TOTAL     28670080                   100
```



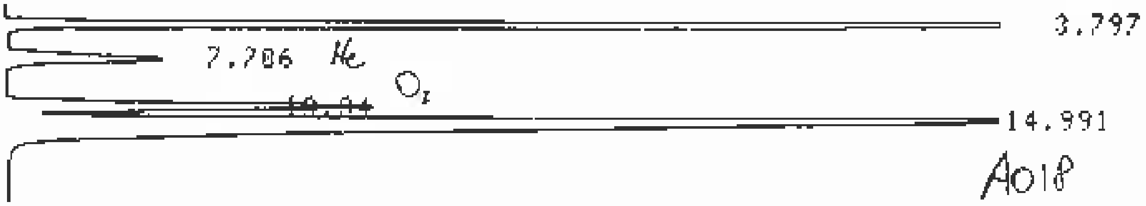
A018
-104
dup

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD         41
REPORT NO    164

PKNO        TIME         AREA   MK   IDNO       CONC         NAME

   1       3.785   10074251                      35.1419
   2       7.814    3259118                      11.3688
   3      13.415    2542476                       8.8689
   4      15.093   12791478   V                  44.6204
                 ----------            -------------
        TOTAL     28667320                   100
```

223-02037-02

131215

⊕ Shimadzu



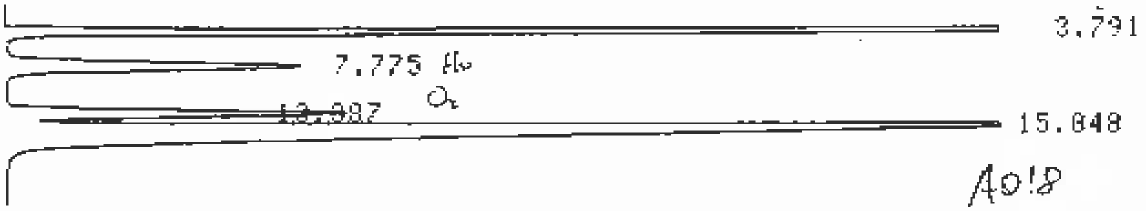
A018
-105

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                      FILE         0
SAMPLE NO    0                      METHOD        41
REPORT NO    165

PKNO       TIME       AREA   MK   IDNO      CONC        NAME

   1      3.797    9327073                   35.4292
   2      7.706    1324097                    5.0296
   3     13.34     2623514                    9.9655
   4     14.991   13051280   V               49.5757
                 ---------          -------------
         TOTAL    26325962               100
```

A018
-105

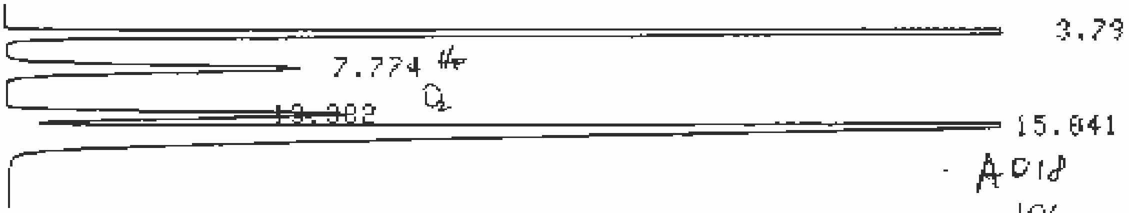
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                      FILE         0
SAMPLE NO    0                      METHOD        41
REPORT NO    166

PKNO       TIME       AREA   MK   IDNO      CONC        NAME

   1      3.801    9356509                   35.461
   2      7.723    1322304                    5.0115
   3     13.389    2613575                    9.9054
   4     15.056   13092942   V               49.6221
                 ---------          -------------
         TOTAL    26385328               100
```

081
223-02037-02
131215
⊕ Shimadzu



A018
-106

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                     FILE        0
SAMPLE NO    0                     METHOD        41
REPORT NO    167

PKNO       TIME       AREA   MK   IDNO       CONC         NAME

   1       3.791    9807714                  35.3173
   2       7.775    2513731                   9.0519
   3      13.387    2428394                   8.7446
   4      15.048   13028467   V              46.8863
                  ----------            -------------
           TOTAL    27778304                 100
```



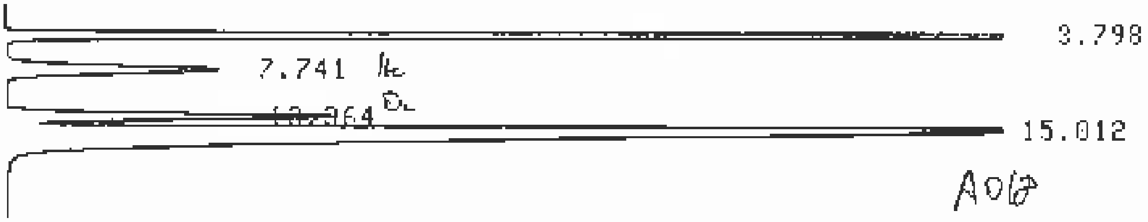
A018
-106

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                     FILE        0
SAMPLE NO    0                     METHOD        41
REPORT NO    168

PKNO       TIME       AREA   MK   IDNO       CONC         NAME

   1       3.79     9847322                  35.3828
   2       7.774    2518153                   9.0481
   3      13.382    2430228                   8.7321
   4      15.041   13035129   V              46.837
                  ----------            -------------
           TOTAL    27830832                 100
```

082

A018
-107

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE         0
SAMPLE NO   0                         METHOD          41
REPORT NO   169

PKNO       TIME       AREA   MK  IDNO      CONC         NAME

   1       3.799    9547765                 35.5046
   2       7.744    1827824                  6.797
   3      13.369    2361427                  8.7813
   4      15.016   13154640   V             48.9172
                 ----------             -------------
         TOTAL    26891654                100
```



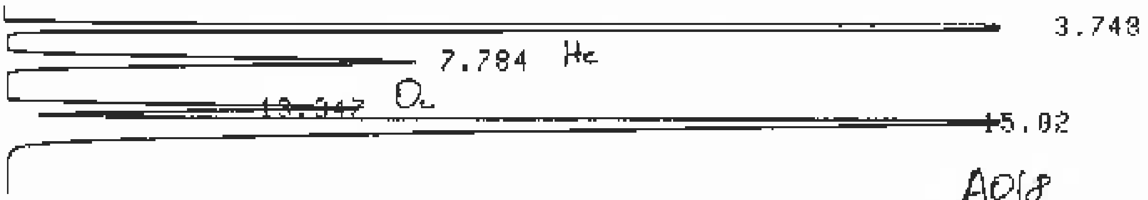
A018
-107
dup

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE         0
SAMPLE NO   0                         METHOD          41
REPORT NO   170

PKNO       TIME       AREA   MK  IDNO      CONC         NAME

   1       3.798    9523334                 35.4787
   2       7.741    1819996                  6.7803
   3      13.364    2357461                  8.7826
   4      15.012   13141620   V             48.9584
                 ----------             -------------
         TOTAL    26842410                100
```

23-02037-02

131215

Shimadzu



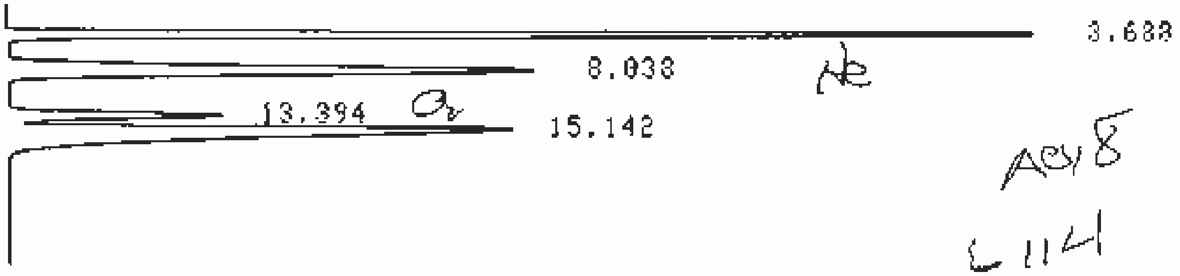
A018
-108

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                      FILE         0
SAMPLE NO    0                      METHOD        41
REPORT NO    100

PKNO       TIME        AREA   MK   IDNO      CONC          NAME

   1       3.748   10278102                    35.279
   2       7.784    3514178                    12.0622
   3      13.347    2551383                     8.7575
   4      15.02    12790142   V                43.9014
                  ---------          -------------
          TOTAL    29133804                   100
```

A018
-108
dy

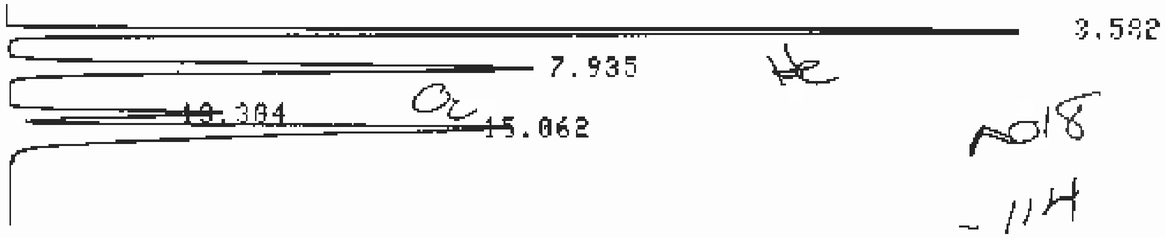
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                      FILE         0
SAMPLE NO    0                      METHOD        41
REPORT NO    101

PKNO       TIME        AREA   MK   IDNO      CONC          NAME

   1       3.754   10256458                    35.1931
   2       7.801    3513238                    12.055
   3      13.4      2560410                     8.7856
   4      15.089   12813302   V                43.9664
                  ---------          -------------
          TOTAL    29143408                   100
```

087



Aug 8
-114

```
C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE        0
SAMPLE NO    0                    METHOD        41
REPORT NO    183

PKNO        TIME        AREA   MK   IDNO      CONC         NAME

   1       3.688  13030188                   35.0435
   2       8.038   9493069                   25.5307
   3      13.394   3126042                    8.4072
   4      15.142  11533631   V               31.0186
                ---------               -------------
        TOTAL     37182928                 100
```

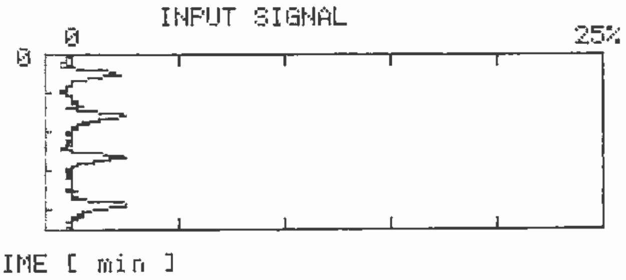


Aug 18
-114
dup

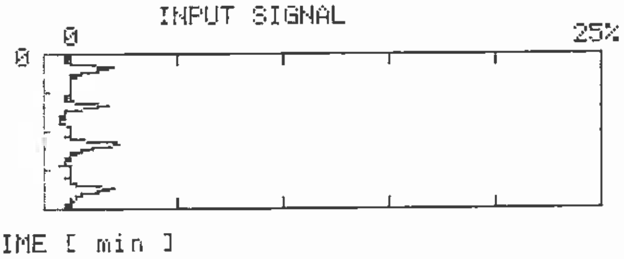
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE        0
SAMPLE NO    0                    METHOD        41
REPORT NO    184

PKNO        TIME        AREA   MK   IDNO      CONC         NAME

   1       3.582  12957500                   35.0019
   2       7.935   9483706                   25.6182
   3      13.304   3115836                    8.4167
   4      15.062  11462428   V               30.9632
                ---------               -------------
        TOTAL     37019468                 100
```

TOC ANALYSIS

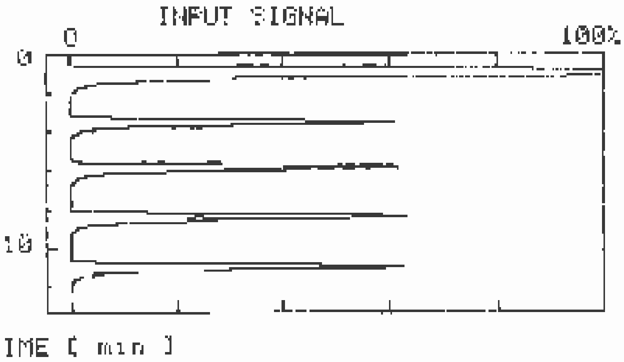
on the TRAPS



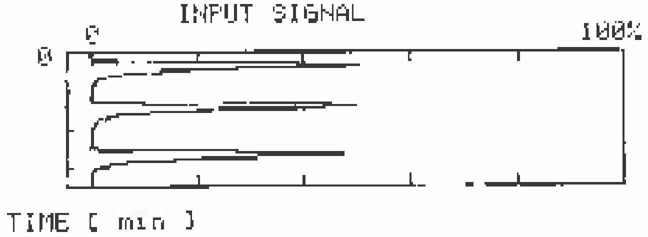
```
SAMPLE#    6    TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm        C#  µl RG
     1- 1128  0.342
     2  1174  0.366
     3  1250  0.405
   + 4  1229  0.394
    - - - - - - - - - - - - - -
    MN  1217  0.388
    SD    39  0.020
    CV  3.22 %
    COR CONC DIL  0.388 [x 1.0]
    COR CONC INJ  0.388 [x 1.0]

          DATE  02(FEB)-09-2016   13:29
```



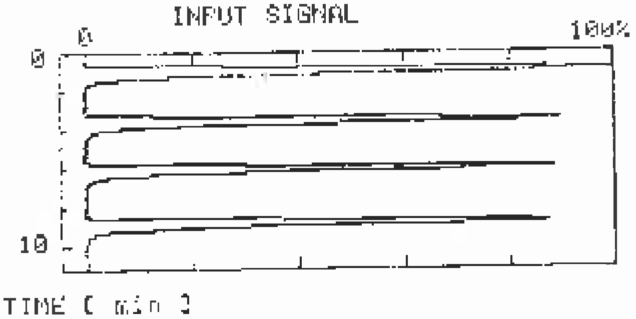
```
SAMPLE#    6    IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#  µl RG
     1   813  0.186
     2   739  0.158
     3- 1020  0.265
   + 4   797  0.180
    - - - - - - - - - - - - - -
    MN   783  0.175
    SD    38  0.014
    CV  4.97 %
    COR CONC DIL  0.175 [x 1.0]
    COR CONC INJ  0.175 [x 1.0]

SAMPLE#    6    TOC(TC-IC)     0.213 ppm

          DATE  02(FEB)-09-2016   13:39
```



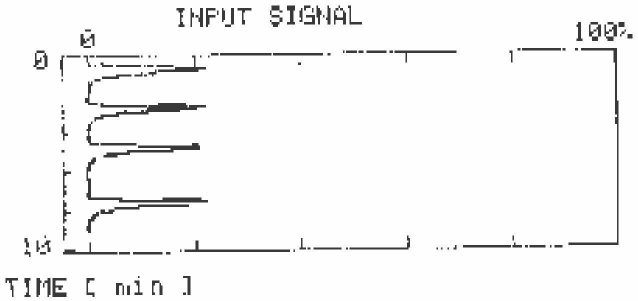
```
SAMPLE#    7    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1-64952  33.07 H
     2-22699  52.35    16
     3 22983  52.99
     4 23215  53.51
   + 5 23300  53.70
    - - - - - - - - - - - - - - - -
    MN 23166  53.40
    SD   164  0.368
    CV   0.7 %
    COR CONC DIL   53.40 [x 1.0]
    COR CONC INJ   53.40 [x 1.0]

         DATE  02(FEB)-09-2016   13:54
```



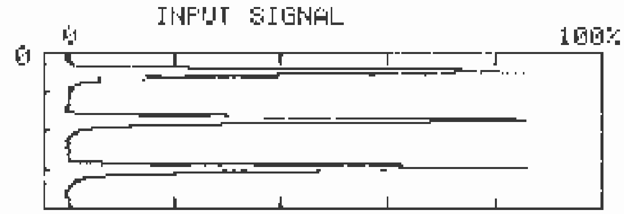
```
SAMPLE#    7    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1 20730  8.069
     2 20627  8.027
     3 19491  7.570
    - - - - - - - - - - - - - - - -
    MN 20282  7.889
    SD   687  0.276
    CV  3.39 %
    COR CONC DIL   7.889 [x 1.0]
    COR CONC INJ   7.889 [x 1.0]

SAMPLE#    7    TOC(TC-IC)      45.51 ppm

         DATE  02(FEB)-09-2016   14:02
```



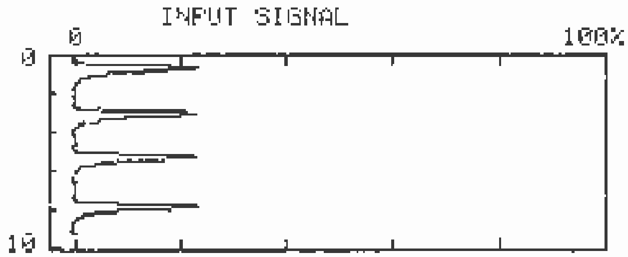
```
SAMPLE#    8    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1-39035  19.76
     2 35104  17.74
     3 34433  17.40
   + 4 34491  17.43
    - - - - - - - - - - - - - - - -
    MN 34676  17.53
    SD   371  0.190
    CV   1.07 %
    COR CONC DIL   17.53 [x 1.0]
    COR CONC INJ   17.53 [x 1.0]

         DATE  02(FEB)-09-2016   14:16
```



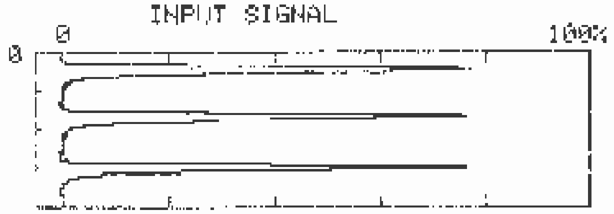
```
SAMPLE#    8    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1   8960  3.332
     2   9129  3.400
     3-  8769  3.255
   + 4   9061  3.373
    - - - - - - - - - - - - - - - -
    MN   9050  3.368
    SD     85  0.034
    CV   0.93 %
    COR CONC DIL   3.368 [x 1.0]
    COR CONC INJ   3.368 [x 1.0]

SAMPLE#    8    TOC(TC-IC)      14.16 ppm

         DATE  02(FEB)-09-2016   14:28
```



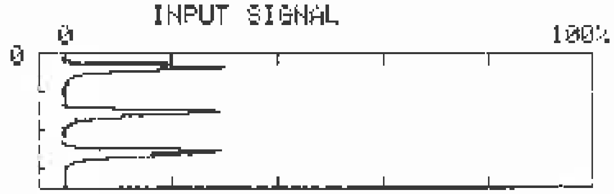
```
SAMPLE#   9   TC
 [x 1,    27μl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm        C#  μl RG
     1 33769  17.06
     2 33634  16.99
     3 33626  16.99
    - - - - - - - - - - - - - - -
    MN 33676  17.01
    SD    80  0.041
    CV  0.23 %
    COR CONC DIL  17.01 [x 1.0]
    COR CONC INJ  17.01 [x 1.0]

        DATE  02(FEB)-09-2016  14:37
```



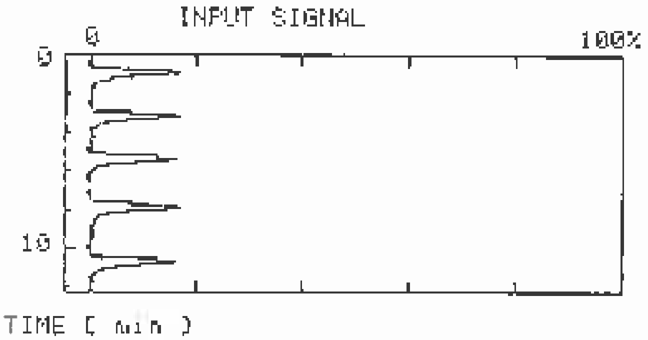
```
SAMPLE#   9   IC
 [x 1,    33μl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#  μl RG
     1  9735  3.644
     2- 9128  3.400
     3  9473  3.539
   + 4  9628  3.601
    - - - - - - - - - - - - - - -
    MN  9612  3.595
    SD   131  0.053
    CV  1.37 %
    COR CONC DIL  3.595 [x 1.0]
    COP CONC INJ  3.595 [x 1.0]

SAMPLE#   9   TOC(TC-IC)    13.41 ppm

        DATE  02(FEB)-09-2016  14:49
```



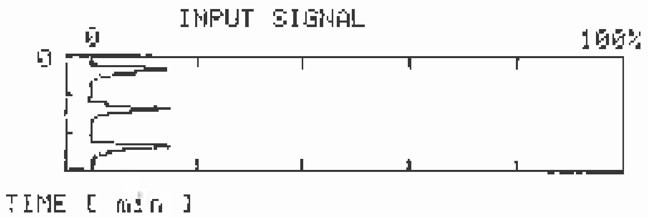
```
SAMPLE#  10   TC
 [x 1,    27μl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm        C#  μl RG
     1 29657  14.95
     2 29475  14.86
     3 29021  14.62
    - - - - - - - - - - - - - - -
    MN 29384  14.81
    SD   327  0.168
    CV  1.11 %
    COR CONC DIL  14.81 [x 1.0]
    COR CONC INJ  14.81 [x 1.0]

        DATE  02(FEB)-09-2016  14:58
```



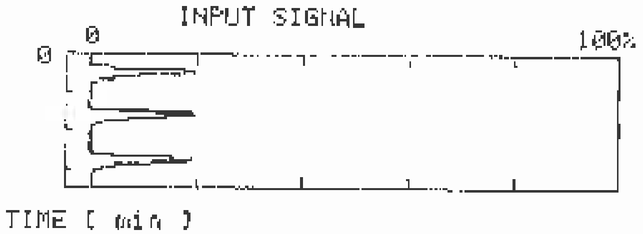
```
SAMPLE#  10   IC
 [x 1,    33μl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#  μl RG
     1 12305  4.678
     2 11736  4.449
     3 12057  4.579
    - - - - - - - - - - - - - - -
    MN 12032  4.569
    SD   285  0.114
    CV  2.37 %
    COR CONC DIL  4.569 [x 1.0]
    COR CONC INJ  4.569 [x 1.0]

SAMPLE#  10   TOC(TC-IC)    10.24 ppm

        DATE  02(FEB)-09-2016  15:06
```



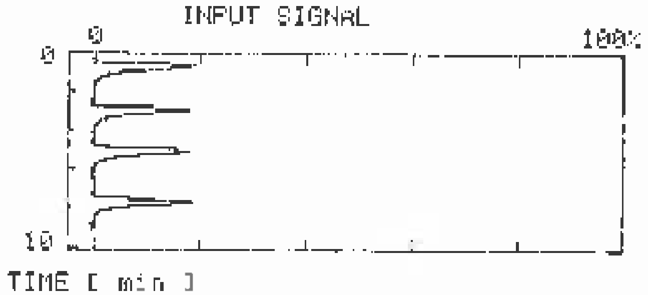
```
SAMPLE#  11    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #   AREA ppm        C#   µl  RG
    1-  7043   3.369
    2   6663   3.175
    3   6609   3.147
 +  4-  7114   3.406
 +  5   6783   3.236
  - - - - - - - - - - - - - - -
  MN   6685   3.186
  SD     89   0.045
  CV   1.33 %
  COR CONC DIL   3.186 [x 1.0]
  COR CONC INJ   3.186 [x 1.0]

        DATE   02(FEB)-09-2016   15:29
```



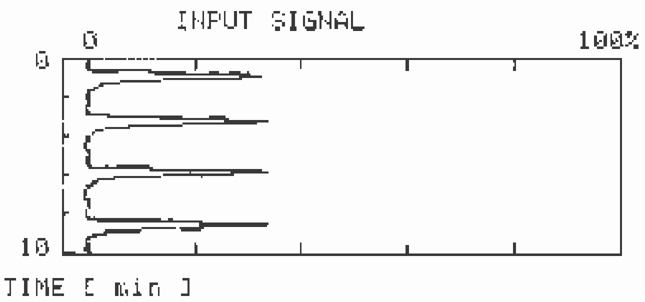
```
SAMPLE#  11    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #   AREA ppm        C#   µl  RG
    1   5738   2.063
    2   6080   2.193
    3   5882   2.118
  - - - - - - - - - - - - - - -
  MN   5900   2.125
  SD    171   0.065
  CV   2.91 %
  COR CONC DIL   2.125 [x 1.0]
  COR CONC INJ   2.125 [x 1.0]

SAMPLE#  11    TOC(TC-IC)     1.061 ppm

        DATE   02(FEB)-09-2016   15:36
```



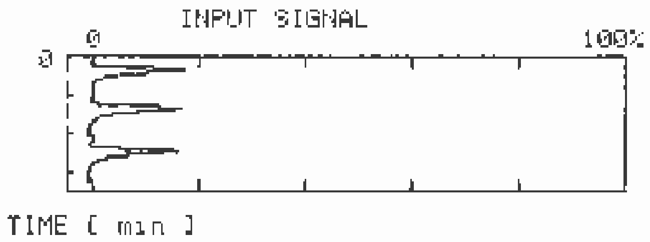
```
SAMPLE#  12    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #   AREA ppm        C#   µl  RG
    1   8068   3.893
    2   8255   3.989
    3   8232   3.977
  - - - - - - - - - - - - - - -
  MN   8185   3.953
  SD    101   0.052
  CV   1.24 %
  COR CONC DIL   3.953 [x 1.0]
  COR CONC INJ   3.953 [x 1.0]

        DATE   02(FEB)-09-2016   15:45
```



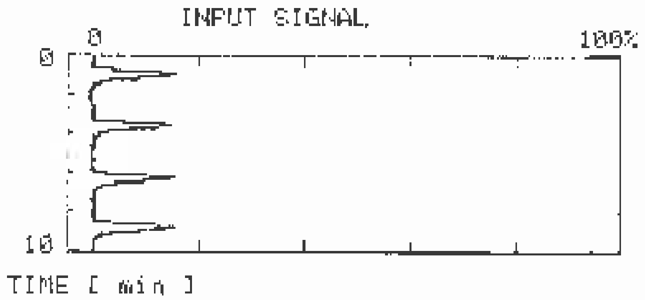
```
SAMPLE#  12    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #   AREA ppm        C#   µl  RG
    1-  7889   2.901
    2   7500   2.745
    3   7483   2.738
 +  4   7509   2.748
  - - - - - - - - - - - - - - -
  MN   7497   2.744
  SD     13   0.005
  CV   0.17 %
  COR CONC DIL   2.744 [x 1.0]
  COR CONC INJ   2.744 [x 1.0]

SAMPLE#  12    TOC(TC-IC)     1.209 ppm

        DATE   02(FEB)-09-2016   15:56
```



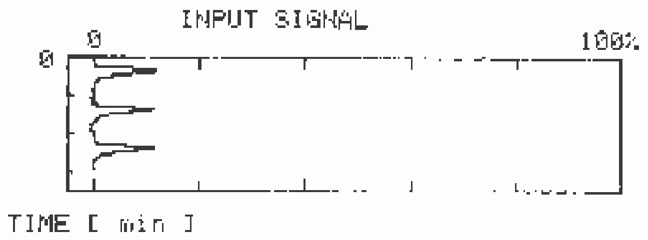
```
SAMPLE#  13    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #  AREA ppm          C#   µl RG
     1-13226   6.530
     2 13724   6.784
     3 13551   6.696
   + 4 13555   6.698
   - - - - - - - - - - - - - -
   MN 13610   6.726
   SD    98   0.050
   CV  0.72 %
   COR CONC DIL   6.726 [x 1.0]
   COR CONC INJ   6.726 [x 1.0]

       DATE  02(FEB)-09-2016  16:08
```



```
SAMPLE#  13    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #  AREA ppm          C#   µl RG
     1  6880   2.498
     2  6781   2.460
     3  6582   2.385
   - - - - - - - - - - - - - -
   MN  6747   2.448
   SD   151   0.057
   CV  2.24 %
   COR CONC DIL   2.448 [x 1.0]
   COR CONC INJ   2.448 [x 1.0]

SAMPLE#  13    TOC(TC-IC)      4.278 ppm

       DATE  02(FEB)-09-2016  16:16
```



```
SAMPLE#  14    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #  AREA ppm          C#   µl RG
     1  6672   3.180
     2  6642   3.164
     3- 6273   2.976
   + 4  6580   3.133
   - - - - - - - - - - - - - -
   MN  6631   3.159
   SD    46   0.024
   CV   0.7 %
   COR CONC DIL   3.159 [x 1.0]
   COR CONC INJ   3.159 [x 1.0]

       DATE  02(FEB)-09-2016  16:28
```



```
SAMPLE#  14    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #  AREA ppm          C#   µl RG
     1  4587   1.624
     2  4354   1.726
     3  4673   1.657
   - - - - - - - - - - - - - -
   MN  4704   1.669
   SD   136   0.052
   CV  2.89 %
   COR CONC DIL   1.669 [x 1.0]
   COR CONC INJ   1.669 [x 1.0]

SAMPLE#  14    TOC(TC-IC)      1.490 ppm

       DATE  02(FEB)-09-2016  16:36
```

Almega Environmental Technical Services

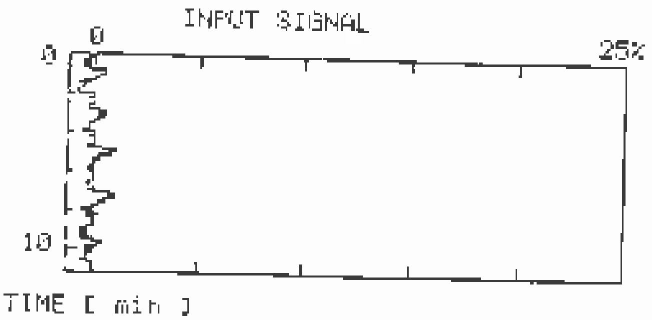
SCAQMD Method 25.3
TOC Analysis on the Trap

Calibration Curve No.: TC IC Page: # 7

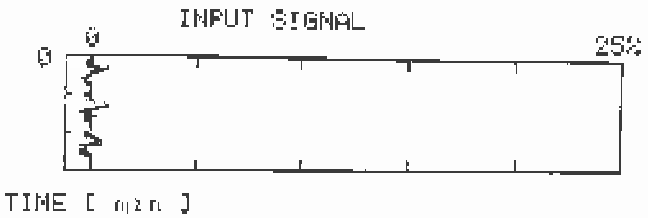
No	Sample ID	Date	Sample Volume, ml		Dilution Factor	Concentration, ppmC		
			Initial	Final		TC	IC	TOC
1	Blank	2/9	—	—	1	-.03	-.02	-.00
2	TCStd		—	—	1	20.76	.013	20.74
3	ICStd		—	—	1	8.716	8.483	.433
4	LCS		—	—	1	11.43	.063	11.36
5	Blank		—	—	1	-.08	-.05	.05
6	AQ8 -114		7.0	7.0	1	.388	.175	.213
7	-101		6.0	6.0	1	53.40	7.889	45.51
8	-102		7.5	7.5	1	17.53	3368	14.16
9	-103		8.0	8.0	1	17.01	3.595	13.41
10	-104		7.75	7.75	1	14.81	4.569	10.24
11	-105		8.25	8.25	1	3.186	2.125	1.061
12	-106		9.0	9.0	1	3.953	2.744	1.209
13	-107		8.0	8.0	1	6.726	2448	4.278
14	-108		7.75	7.75	1	3.159	1.669	1.490
15	-201		8.75	8.75	1	4.917	4.333	.584
16	-202		8.0	8.0	1	9059	2.685	6.374
17	-203		7.25	7.25	1	22.24	4436	17.80
18	-204		8.75	8.75	1	34.09	1.551	32.53
19	-205		7.5	7.5	1	42.57	1343	41.22
20	LCS		—	—	1	11.88	.157	11.72
21								

Comments

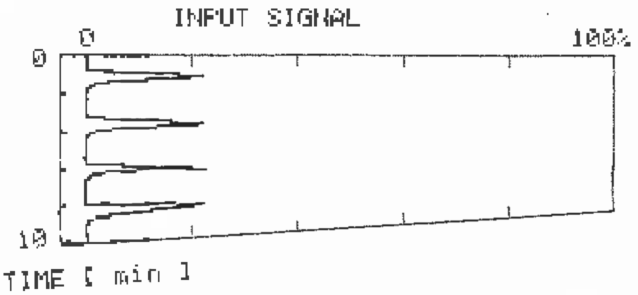
Checked by:



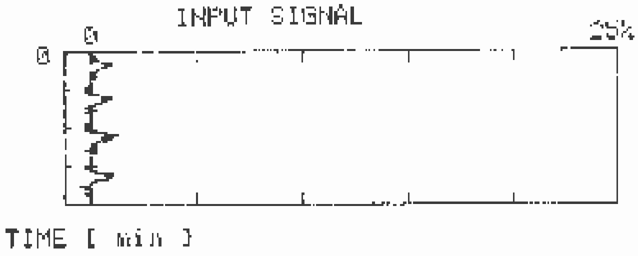
```
SAMPLE#    1    TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm          C#  µl RG
    1-  483  0.012
    2   368  -0.04
    3   398  -0.03
  + 4-  549  0.046
  + 5   427  -0.01
  - - - - - - - - - - - - - -
   MN   397  -0.03
   SD    29  0.015
   CV  7.41 %
   COR CONC DIL  -0.03 [x 1.0]
   COR CONC INJ  -0.03 [x 1.0]

       DATE  02(FEB)-09-2016   10:52
```



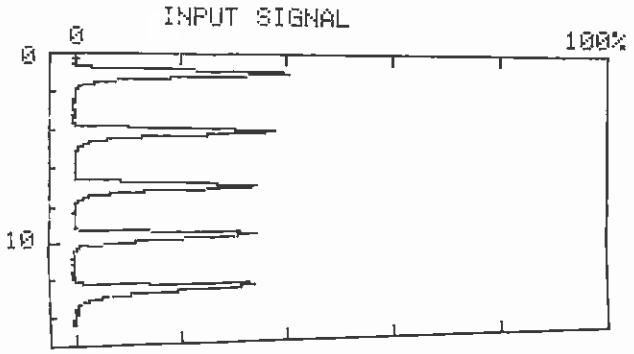
```
SAMPLE#    1    IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm          C#  µl RG
    1   284  -0.01
    2   236  -0.03
    3   250  -0.02
  - - - - - - - - - - - - - -
   MN   256  -0.02
   SD    24  0.009
   CV  9.61 %
   COR CONC DIL  -0.02 [x 1.0]
   COR CONC INJ  -0.02 [x 1.0]

SAMPLE#    1   TOC(TC-IC)      -0.00 ppm

       DATE  02(FEB)-09-2016   10:59
```



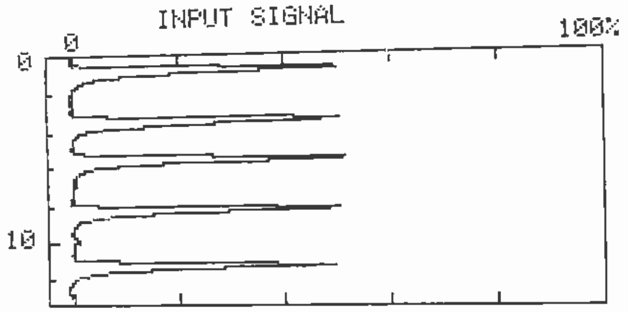
```
SAMPLE#    2    TC
 [x 5,    30µl, C# 16, #WASH 2, SP  0min]
    #  AREA ppm          C#  µl RG
    1- 8949  20.56
    2  9057  20.81
    3  8970  20.61
  + 4  9075  20.85
  - - - - - - - - - - - - - - -
   MN  9034  20.76
   SD    56  0.131
   CV  0.62 %
   COR CONC DIL  20.76 [x 1.0]
   COR CONC INJ  20.76 [x 1.0]

       DATE  02(FEB)-09-2016   11:21
```



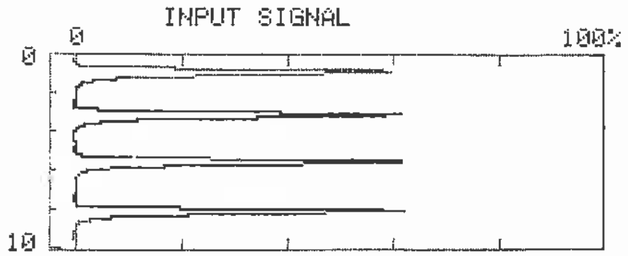
```
SAMPLE#    2    IC
 [x [illegible], C# 13, #WASH 2, SP  0min]
    #  AREA ppm          C#  µl RG
    1  [illegible]
    2   344  0.008
    3   387  0.024
  + 4   345  0.003
  - - - - - - - - - - - - - - -
   MN   358  0.013
   SD    24  0.009
   CV  6.64 %
   COR CONC DIL  0.013 [x 1.0]
   COR CONC INJ  0.013 [x 1.0]

SAMPLE#    2   TOC(TC-IC)      20.74 ppm

       DATE  02(FEB)-09-2016   11:31
```



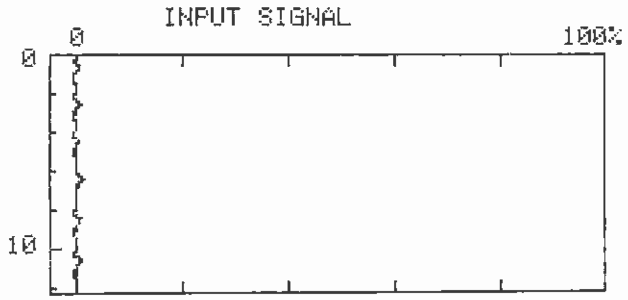
```
TIME [ min ]

SAMPLE#   3   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm        C#  µl RG
     1-19328  9.651
     2 18725  9.342
     3-17096  8.508
   + 4 17255  8.589
   + 5 17703  8.818
    - - - - - - - - - - - - - -
    MN 17894  8.916
    SD   753  0.385
    CV  4.21 %
    COR CONC DIL  8.916 [x 1.0]
    COR CONC INJ  8.916 [x 1.0]

         DATE  02(FEB)-09-2016  11:54
```



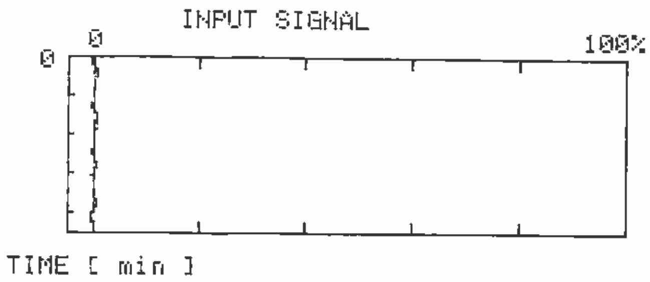
```
TIME [ min ]

SAMPLE#   3   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#  µl RG
     1 21818  8.507
     2-21280  8.290
     3 21824  8.509
   + 4-21309  8.302
   + 5 21539  8.435
    - - - - - - - - - - - - - -
    MN 21760  8.483
    SD   105  0.042
    CV  0.48 %
    COR CONC DIL  8.483 [x 1.0]
    COR CONC INJ  8.483 [x 1.0]

SAMPLE#   3   TOC(TC-IC)    0.433 ppm

         DATE  02(FEB)-09-2016  12:09
```



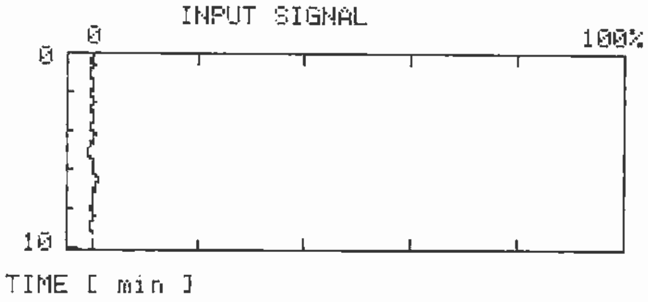
```
TIME [ min ]

SAMPLE#   4   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm        C#  µl RG
     1-22469  11.26
     2 22766  11.41
     3 22898  11.48
   + 4 22726  11.39
    - - - - - - - - - - - - - -
    MN 22796  11.43
    SD    90  0.046
    CV  0.39 %
    COR CONC DIL  11.43 [x 1.0]
    COR CONC INJ  11.43 [x 1.0]

         DATE  02(FEB)-09-2016  12:20
```



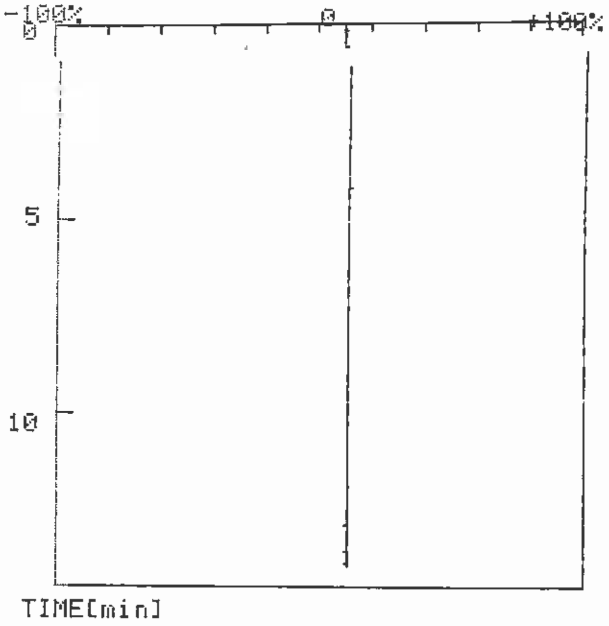
```
TIME [ min ]

SAMPLE#   4   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#  µl RG
     1-   249  -0.02
     2    469  0.055
     3-   304  -0.00
   + 4-   372  0.018
   + 5    510  0.071
   + 6    489  0.063
    - - - - - - - - - - - - - -
    MN    489  0.063
    SD     20  0.007
    CV  4.18 %
    COR CONC DIL  0.063 [x 1.0]
    COR CONC INJ  0.063 [x 1.0]

SAMPLE#   4   TOC(TC-IC)    11.36 ppm

         DATE  02(FEB)-09-2016  12:34
```



```
SAMPLE#    5    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #   AREA ppm        C#   µl RG
     1    402  -0.02
     2    527  0.034
     3-   209  -0.12
   + 4    418  -0.02
   - - - - - - - - - - - - - - -
    MN    449  -0.00
    SD     68  0.034
    CV   15.1 %
    COR CONC DIL   -0.00 [x 1.0]
    COR CONC INJ   -0.00 [x 1.0]

         DATE  02(FEB)-09-2016   13:01
```

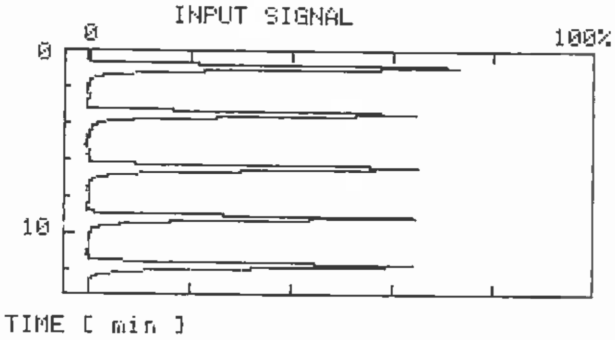


```
SAMPLE#    5    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #   AREA ppm        C#   µl RG
     1    151  -0.06
     2    207  -0.04
     3-   538  0.082
   + 4-   423  0.038
   + 5    184  -0.05
   - - - - - - - - - - - - - - -
    MN    180  -0.05
    SD     28  0.010
    CV   15.5 %
    COR CONC DIL   -0.05 [x 1.0]
    COR CONC INJ   -0.05 [x 1.0]

SAMPLE#   5    TOC(TC-IC)     0.050 ppm

         DATE  02(FEB)-09-2016   13:13
```

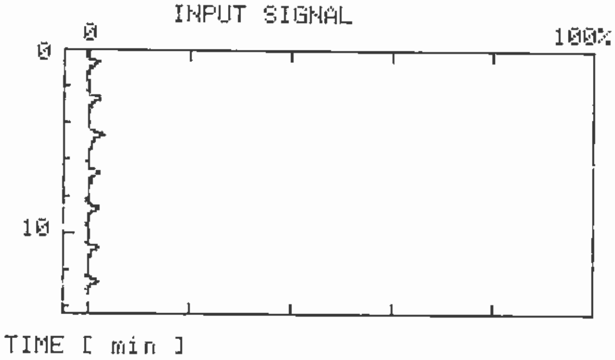


```
  RANGE                      : x1
[READY]
  TC FURNACE TEMP            :  OK      679°C
  DEHUMIDIFIER TEMP          :  OK      1.0°C
  BASELINE POSITION          :  OK
  BASELINE FLUCTUATION:         OK
  BASELINE NOISE             :  OK

         DATE   02(FEB)-09-2016   10:08
```

```
TOC-5000 DATA REPORT
        DATE   02(FEB)-09-2016 18:55

SPL# TC,ppm   RMK     IC,ppm   RMK     TOC,ppm
  1   -0.03 14****   -0.02 13****    -0.00
  2   20.76 16****   0.013 13****    20.74
  3   8.916 14****   8.483 13****    0.433
  4   11.43 14****   0.063 13****    11.36
  5   -0.00 14****   -0.05 13****    0.050
  6   0.388 14****   0.175 13****    0.213
  7   53.40 16*H**   7.889 13****    45.51
  8   17.53 14****   3.368 13****    14.16
  9   17.01 14****   3.595 13****    13.41
 10   14.81 14****   4.569 13****    10.24
 11   3.186 14****   2.125 13****    1.061
 12   3.953 14****   2.744 13****    1.209
 13   6.726 14****   2.448 13****    4.278
 14   3.159 14****   1.669 13****    1.490
 15   4.917 14****   4.333 13****    0.584
 16   9.059 14****   2.685 13****    6.374
 17   22.24 16*H**   4.436 13****    17.80
 18   34.09 16*H**   1.551 13****    32.53
 19   42.57 16*H**   1.343 13****    41.22
 20   11.88 14****   0.157 13****    11.72

ANALYST :
SAMPLE  :
```



```
SAMPLE#  20    TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #   AREA ppm       C#  µl RG
    1-27380  13.78
    2-24909  12.51
    3 23748  11.92
  + 4 23567  11.82
  + 5 23719  11.90
   - - - - - - - - - - - - - -
   MN 23678  11.88
   SD    97  0.050
   CV  0.41 %
   COR CONC DIL  11.88 [x 1.0]
   COR CONC INJ  11.88 [x 1.0]

         DATE  02(FEB)-09-2016  18:36
```



```
SAMPLE#  20    IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #   AREA ppm       C#  µl RG
    1-   892  0.217
    2-   898  0.219
    3-  1064  0.282
  + 4    752  0.163
  + 5    732  0.156
  + 6-   606  0.108
  + 7    726  0.153
   - - - - - - - - - - - - - -
   MN    736  0.157
   SD     13  0.005
   CV   1.84 %
   COR CONC DIL  0.157 [x 1.0]
   COR CONC INJ  0.157 [x 1.0]

SAMPLE#  20   TOC(TC-IC)     11.72 ppm

         DATE  02(FEB)-09-2016  18:54
```

TANK PREPARATION

TANK PREPARATIONS

Client:	CES	Lab No.:	A 018
Project No.:	c9922		
Unit Tested:	Burrtec / Gore		
Sampling Date:	4-Feb-16		
Date pressurized:	8-Feb-16		

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg		Final Pressure	Comments
		1	2				
22081	101	-758	-758	-134	*	170	Run # 1
S029	102	-758	-758	-160	*	164	Run # 2
S076	103	-758	-758	-158	*	164	Run # 3
E0022	104	-758	-758	-148	*	162	Run # 4
E0019	105	-758	-758	-170	*	160	Run # 5
A106	106	-758	-758	-186	*	168	Run # 6

* - Post -test Pressure is less then 200 mm Hg.

TANK PREPARATIONS

Client:	CES	Lab No.:	A 018
Project No.:	c9922		
Unit Tested:	Burrtec / Gore		
Sampling Date:	4-Feb-16		
Date pressurized:	8-Feb-16		

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg		Final Pressure	Comments
		1	2				
S077	107	-758	-758	-208		164	Run # 7
301	108	-758	-758	-156	*	164	Run # 8
S070	114	-758	-758	20	*	166	Run # 14

* - Post -test Pressure is less then 200 mm Hg.

CALIBRATIONS

17-Feb-16
Current

	100 ppm mix					1000 ppm mix					2000 ppm mix						
	conc	area 1	area 2	RF 1	RF 2	conc	area 1	area 2	RF 1	RF 2	conc	area 1	area 2	RF 1	RF 2	Ave	RSD
Carbon Monoxide	101.08	174659	173097	5.79E-04	5.84E-04	1000.4	1715054	1721231	5.83E-04	5.81E-04	2006.8	3649011	3643625	5.50E-04	5.51E-04	5.71E-04	1.9
Methane	101.92	186705	187767	5.46E-04	5.43E-04	1001.8	1834200	1840846	5.46E-04	5.44E-04	2010	3593083	3587084	5.59E-04	5.60E-04	5.50E-04	-1.9
Carbon Dioxide	104.3	184321	184699	5.66E-04	5.65E-04	1002	1810513	1819945	5.53E-04	5.51E-04	1999	3549147	3550089	5.63E-04	5.63E-04	5.60E-04	0.1
Ethane	97.06	185227	183571	5.24E-04	5.29E-04	1004	1789843	1797879	5.61E-04	5.58E-04	2015	3584223	3579270	5.62E-04	5.63E-04	5.50E-04	2.0
TGNMO	101.9	176590	176723	5.77E-04	5.77E-04	1002	1741911	1749412	5.75E-04	5.73E-04	2002	3444635	3436779	5.81E-04	5.83E-04	5.78E-04	3.0
	Average	183211	183190	5.53E-04	5.53E-04	Average	1778304	1785862.6	5.64E-04	5.61E-04	Average	3564020	3559369	5.63E-04	5.64E-04		
			Average	5.53E-04				Average	5.63E-04				Average	5.64E-04			
	RSD%				1.3					-0.4					0.5		

Average **5.61E-04**

RSD, %

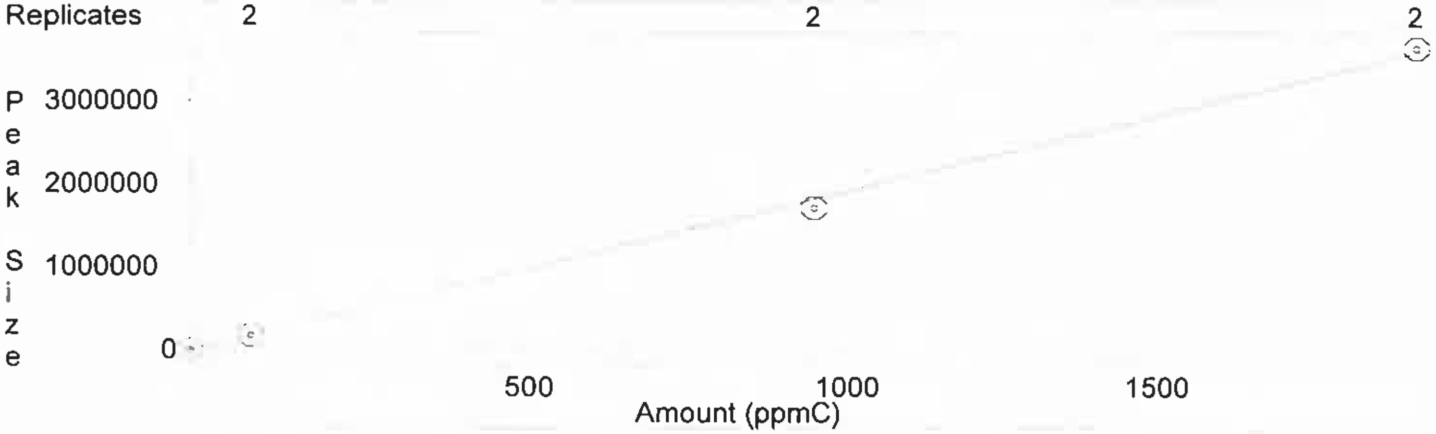
RSD_{CO} =	3.894	r_{CO} =	0.99921
RSD_{CH4} =	1.220	r_{CH4} =	0.99995
RSD_{CO2} =	2.091	r_{CO2} =	0.99993
RSD_{C2H6} =	1.570	r_{C2H6} =	1.00000
RSD_{NMOC} =	1.609	r_{NMOC} =	0.99999

Print Date: 18 Feb 2016 14:50:25
Calibration Curves Report - Page 1
File: g:\2016\jan_16\nmoc_120815.mth
Detector: 800 Interface Box, Address: 88, Channel ID: 2

Carbon Monoxide

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.810746e+003x

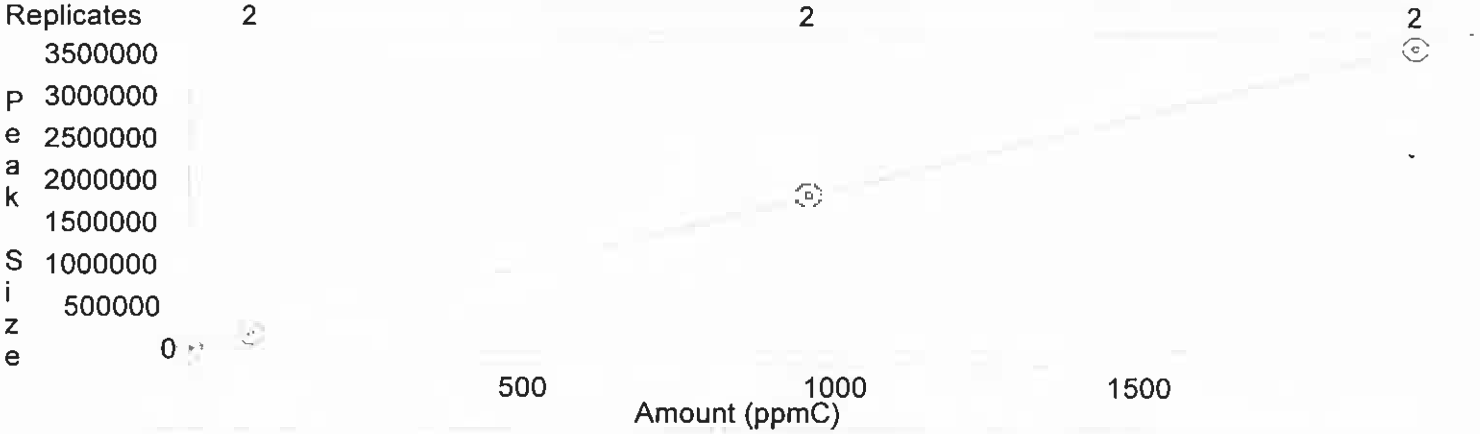
Resp. Fact. RSD: 3.894%
Coeff. Det.(r^2): 0.998422



Methane

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.781904e+003x

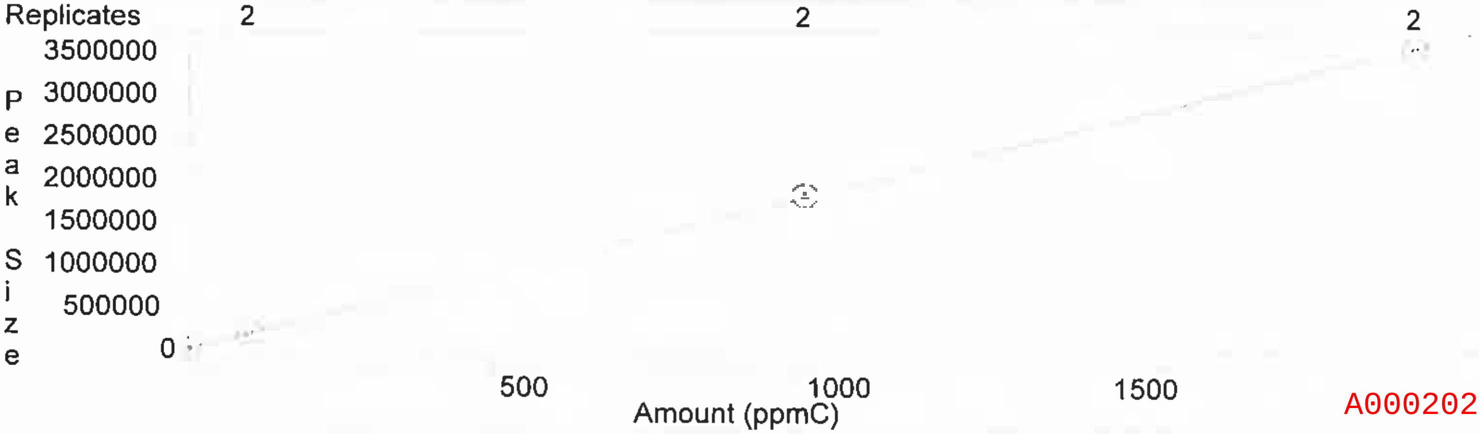
Resp. Fact. RSD: 1.220%
Coeff. Det.(r^2): 0.999907



Carbon Dioxide

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.777347e+003x

Resp. Fact. RSD: 2.091%
Coeff. Det.(r^2): 0.999865

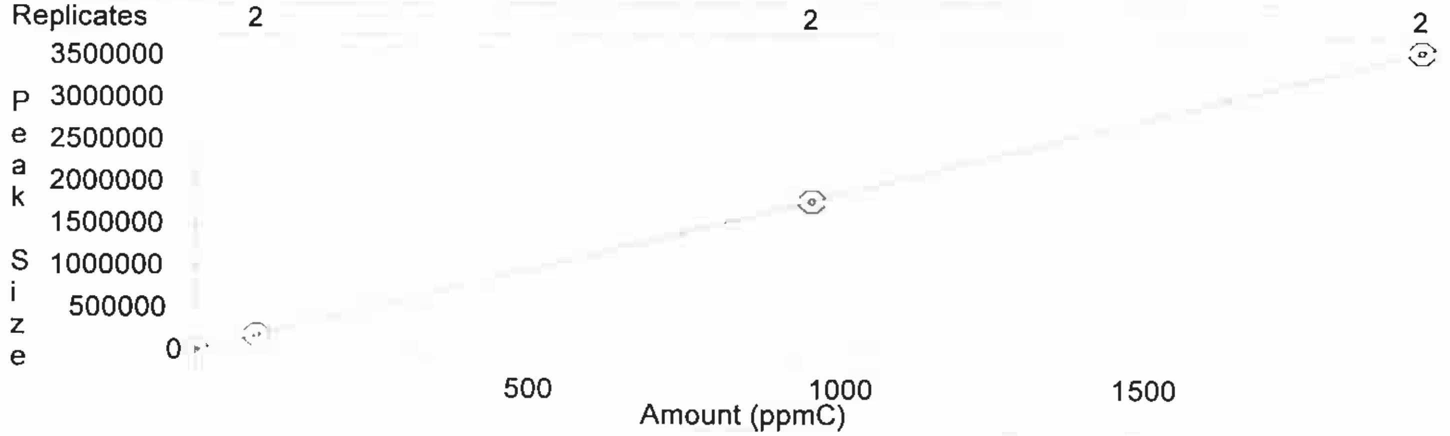


Print Date: 18 Feb 2016 14:50:26
Calibration Curves Report - Page 2
File: g:\2016\jan_16\nmoc_120815.mth
Detector: 800 Interface Box, Address: 88, Channel ID: 2

Ethane

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.770637e+003x

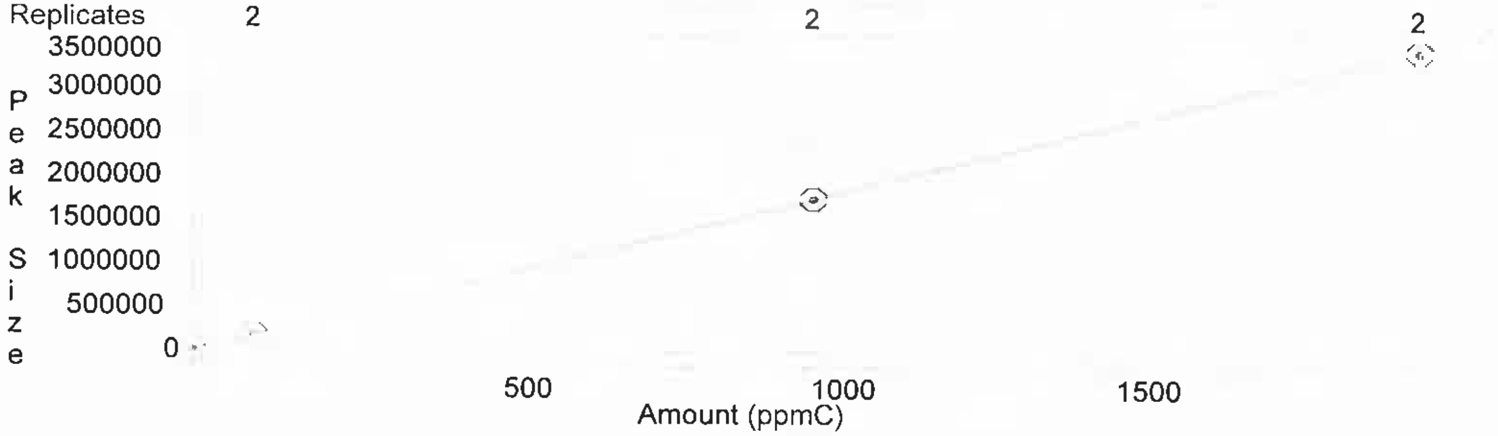
Resp. Fact. RSD: 1.570%
Coeff. Det.(r^2): 0.999994



NMOC

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.715921e+003x

Resp. Fact. RSD: 1.609%
Coeff. Det.(r^2): 0.999984

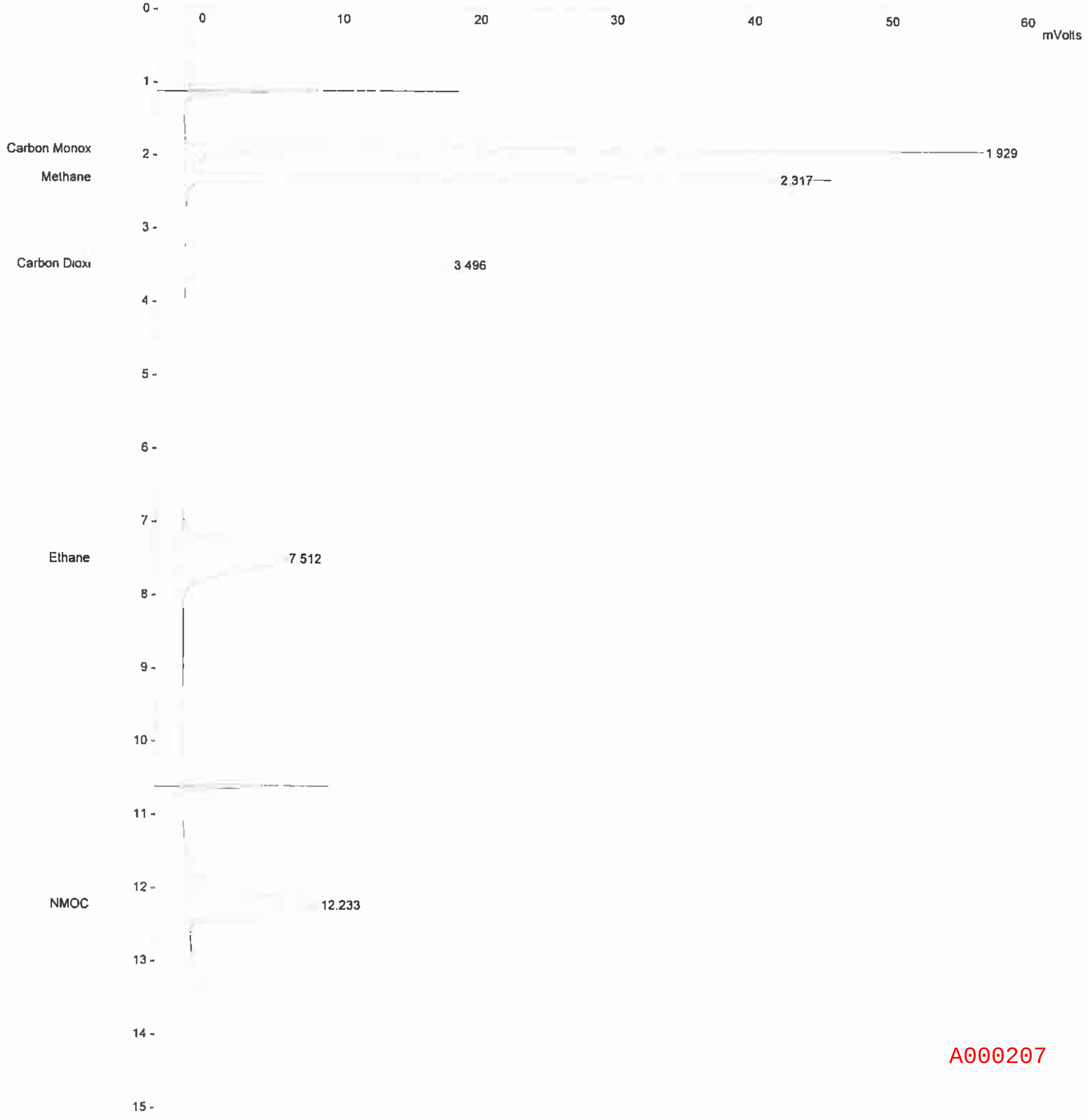


```
Print Date: Thu Feb 18 14:57:37 2016                 Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 14;34;08, lab air.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/17/2016 14:34     Calculation Date: 2/18/2016 14:57

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                        Width
 Peak      Peak          Result      Time   Offset        Area     Sep.   1/2    Status
  No.      Name          (ppmC)     (min)    (min)     (counts)    Code  (sec)   Codes
 ---- ------------ ----------- ------- ------- ----------- ---- -----  -------
    1 Carbon Monox     83.3950   1.904  -0.026     151650    BB    2.5
    2 Methane           1.8956   2.323   0.005       3374    TS    0.0
    3 Carbon Dioxi    504.6068   3.507   0.005     895732    BB    8.2
    4 Ethane                     7.541                                     M
    5 NMOC                      12.233                                     M
 ---- ------------ ----------- ------- ------- ----------- ---- -----  -------
      Totals:         589.8974          -0.016    1050756

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 1      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -419 microVolts          LSB:      1 microVolts

Noise (used): 72 microVolts - monitored before this run

Stream: 1        Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 14;34;08, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/17/2016 14:34    Calculation Date: 2/18/2016 14:57

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 48          Zero Offset = 4%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```

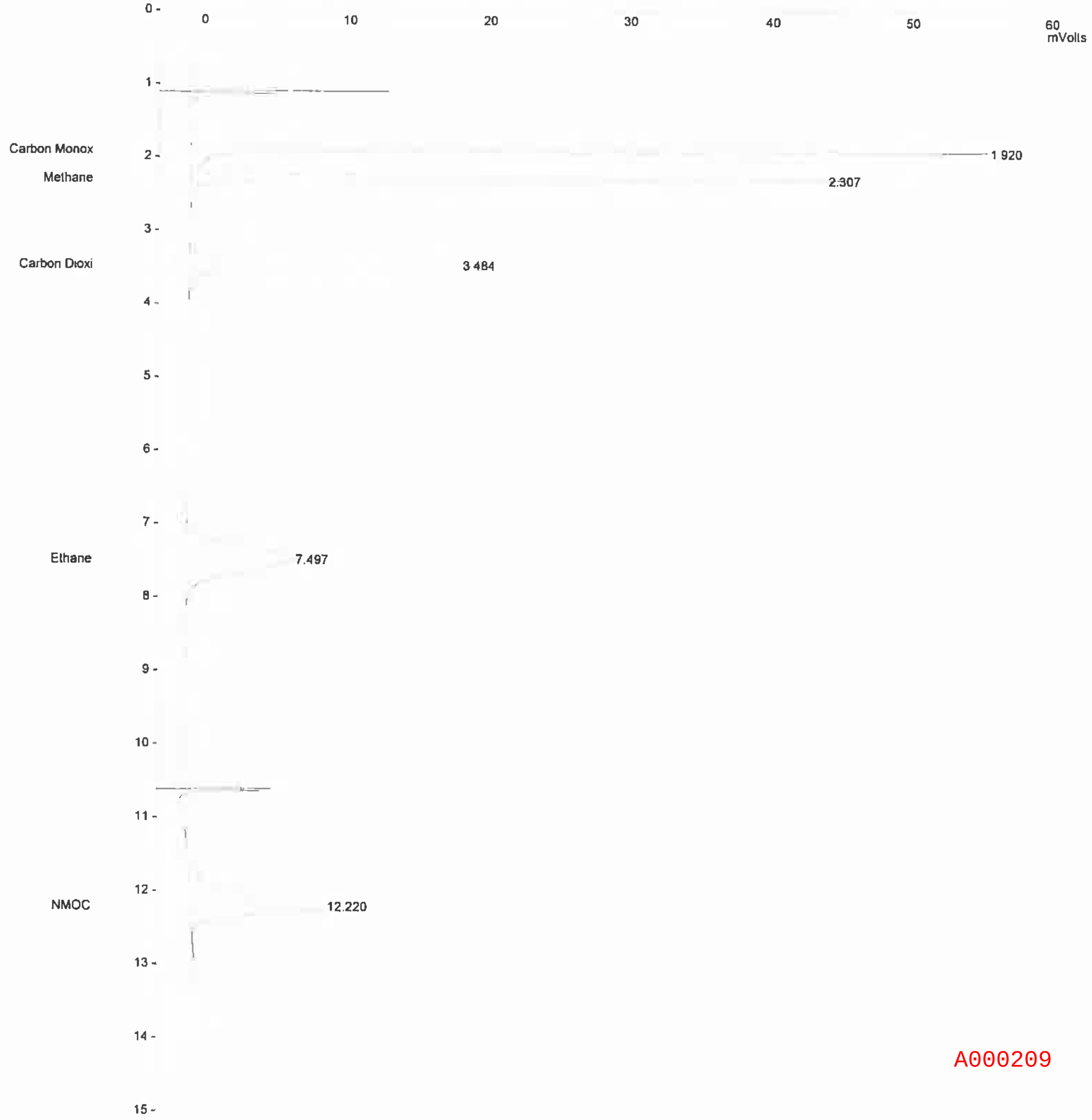
```
Print Date: Thu Feb 18 14:56:26 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 11:47:16, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\-nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/17/2016 11:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 08
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 3

                       Ret.    Time                     Width
 Peak     Peak         Time   Offset      Area     Sep.  1/2   Status
  No.     Name         (min)   (min)    (counts)   Code (sec)  Codes
 ---- ------------     ------- ------- -----------  ---- -----  ------
    1 Carbon Monox       1.929  -0.001     174659    BV    2.6
    2 Methane            2.317  -0.001     186705    VB    3.6
    3 Carbon Dioxi       3.496  -0.006     184321    BB    8.2
    4 Ethane             7.512  -0.029     185227    BB   22.6
    5 NMOC              12.233   0.000     176590    BB   16.4
 ---- ------------     ------- ======= ===========  ---- -----  ------
      Totals:                   -0.037     907502

Total Unidentified Counts :           0 counts

Detected Peaks: 6           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -411 microVolts          LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 11;47;16, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/17/2016 11:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                       Bus Address  : 88
Instrument : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10     Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27           Zero Offset = 4%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



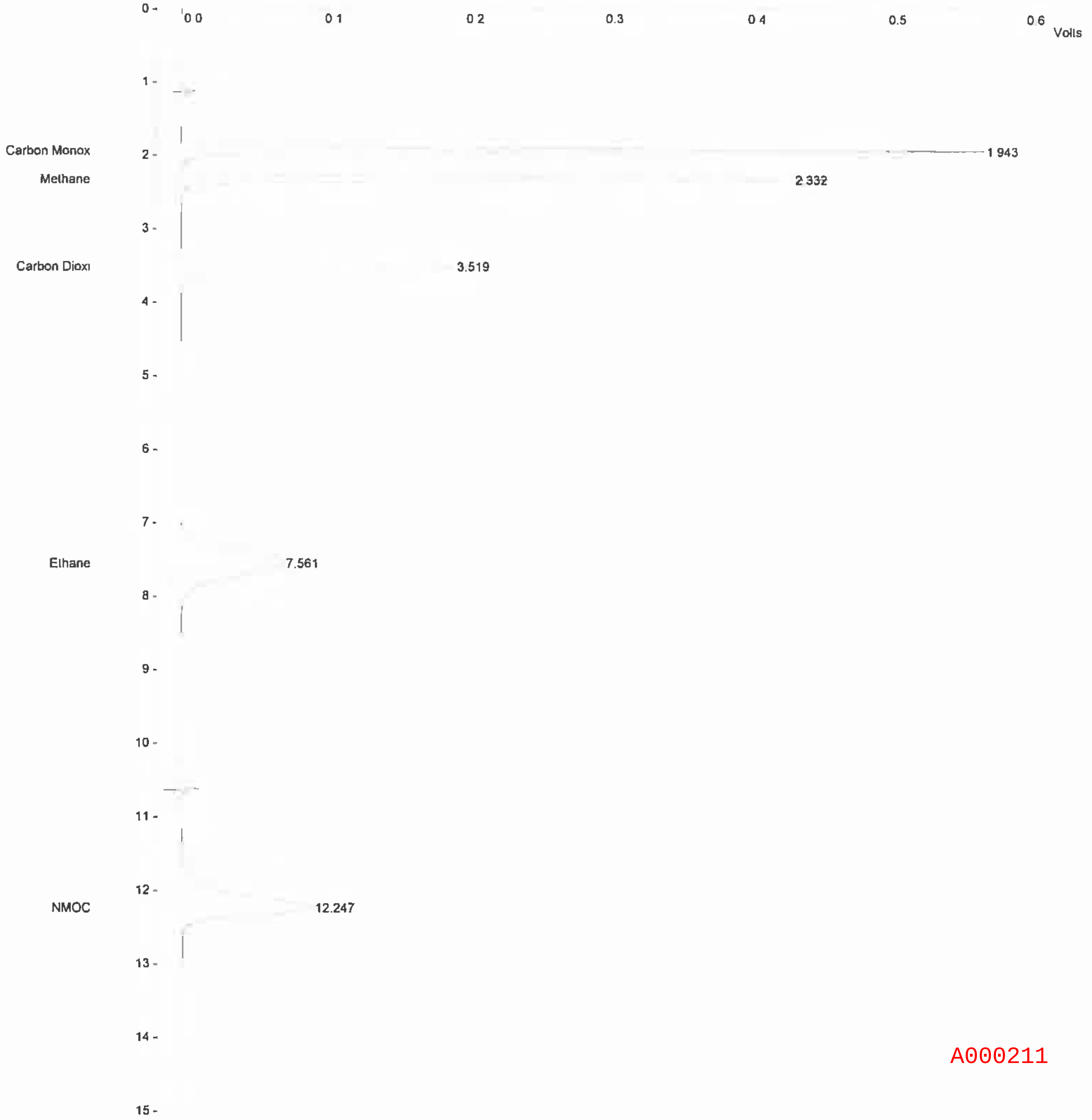
```
Print Date: Thu Feb 18 14:56:34 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 12:10:50, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/17/2016 12:10    Calculation Date: 2/18/2016 14:56

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3586-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 3

                       Ret.     Time                       Width
 Peak      Peak        Time    Offset      Area     Sep.   1/2    Status
 No.       Name        (min)    (min)    (counts)   Code  (sec)   Codes
 ---- ------------   ------- -------  ----------  ----  -----   ------
    1 Carbon Monox     1.920  -0.009      173097    BV    2.6
    2 Methane          2.307  -0.010      187767    VB    3.6
    3 Carbon Dioxi     3.484  -0.012      184699    BB    8.2
    4 Ethane           7.497  -0.015      183571    BB   22.5
    5 NMOC            12.220  -0.013      176723    BB   16.4
 ---- ------------   ------- -------  ----------  ----  -----   ------
      Totals:                 -0.059      905857

Total Unidentified Counts :           0 counts

Detected Peaks: 5           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -203 microVolts          LSB:      1 microVolts

Noise (used): 64 microVolts - monitored before this run

Stream: 1       Injection Number: 3     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 12;10;50, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/17/2016 12:10    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27          Zero Offset = 4%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



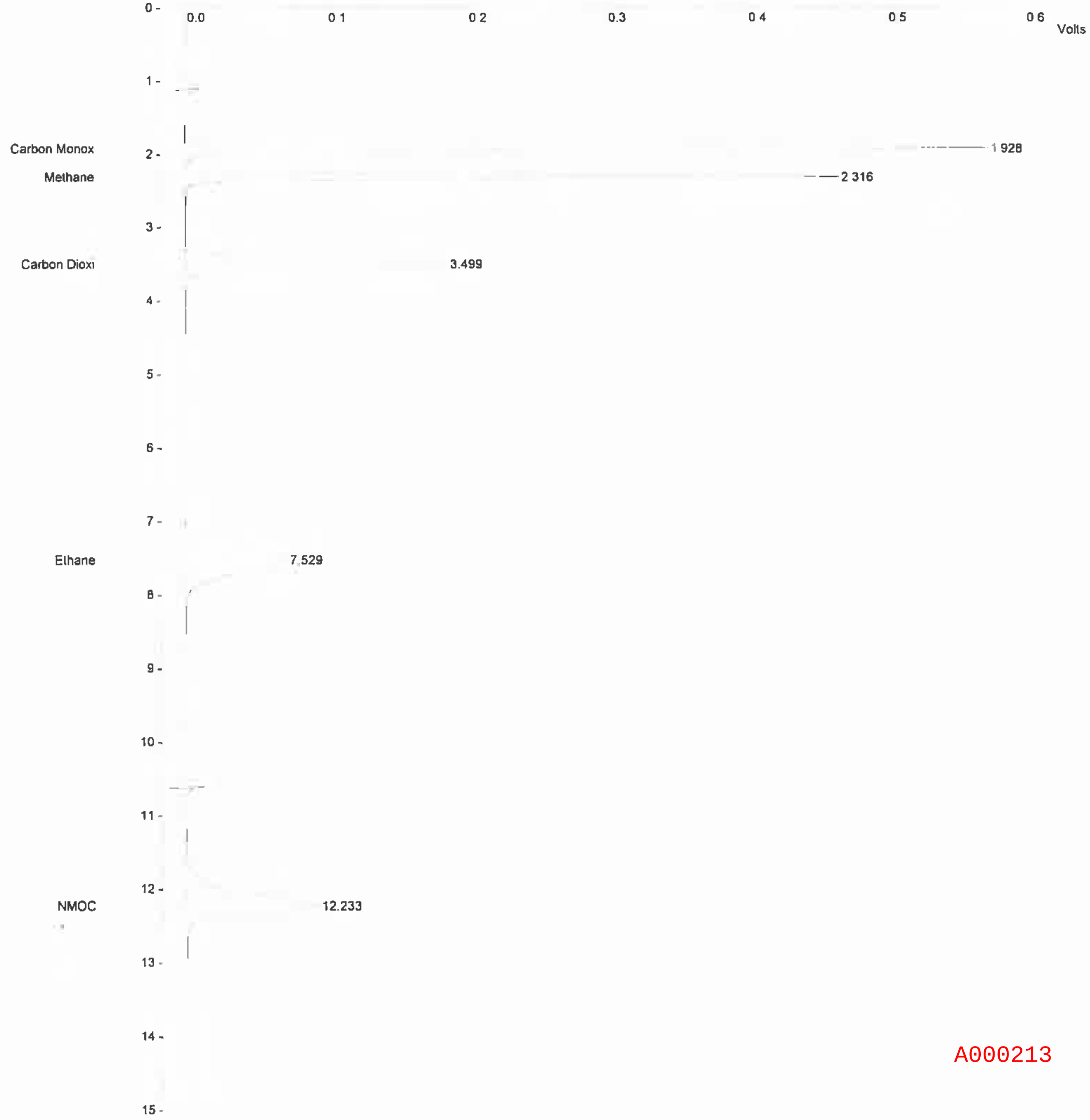
```
Print Date: Thu Feb 18 14:56:41 2016               Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 15:23:50, 1000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 1000ppm mix

Injection Date: 2/17/2016 15:23    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3586-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 2

                          Ret.    Time                       Width
 Peak       Peak          Time   Offset     Area      Sep.    1/2     Status
  No.       Name          (min)   (min)    (counts)   Code   (sec)    Codes
 ----  ------------    -------  -------  ----------   ----   -----   ------
    1  Carbon Monox       1.943    0.023     1715054     BV     2.7
    2  Methane            2.332    0.026     1834200     VV     3.6
    3  Carbon Dioxi       3.519    0.035     1810513     VB     8.2
    4  Ethane             7.561    0.064     1789843     BB    22.6
    5  NMOC              12.247    0.027     1741911     BB    16.0
 ----  ------------    -------  =======  ==========   ----   -----   ------
       Totals:                   0.175     8891521

Total Unidentified Counts :           0 counts

Detected Peaks: 6          Rejected Peaks: 1       Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -414 microVolts          LSB:      1 microVolts

Noise (used): 28 microVolts - monitored before this run

Stream: 1      Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-17-2016, 15;23;50, 1000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 1000ppm mix

Injection Date: 2/17/2016 15:23    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 270          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



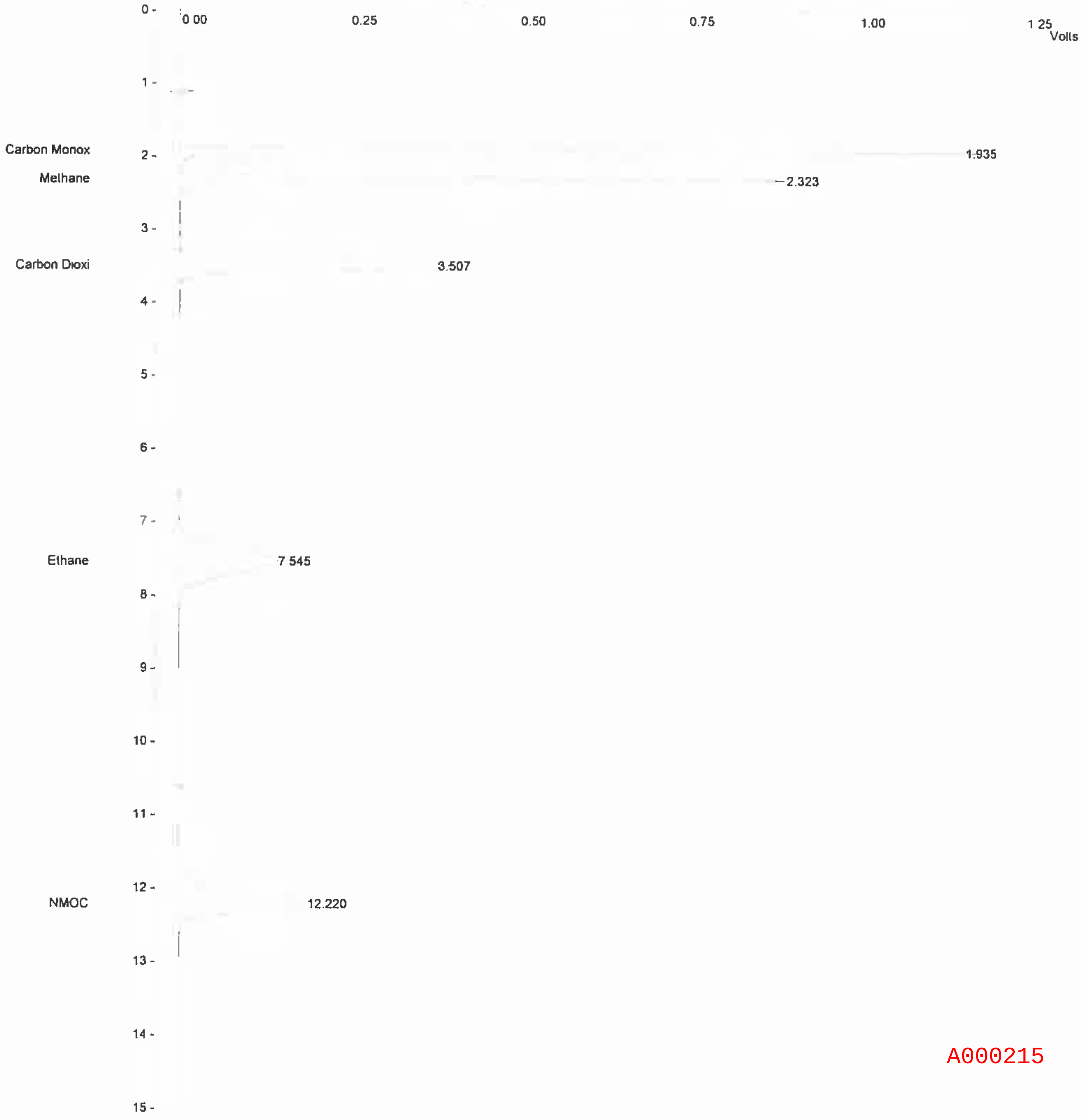
```
Print Date: Thu Feb 18 14:56:48 2016               Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 15:47:14, 1000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 1000ppm mix

Injection Date: 2/17/2016 15:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 2

                         Ret.    Time                     Width
 Peak       Peak         Time   Offset       Area     Sep.  1/2    Status
  No.       Name         (min)   (min)     (counts)   Code (sec)   Codes
 ---- ------------     ------- -------  ----------   ---- -----   ------
    1 Carbon Monox       1.928  -0.014     1721231     BV    2.7
    2 Methane            2.316  -0.016     1840846     VV    3.7
    3 Carbon Dioxi       3.499  -0.019     1819945     VB    8.2
    4 Ethane             7.529   0.032     1797879     BB   22.6
    5 NMOC              12.233  -0.013     1749412     BB   15.8
 ---- ------------     ------- -------  ----------   ---- -----   ------
      Totals:                   -0.094     8929313

Total Unidentified Counts :          0 counts

Detected Peaks: 8           Rejected Peaks: 3      Identified Peaks: 5

Multiplier: N/A         Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -102 microVolts          LSB:     1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1       Injection Number: 3     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-17-2016, 15;47;14, 1000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 1000ppm mix

Injection Date: 2/17/2016 15:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 271          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



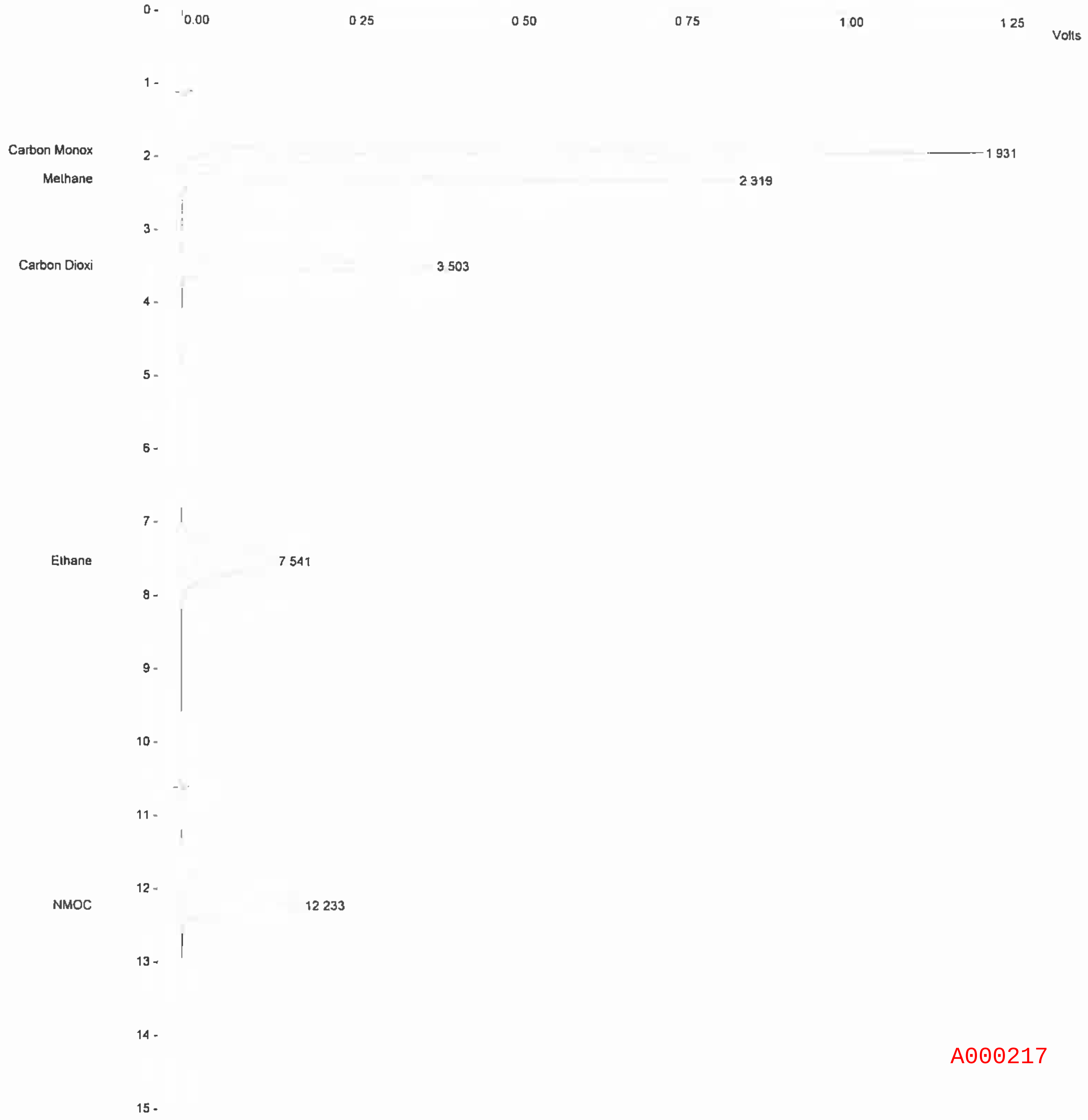
```
Print Date: Thu Feb 18 14:57:04 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 16;40;15, 2000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 2000ppm mix

Injection Date: 2/17/2016 16:40    Calculation Date: 2/18/2016 14:56

Operator     : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                            Bus Address  : 88
Instrument  : Varian Star #1            Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10          Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 1

                         Ret.    Time                          Width
 Peak       Peak         Time   Offset      Area       Sep.    1/2    Status
  No.       Name         (min)   (min)    (counts)     Code   (sec)   Codes
 ---- ------------     ------- ------- -----------   ----  -----   ------
    1 Carbon Monox      1.935   0.005     3649011     BV     2.8
    2 Methane           2.323   0.005     3593083     VV     3.6
    3 Carbon Dioxi      3.507   0.005     3549147     VB     8.2
    4 Ethane            7.545   0.004     3584223     VB    22.7
    5 NMOC             12.220  -0.013     3444635     BB    15.7
 ---- ------------     ------- ------- ==========   ----  -----   ------
      Totals:                   0.006    17820099

Total Unidentified Counts :            0 counts

Detected Peaks: 7           Rejected Peaks: 2      Identified Peaks: 5

Multiplier: N/A         Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -347 microVolts          LSB:      1 microVolts

Noise (used): 30 microVolts - monitored before this run

Stream: 1      Injection Number: 2    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*****************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 16;40;15, 2000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 2000ppm mix

Injection Date: 2/17/2016 16:40    Calculation Date: 2/18/2016 14:56

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 561          Zero Offset = 2%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



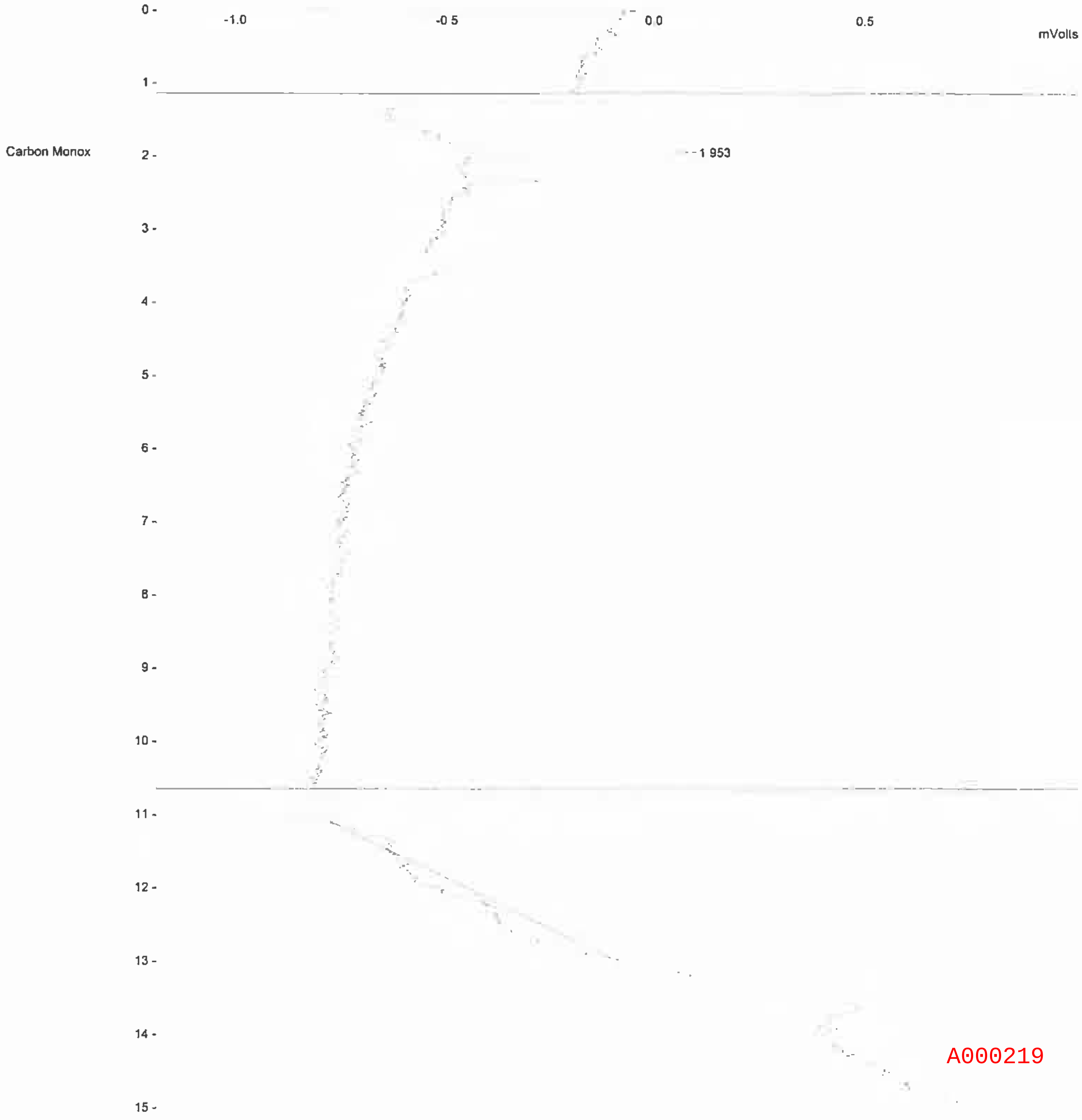
```
Print Date: Thu Feb 18 14:57:11 2016             Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-17-2016, 17:07:56, 2000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 2000ppm mix

Injection Date: 2/17/2016 17:07    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3508-d6b-21c1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : I

                        Ret.    Time                       Width
 Peak       Peak        Time   Offset      Area      Sep.   1/2    Status
  No.       Name        (min)   (min)    (counts)    Code  (sec)   Codes
 ---- ------------    -------- ------- ----------   ----  -----   ------
    1 Carbon Monox       1.931  -0.003    3643625     BV    2.7
    2 Methane            2.319  -0.003    3587084     VV    3.6
    3 Carbon Dioxi       3.503  -0.003    3550089     VB    8.2
    4 Ethane             7.541  -0.004    3579270     BB   22.7
    5 NMOC              12.233   0.013    3436779     BB   15.9
 ---- ------------    -------- ======= ==========   ----  -----   ------
      Totals:                   -0.000   17796847

Total Unidentified Counts :            0 counts

Detected Peaks: 6           Rejected Peaks: 1      Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -276 microVolts          LSB:      1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1      Injection Number: 3    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 17;07;56, 2000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 2000ppm mix

Injection Date: 2/17/2016 17:07    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 581        Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min  Min / Tick  = 1.00
```



```
Print Date: Thu Feb 18 14:58:15 2016                  Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-17-2016, 17;35;35, n2 blank s077.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank s077

Injection Date: 2/17/2016 17:35     Calculation Date: 2/18/2016 14:58

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-35A8-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                          Ret.     Time                             Width
 Peak       Peak            Result        Time    Offset        Area       Sep.      1/2     Status
 No.        Name            (ppmC)        (min)    (min)       (counts)    Code     (sec)    Codes
 ----  ------------   ----------   -------  -------  ----------  ----  -----  ------
    1  Carbon Monox       0.8770      1.953    0.023        1595    BB    2.7
    2  Methane                        2.318                                        M
    3  Carbon Dioxi                   3.502                                        M
    4  Ethane                         7.541                                        M
    5  NMOC                          12.233                                        M
 ----  ------------   ==========   -------  =======  ==========  ----  -----  ------
       Totals:            0.8770               0.023        1595

Status Codes:
M - Missing peak

Total Unidentified Counts :             0 counts

Detected Peaks: 3            Rejected Peaks: 2        Identified Peaks: 5

Multiplier: 1            Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -17 microVolts           LSB:      1 microVolts

Noise (used): 109 microVolts - monitored before this run

Stream: 2       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 17;35;35, n2 blank s077.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank s077

Injection Date: 2/17/2016 17:35    Calculation Date: 2/18/2016 14:58

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =   1.32 cm/min   Attenuation = 1          Zero Offset = 47%
Start Time  =  0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



AIR ANALYSIS REPORT

NON METHANE NON-ETHANE ORGANIC COMPOUND EMISSIONS BY SCAQMD METHOD 25.3(TCA/FID)

Prepared for:

Mr. C.E. Schmidt
C. E. Schmidt
19200 Live Oak Road
Red Bluff, CA 96080

Sampling Date: 02/05/16
Report Date: 02/24/16

Prepared by:

Almega Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630

Report Number: c9922
200 Series

Prepared by: ______________________
Douglass Williams, Laboratory Manager

Reviewed by: ______________________
John Phillips, President

Almega
ENVIRONMENTAL

LABORATORY REPORT

Non-Methane Non-Ethane Organic compound Emissions by SCAQMD Method 25.3 (TCA/FID)

Client	CES
Project No	c9972
Unit Tested	Burner / Gate
Sampling Date	5-Feb-16
Analyzed Date	21-Feb-16
Lab No	A 018

Client Sample ID	Lab ID	Almega Sample ID		Total* NMNEO ppm	NMNEO ppm condensable	NMNEO ppm noncondensable	CH_4 ppm	C_2H_6 ppm	CO ppm	CO_2 ppm	O_2 % v/v by TCD	He % v/v by TCD
		Tank	Trap									
G - 201	A 018 - 201	298	V - 201	3.43	2.16	1.27	24.3	ND	16.0	2203	20.5	1.94
G - 202	A 018 - 202	A116	V - 202	23.1	21.6	1.47	78.2	ND	16.8	2828	20.4	2.54
G - 203	A 018 - 203	91180	V - 203	66.7	55.8	10.9	103	ND	19.1	3587	19.9	4.80
G - 204	A 018 - 204	S017	V - 204	142	130	11.8	205	ND	18.4	2731	19.5	7.41
G - 205	A 018 - 205	537	V - 205	147	129	18.0	230	ND	21.4	2877	19.4	6.99
G - 206	A 018 - 206	91187	V - 206	7.30	2.44	4.85	15.8	ND	19.7	1653	20.8	1.26
G - 207	A 018 - 207	A124	V - 207	11.1	3.72	7.43	4.42	ND	18.6	2729	20.4	1.90
G - 208	A 018 - 208	E0021	V - 208	16.4	7.55	8.85	6.57	ND	25.2	3931	19.9	3.54
G - 209	A 018 - 209	A126	V - 209	24.1	7.01	17.1	26.5	ND	21.0	7150	19.9	4.47
G - 210	A 018 - 210	A107	V - 210	23.4	7.40	16.0	26.8	ND	18.3	7163	19.5	4.42
G - 211	A 018 - 211	E0002	V - 211	13.8	5.37	8.40	15.0	ND	15.9	3684	20.3	2.93
G - 212	A 018 - 212	91185	V - 212	45.5	29.1	16.4	6.08	ND	22.0	9246	19.6	4.43
G - 213	A 018 - 213	S036	V - 213	16.2	8.92	7.29	10.7	ND	16.3	5911	20.5	2.21
G - 214	A 018 - 214	22083	V - 214	30.1	24.1	6.06	159	ND	19.2	4443	20.0	1.43
G - 215	A 018 - 215	S011	V - 215	< 1.0	< 0.50	ND	ND	ND	21.3	112	18.5	10.0
Detection Limit					0.5	1	1	1	1	1	0.2	0.05

* NOTE - the BIAS FACTOR (of 1.066) is NOT applied in these results

ND Not Detected

Water Blank , ppmC 0.05

TGNMNEO concentration values are reported in ppm (v/v) as Methane (carbon#=1)

The sample cylinder is analyzed for NMNEO, CO, CH_4, CO_2 and C_2H_6. It is then directed to a separation column where all heavy organics (C_3+) separate from the light organics (CO, CO_2, CH_4 and C_2H_6). The light organics are then passed through a reduction catalyst to convert CO and CO_2 to CH_4, and are then directed to a FID for detection and quantification. The heavy organics are backflushed off the holding column, passed through an oxidation catalyst, which convert all organics to CO_2, then through a reduction catalyst to convert CO_2 to CH_4 and then to a FID for detection and quantification.

Reviewed by DW

CALCULATIONS

Client: CES
Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date tested: 24-Feb-16

Parameter	Symbol	Units	Run # 1	Run # 2
Sample ID			G - 201	G - 202
Lab ID			A 018 - 201	A 018 - 202
Sample Tank				
Tank No			298	A116
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	604	602
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	928	922
Dilution Factor	DF_T		1.55	1.54
Concentration Methane	C_{CH4}	ppm	15.69	50.70
NMNEO (noncond)	C_{SA}	ppm	**0.82**	**0.95**
Sample Volume	Vs	L	4.667	4.652
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**24.3**	**78.2**
NMNEO (noncond)	C_{SAT}	ppm	**1.27**	**1.47**
Condensate Recovery - Trap				
Sample ID			V - 201	V - 202
Trap No			V - 201	V - 202
Lab No.:			A 018 - 201	A 018 - 202
Sample Impinger Volume	V_{IMP}	ml	8.75	8.00
Sample Volume	V_S	L	4.667	4.652
TC Concentration	C_{TC}	mg/L	4.917	9.060
IC Concentration	C_{IC}	mg/L	4.333	2.685
TOC Concentration	C_{TOC}	mg/L	0.584	6.375
NMNEO, Condensable	C_T	ppm	**2.16**	**21.62**
TNMNEOC (Csa+C_T)	C	ppmC	**3.43**	**23.09**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$k_1 = (273+15.56)/760=0.3799$
$C_{SAT}= DF * C_{SA}$
$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$
V_{ID} =23.6902 L/mole

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date tested: 24-Feb-16

Parameter	Symbol	Units	Run # 3	Run # 4
Sample ID			G - 203	G - 204
Lab ID			A 018 - 203	A 018 - 204
<u>Sample Tank</u>				
Tank No			91180	S017
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	^oC	21	21
Abs. Pre-test Temperature	T_{TI}	^oK	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	594	558
Post-test Temperature	t_{TS}	^oC	21	21
Abs. Post-test Temperature	T_{TS}	^oK	296	294
Final Pressure	P_{TF}	mm Hg (abs)	926	924
Dilution Factor	DF_T		1.58	1.67
Concentration Methane	C_{CH4}	ppm	65.08	123.05
NMNEO (noncond)	C_{SA}	ppm	6.87	7.08
Sample Volume	Vs	L	4.559	4.311
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**102.8**	**205.2**
NMNEO (noncond)	C_{SAT}	ppm	**10.85**	**11.80**
<u>Condensate Recovery - Trap</u>				
Sample ID			V - 203	V - 204
Trap No			V - 203	V - 204
Lab No.:			A 018 - 203	A 018 - 204
Sample Impinger Volume	V_{IMP}	ml	7.25	8.75
Sample Volume	V_S	L	4.559	4.311
TC Concentration	C_{TC}	mg/L	22.233	34.093
IC Concentration	C_{IC}	mg/L	4.436	1.551
TOC Concentration	C_{TOC}	mg/L	17.797	32.542
NMNEO, Condensable	C_T	ppm	**55.83**	**130.30**
TNMNEOC (Csa+C_T)	C	ppmC	**<u>66.68</u>**	**<u>142.10</u>**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$k_1 = (273+15.56)/760=0.3799$
$C_{SAT}= DF * C_{SA}$
$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$
V_{ID} =23.6902 L/mole

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date tested: 24-Feb-16

Parameter	Symbol	Units	Run # 5	Run # 6
Sample ID			G - 205	G - 206
Lab ID			A 018 - 205	A 018 - 206
Sample Tank				
Tank No			S37	91187
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	^{o}C	21	21
Abs. Pre-test Temperature	T_{TI}	^{o}K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	614	556
Post-test Temperature	t_{TS}	^{o}C	21	21
Abs. Post-test Temperature	T_{TS}	^{o}K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	926	924
Dilution Factor	DF_T		1.52	1.67
Concentration Methane	C_{CH4}	ppm	151.63	9.46
NMNEO (noncond)	C_{SA}	ppm	**11.84**	**2.90**
Sample Volume	Vs	L	4.745	4.295
Methane in Tank(C_{CH4}*DFT)	C_{CH4T}	ppm	**230.21**	**15.83**
NMNEO (noncond)	C_{SAT}	ppm	**17.98**	**4.85**
Condensate Recovery - Trap				
Sample ID			V - 205	V - 206
Trap No			V - 205	V - 206
Lab No.:			A 018 - 205	A 018 - 206
Sample Impinger Volume	V_{IMP}	ml	7.50	7.75
Sample Volume	V_S	L	4.745	4.295
TC Concentration	C_{TC}	mg/L	42.570	2.05
IC Concentration	C_{IC}	mg/L	1.343	1.367
TOC Concentration	C_{TOC}	mg/L	41.227	0.69
NMNEO, Condensable	C_T	ppm	**128.54**	**2.44**
TNMNEOC (Csa+CT)	C	ppmC	**146.53**	**7.30**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$

V_{ID} =23.6902 L/mole

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date tested: 24-Feb-16

Parameter	Symbol	Units	Run # 7	Run # 8
Sample ID			G - 207	G - 208
Lab ID			A 018 - 207	A 018 - 208
<u>Sample Tank</u>				
Tank No			A124	E0021
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_h	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	570	578
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	922	926
Dilution Factor	DF_T		1.63	1.61
Concentration Methane	C_{CH4}	ppm	2.71	4.07
NMNEO (noncond)	C_{SA}	ppm	**4.56**	**5.49**
Sample Volume	Vs	L	4.404	4.466
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**4.4**	**6.6**
NMNEO (noncond)	C_{SAT}	ppm	**7.43**	**8.85**
<u>Condensate Recovery - Trap</u>				
Sample ID			V - 207	V - 208
Trap No			V - 207	V - 208
Lab No.:			A 018 - 207	A 018 - 208
Sample Impinger Volume	V_{IMP}	ml	8.50	8.00
Sample Volume	V_S	L	4.404	4.466
TC Concentration	C_{TC}	mg/L	2.493	3.879
IC Concentration	C_{IC}	mg/L	1.517	1.743
TOC Concentration	C_{TOC}	mg/L	0.976	2.136
NMNEO, Condensable	C_T	ppm	**3.72**	**7.55**
TNMNEOC (Csa+C_T)	C	ppmC	**<u>11.15</u>**	**<u>16.40</u>**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$

V_{ID} =23.6902 L/mole

CALCULATIONS

Client:	CES	Lab No.: A 018
Project No.:	c9922	
Unit Tested:	Burrtec / Gore	
Sampling Date:	5-Feb-16	
Date tested:	24-Feb-16	

Parameter	Symbol	Units	Run # 9	Run # 10
Sample ID			G - 209	G - 210
Lab ID			A 018 - 209	A 018 - 210
Sample Tank				
Tank No			A126	A107
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	^oC	21	21
Abs. Pre-test Temperature	T_{TI}	^oK	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	456	602
Post-test Temperature	t_{TS}	^oC	21	21
Abs. Post-test Temperature	T_{TS}	^oK	296	294
Final Pressure	P_{TF}	mm Hg (abs)	930	922
Dilution Factor	DF_T		2.07	1.54
Concentration Methane	C_{CH4}	ppm	12.81	17.39
NMNEO (noncond)	C_{SA}	ppm	8.26	10.36
Sample Volume	Vs	L	3.496	4.652
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**26.5**	**26.8**
NMNEO (noncond)	C_{SAT}	ppm	**17.09**	**15.98**
Condensate Recovery - Trap				
Sample ID			V - 209	V - 210
Trap No			V - 209	V - 210
Lab No.:			A 018 - 209	A 018 - 210
Sample Impinger Volume	V_{IMP}	ml	8.50	8.50
Sample Volume	V_S	L	3.496	4.652
TC Concentration	C_{TC}	mg/L	3.455	4.055
IC Concentration	C_{IC}	mg/L	1.994	2.002
TOC Concentration	C_{TOC}	mg/L	1.461	2.053
NMNEO, Condensable	C_T	ppm	**7.01**	**7.40**
TNMNEOC (Csa+C_T)	C	ppmC	**24.10**	**23.38**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$

V_{ID} =23.6902 L/mole

CALCULATIONS

Client:	CES	Lab No.: A 018
Project No.:	c9922	
Unit Tested:	Burrtec / Gore	
Sampling Date:	5-Feb-16	
Date tested:	24-Feb-16	

Parameter	Symbol	Units	Run # 11	Run # 12
Sample ID			G - 211	G - 212
Lab ID			A 018 - 211	A 018 - 212
Sample Tank				
Tank No			E0002	91185
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	°C	21	21
Abs. Pre-test Temperature	T_{TI}	°K	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	678	606
Post-test Temperature	t_{TS}	°C	21	21
Abs. Post-test Temperature	T_{TS}	°K	294	294
Final Pressure	P_{TF}	mm Hg (abs)	930	920
Dilution Factor	DF_T		1.38	1.53
Concentration Methane	C_{CH4}	ppm	10.85	3.98
NMNEO (noncond)	C_{SA}	ppm	**6.08**	**10.73**
Sample Volume	Vs	L	5.241	4.683
Methane in Tank(C_{CH4}*DFT)	C_{CH4T}	ppm	**14.97**	**6.08**
NMNEO (noncond)	C_{SAT}	ppm	**8.40**	**16.40**
Condensate Recovery - Trap				
Sample ID			V - 211	V - 212
Trap No			V - 211	V - 212
Lab No.:			A 018 - 211	A 018 - 212
Sample Impinger Volume	V_{IMP}	ml	8.00	7.75
Sample Volume	V_S	L	5.241	4.683
TC Concentration	C_{TC}	mg/L	4.432	15.75
IC Concentration	C_{IC}	mg/L	2.648	6.845
TOC Concentration	C_{TOC}	mg/L	1.784	8.91
NMNEO, Condensable	C_T	ppm	**5.37**	**29.08**
TNMNEOC (Csa+CT)	C	ppmC	**13.77**	**45.48**

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$

V_{ID} =23.6902 L/mole

CALCULATIONS

Client: CES Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date tested: 24-Feb-16

Parameter	Symbol	Units	Run # 13	Run # 14
Sample ID			G - 213	G - 214
Lab ID			A 018 - 213	A 018 - 214
<u>Sample Tank</u>				
Tank No			S036	22083
Sample Tank Volume	V_T	L	6.000	6.000
Barometric Pressure	P_b	mm Hg	763	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2	2
Pre-test Temperature	t_{TI}	^oC	21	21
Abs. Pre-test Temperature	T_{TI}	^oK	294	294
Post-test Pressure	P_{TS}	mm Hg (abs)	600	612
Post-test Temperature	t_{TS}	^oC	21	21
Abs. Post-test Temperature	T_{TS}	^oK	294	294
Final Pressure	P_{TF}	mm Hg (abs)	928	934
Dilution Factor	DF_T		1.56	1.54
Concentration Methane	C_{CH4}	ppm	6.85	103.32
NMNEO (noncond)	C_{SA}	ppm	**4.68**	**3.94**
Sample Volume	Vs	L	4.636	4.729
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**10.7**	**158.7**
NMNEO (noncond)	C_{SAT}	ppm	**7.29**	**6.06**
<u>Condensate Recovery - Trap</u>				
Sample ID			V - 213	V - 214
Trap No			V - 213	V - 214
Lab No.:			A 018 - 213	A 018 - 214
Sample Impinger Volume	V_{IMP}	ml	8.75	8.25
Sample Volume	V_S	L	4.636	4.729
TC Concentration	C_{TC}	mg/L	6.538	10.353
IC Concentration	C_{IC}	mg/L	4.141	3.352
TOC Concentration	C_{TOC}	mg/L	2.397	7.001
NMNEO, Condensable	C_T	ppm	**8.92**	**24.09**
TNMNEOC (Csa+C_T)	C	ppmC	<u>**16.22**</u>	<u>**30.15**</u>

Calculations

$V_S=k_1*V_T*(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$k_1 = (273+15.56)/760=0.3799$

$C_{SAT}= DF * C_{SA}$

$C_{CH4T} = DF * C_{CH4}$

$DF=(P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$

$C_T =(C_{TOC} * V_{IMP} * V_{ID})/(V_S*A_C)$

V_{ID} =23.6902 L/mole

CALCULATIONS

Client: CES — Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date tested: 24-Feb-16

Parameter	Symbol	Units	Run # 15
Sample ID			G - 215
Lab ID			A 018 - 215
Sample Tank			
Tank No			S011
Sample Tank Volume	V_T	L	6.000
Barometric Pressure	P_b	mm Hg	763
Pre-test Pressure	P_{TI}	mm Hg (abs)	2
Pre-test Temperature	t_{TI}	°C	21
Abs. Pre-test Temperature	T_{TI}	°K	294
Post-test Pressure	P_{TS}	mm Hg (abs)	1020
Post-test Temperature	t_{TS}	°C	21
Abs. Post-test Temperature	T_{TS}	°K	296
Final Pressure	P_{TF}	mm Hg (abs)	1020
Dilution Factor	DF_T		1.01
Concentration Methane	C_{CH4}	ppm	ND
NMNEO (noncond)	C_{SA}	ppm	ND
Sample Volume	Vs	L	7.839
Methane in Tank(C_{CH4}*DF_T)	C_{CH4T}	ppm	**ND**
NMNEO (noncond)	C_{SAT}	ppm	**ND**
Condensate Recovery - Trap			
Sample ID			V - 215
Trap No			V - 215
Lab No.:			A 018 - 215
Sample Impinger Volume	V_{IMP}	ml	7.00
Sample Volume	V_S	L	7.839
TC Concentration	C_{TC}	mg/L	0.488
IC Concentration	C_{IC}	mg/L	0.466
TOC Concentration	C_{TOC}	mg/L	0.023
NMNEO, Condensable	C_T	ppm	**0.04**
TNMNEOC (Csa+C_T)	C	ppmC	**<u>0.04</u>**

Calculations

$V_S = k_1 * V_T * (P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$k_1 = (273+15.56)/760 = 0.3799$
$C_{SAT} = DF * C_{SA}$
$C_{CH4T} = DF * C_{CH4}$

$DF = (P_{TF}/T_{TF})/(P_{TS}/T_{TS} - P_{TI}/T_{TI})$
$C_T = (C_{TOC} * V_{IMP} * V_{ID})/(V_S * A_C)$
V_{ID} =23.6902 L/mole

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c9922	Lab No.:	A 018
Sampling Date:	5-Feb-16	Analyzed Date:	24-Feb-16

Run # 1

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 201	17929	18298	-2.06	10.2	10.5	10.3	-2.04
CH4	A 018 - 201	28718	28340	1.32	15.8	15.6	15.7	1.32
CO2	A 018 - 201	2542433	2543046	-0.02	1424.1	1424.5	1424.3	-0.02
O2*	A 018 - 201	2635303	2650934	-0.59	13.2	13.3	13.3	-0.59
He*	A 018 - 201	1439286	1438104	0.08	1.3	1.3	1.3	0.08
C2H6	A 018 - 201	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 201	1482	1362	8.10	0.9	0.8	0.8	8.44
Analyte	**Sample ID**	**Conc # 1**	**Conc # 2**	**Conc # 3**	**Mean Conc ppm**	**COV 10%**		
Trap Analysis								
TC	A 018 - 201	4.875	4.952	4.925	4.917	0.76	DF 1	
IC	A 018 - 201	4.418	4.272	4.310	4.333	1.64		

Run # 2

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 202	18846	19280	-2.30	10.8	11.0	10.9	-2.28
CH4	A 018 - 202	92134	92278	-0.16	50.7	50.7	50.7	-0.16
CO2	A 018 - 202	3270919	3278056	-0.22	1832.2	1836.2	1834.2	-0.22
O2*	A 018 - 202	2652613	2611304	1.56	13.3	13.1	13.2	1.57
He*	A 018 - 202	1899338	1883610	0.83	1.7	1.6	1.6	0.83
C2H6	A 018 - 202	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 202	1663	1629	2.04	1.0	0.9	1.0	2.07
Analyte	**Sample ID**	**Conc # 1**	**Conc # 2**	**Conc # 3**	**Mean Conc ppm**	**COV 10%**		
Trap Analysis								
TC	A 018 - 202	9.187	8.940	9.052	9.060	1.32	DF=1	
IC	A 018 - 202	2.760	2.661	2.634	2.685	2.24		

Water blank

TC	0.000
IC	-0.050
TOC	**0.050**

* - by GC/TCD

$\text{Conc}_{(TC)}$ in tank = $\text{MeanConc}_{(TC)}$ * DF

$\text{Conc}_{(IC)}$ in tank = $\text{MeanConc}_{(IC)}$ * DF

$\text{Conc}_{(IC)}$ in tank = $\text{MeanConc}_{(IC)}$ * DF

$\text{Conc}_{(TOC)}$ in tank = $\text{MeanConc}_{(TOC)}$ * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.: c9922
Sampling Date: 5-Feb-16
Lab No.: A 018
Analyzed Date: 24-Feb-16

Run # 3

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 203	20844	21462	-2.96	11.9	12.3	**12.1**	-2.92
CH4	A 018 - 203	117982	118750	-0.65	64.87	65.29	**65.08**	-0.65
CO2	A 018 - 203	4043935	4060877	-0.42	2265.2	2274.7	**2269.9**	-0.42
O2*	A 018 - 203	2497756	2513687	-0.64	12.6	12.6	**12.6**	-0.64
He*	A 018 - 203	3482875	3494237	-0.33	3.0	3.0	**3.0**	-0.33
C2H6	A 018 - 203	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 203	11854	11923	-0.58	6.8	6.9	**7**	-0.58

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 203	22.05	22.20	22.45	**22.23**	0.90	DF=1
IC	A 018 - 203	4.564	4.358	4.386	**4.436**	2.37	

Run # 4

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 204	18836	19800	-5.12	10.8	11.3	**11.0**	-4.99
CH4	A 018 - 204	234406	213226	9.04	128.88	117.21	**123.05**	9.46
CO2	A 018 - 204	3007563	2840439	5.56	1684.7	1591.1	**1637.9**	5.72
O2*	A 018 - 204	2330011	2313238	0.72	11.7	11.6	**11.7**	0.72
He*	A 018 - 204	5112867	5084896	0.55	4.5	4.4	**4.4**	0.55
C2H6	A 018 - 204	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 204	12283	12227	0.46	7.1	7.1	**7.1**	0.46

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 204	34.17	34.12	33.99	**34.09**	0.26	DF=1
IC	A 018 - 204	1.613	1.55	1.490	**1.551**	3.68	

Water blank

TC	0.000
IC	-0.050
TOC	**0.050**

Conc[illegible] in tank MeanConc[illegible] * DF
Conc[illegible] in tank MeanConc[illegible] * DF
Conc[illegible] in tank MeanConc[illegible] * DF
Conc[illegible] in tank · MeanConc[illegible] * DF

* - by GC/TCD

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c9922	Lab No.:	A 018
Sampling Date:	5-Feb-16	Analyzed Date:	24-Feb-16

Run # 5

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 205	24677	24681	-0.02	14.1	14.1	**14.1**	-0.02
CH4	A 018 - 205	276254	275326	0.34	151.9	151.4	**151.6**	0.34
CO2	A 018 - 205	3386591	3379139	0.22	1897.0	1892.8	**1894.9**	0.22
O2*	A 018 - 205	2542097	2533271	0.35	12.8	12.7	**12.8**	0.35
He*	A 018 - 205	5289012	5274793	0.27	4.6	4.6	**4.6**	0.27
C2H6	A 018 - 205	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 205	20675	20342	1.61	11.9	11.7	**11.8**	1.62

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 205	42.64	42.67	42.40	**42.57**	0.34	DF 1
IC	A 018 - 205	1.301	1.397	1.331	**1.343**	3.37	

Run # 6

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 206	19937	21253	-6.60	11.4	12.1	**11.8**	-6.39
CH4	A 018 - 206	17299	17109	1.10	9.5	9.4	**9.5**	1.10
CO2	A 018 - 206	1762484	1764299	-0.10	987.3	988.3	**987.8**	-0.10
O2*	A 018 - 206	2476052	2460221	0.64	12.4	12.4	**12.4**	0.64
He*	A 018 - 206	864465	857089	0.85	0.8	0.7	**0.7**	0.86
C2H6	A 018 - 206	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 206	4942	5101	-3.22	2.85	2.95	**2.90**	-3.17

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 206	2.023	2.025	2.111	2.053	2.19	DF=1
IC	A 018 - 206	1.394	1.376	1.330	1.367	2.20	

Water blank	
TC	0.000
IC	-0.050
TOC	0.050

* - by GC/TCD

Conc[illegible] in tank = MeanConc[illegible] * DF
Conc[illegible] in tank = MeanConc[illegible] * DF
Conc[illegible] in tank = MeanConc[illegible] * DF
Conc[illegible] in tank = MeanConc[illegible] * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	e9932	Lab No.:	A 018
Sampling Date:	5-Feb-16	Analyzed Date:	24-Feb-16

Run # 7

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 207	19594	20389	-4.06	11.2	11.6	11.4	-3.98
CH4	A 018 - 207	4948	4924	0.49	2.7	2.7	2.7	0.49
CO2	A 018 - 207	2994720	2988659	0.20	1677.5	1674.1	1675.8	0.20
O2*	A 018 - 207	2493691	2435543	2.31	12.7	12.4	12.5	2.36
He*	A 018 - 207	1334574	1297074	2.81	1.2	1.2	1.2	2.85
C2H6	A 018 - 207	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 207	7914	7883	0.39	4.6	4.6	4.6	0.39
Analyte	**Sample ID**	**Conc # 1**	**Conc # 2**	**Conc # 3**	**Mean Conc ppm**	**COV 10%**		
Trap Analysis								
TC	A 018 - 207	2.450	2.517	2.511	2.493	1.36	DF=1	
IC	A 018 - 207	1.516	1.510	1.524	1.517	0.40		

Run # 8

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 208	27585	27103	1.75	15.8	15.5	15.6	1.76
CH4	A 018 - 208	7486	7334	2.03	4.1	4.0	4.1	2.05
CO2	A 018 - 208	4340181	4359977	-0.46	2431.1	2442.2	2436.7	-0.46
O2*	A 018 - 208	2425989	2427495	-0.06	12.3	12.3	12.3	-0.06
He*	A 018 - 208	2471312	2473394	-0.08	2.2	2.2	2.2	-0.08
C2H6	A 018 - 208	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 208	9311	9687	-4.04	5.4	5.6	5.5	-3.96
Analyte	**Sample ID**	**Conc # 1**	**Conc # 2**	**Conc # 3**	**Mean Conc ppm**	**COV 10%**		
Trap Analysis								
TC	A 018 - 208	3.851	3.941	3.845	3.879	1.31	DF=1	
IC	A 018 - 208	1.709	1.719	1.801	1.743	2.70		

Water blank

TC	-0.110
IC	-0.070
TOC	**-0.040**

* - by GC/TCD

Conc[illegible] in tank = MeanConc[illegible] * DF

Conc[illegible] in tank = MeanConc[illegible] * DF

Conc[illegible] in tank = MeanConc[illegible] * DF

Conc[illegible] in tank = MeanConc[illegible] * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.:	c9922	Lab No.:	A 018
Sampling Date:	5-Feb-16	Analyzed Date:	24-Feb-16

Run # 9

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 209	18295	17201	5.98	10.5	9.8	**10.1**	6.16
CH4	A 018 - 209	22775	23835	-4.65	12.52	13.10	**12.81**	-4.55
CO2	A 018 - 209	6170223	6165741	0.07	3456.2	3453.7	**3455.0**	0.07
O2*	A 018 - 209	1888466	1887392	0.06	9.6	9.6	**9.6**	0.06
He*	A 018 - 209	2430629	2426392	0.17	2.2	2.2	**2.2**	0.17
C2H6	A 018 - 209	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 209	14284	14314	-0.21	8.2	8.3	**8**	-0.21

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 209	3.437	3.443	3.485	**3.455**	0.70	DF =1
IC	A 018 - 209	1.986	1.970	2.026	1.994	1.36	

Run # 10

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 210	20250	21316	-5.26	11.6	12.2	**11.9**	-5.13
CH4	A 018 - 210	30300	32976	-8.83	16.66	18.13	**17.39**	-8.46
CO2	A 018 - 210	8288341	8298788	-0.13	4642.7	4648.5	**4645.6**	-0.13
O2*	A 018 - 210	2475956	2500499	-0.99	12.6	12.7	**12.7**	-0.99
He*	A 018 - 210	3203980	3239606	-1.11	2.8	2.9	**2.9**	-1.11
C2H6	A 018 - 210	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 210	17833	18045	-1.19	10.3	10.4	**10.4**	-1.18

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 210	4.06	4.01	4.09	**4.06**	0.93	DF=1
IC	A 018 - 210	1.970	2.02	2.019	**2.002**	1.30	

Water blank	
TC	-0.110
IC	-0.070
TOC	0.00

Conc$_{TC}$ in tank = MeanConc$_{TC}$ * DF

Conc$_{[illegible]}$ in tank = MeanConc$_{[illegible]}$ * DF

Conc$_{IC}$ in tank = MeanConc$_{IC}$ * DF

Conc$_{[illegible]}$ in tank = MeanConc$_{[illegible]}$ * DF

* - by GC/TCD

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.: e9922
Sampling Date: 5-Feb-16
Lab No.: A 018
Analyzed Date: 24-Feb-16

Run # 11								
Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018-211	19468	20749	-6.58	11.1	11.9	11.5	-6.37
CH4	A 018-211	19674	19778	-0.53	10.8	10.9	10.8	-0.53
CO2	A 018-211	4764148	4765269	-0.02	2668.6	2669.3	2668.9	-0.02
O2*	A 018-211	2890363	2904967	-0.51	14.7	14.8	14.7	-0.50
He*	A 018-211	2396728	2383142	0.57	2.1	2.1	2.1	0.57
C2H6	A 018-211	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018-211	10384	10678	-2.83	6.0	6.2	6.1	-2.79
Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%		
Trap Analysis								
TC	A 018-211	4,481	4,353	4.461	4.432	1.47	DF=1	
IC	A 018-211	2.681	2.628	2.634	2.648	0.98		

Run # 12								
Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018-212	25220	25265	-0.18	14.4	14.4	14.4	-0.18
CH4	A 018-212	7278	7190	1.21	4.0	4.0	4.0	1.22
CO2	A 018-212	10789888	10810851	-0.19	6043.9	6055.7	6049.8	-0.19
O2*	A 018-212	2520209	2522993	-0.11	12.8	12.8	12.8	-0.11
He*	A 018-212	3246904	3273763	-0.83	2.9	2.9	2.9	-0.82
C2H6	A 018-212	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018-212	19002	18146	4.50	10.97	10.48	10.73	4.61
Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%		
Trap Analysis								
TC	A 018-212	15.56	15.72	15.98	15.75	1.32	DF=1	
IC	A 018-212	6.969	6.737	6.828	6.845	1.64		

Water blank	
TC	-0.110
IC	-0.070
TOC	0.00

* - by GC/TCD

Conc_{CO} in tank = MeanConc_{CO} * DF
Conc_{CO2} in tank = MeanConc_{CO2} * DF
$\text{Conc}_{[illegible]}$ in tank = $\text{MeanConc}_{[illegible]}$ * DF
Conc_{C2H6} in tank = MeanConc_{C2H6} * DF

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.: c9932
Sampling Date: 5-Feb-16
Lab No.: A 018
Analyzed Date: 24-Feb-16

Run # 13

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 213	18069	18504	-2.41	10.3	10.6	**10.4**	-2.38
CH4	A 018 - 213	12511	12396	0.92	6.9	6.8	**6.8**	0.92
CO2	A 018 - 213	5275103	8279596	-56.96	2954.8	4637.8	**3796.3**	-44.33
O2*	A 018 - 213	2582489	2587756	-0.20	13.1	13.2	**13.1**	-0.20
He*	A 018 - 213	1598527	1599700	-0.07	1.4	1.4	**1.4**	-0.07
C2H6	A 018 - 213	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 213	8050	8171	-1.50	4.6	4.7	**4.7**	-1.49

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 213	6.589	6.625	6.399	**6.538**	1.79	DF=1
IC	A 018 - 213	4.192	4.148	4.083	**4.141**	1.24	

Run # 14

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 214	21984	21861	0.56	12.6	12.5	**12.5**	0.56
CH4	A 018 - 214	189310	186515	1.48	104.1	102.5	**103.3**	1.49
CO2	A 018 - 214	5160383	5164446	-0.08	2890.6	2892.8	**2891.7**	-0.08
O2*	A 018 - 214	2618317	2624679	-0.24	13.0	13.1	**13.0**	-0.24
He*	A 018 - 214	1048183	1053211	-0.48	0.9	0.9	**0.9**	-0.48
C2H6	A 018 - 214	ND	ND	ND	ND	ND	**ND**	ND
NMNEO	A 018 - 214	6775	6876	-1.49	3.9	4.0	**3.9**	-1.48

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 214	10.23	10.40	10.43	**10.35**	0.98	DF 1
IC	A 018 - 214	3.372	3.310	3.374	**3.352**	1.01	

Water blank

TC	-0.110
IC	-0.070
TOC	0.00

$\text{Conc}_{(TC)}$ in tank = $\text{MeanConc}_{(TC)}$ * DF
$\text{Conc}_{(TOC)}$ in tank = $\text{MeanConc}_{(TOC)}$ * DF
$\text{Conc}_{(IC)}$ in tank = $\text{MeanConc}_{(IC)}$ * DF
$\text{Conc}_{(gas)}$ in tank = $\text{MeanConc}_{(gas)}$ * DF

* - by GC/TCD

QA/QC SUMMARY
(Repeat Analysis)

Client Project No.: c9922
Sampling Date: 5-Feb-16
Run # 15

Lab No.: A 018
Analyzed Date: 24-Feb-16

Analyte	Sample ID	Area Count #1	Area Count #2	Area % diff (±20%)	Conc # 1	Conc # 2	Mean Conc ppm	% diff from Mean
Tank Analysis								
CO	A 018 - 215	38708	34884	9.88	22.1	19.9	21.0	10.39
CH4	A 018 - 215	ND	ND	ND	ND	ND	ND	ND
CO2	A 018 - 215	2141	1813	15.32	1.2	1.0	1.1	16.59
O2*	A 018 - 215	3683880	3675344	0.23	18.3	18.3	18.3	0.23
He*	A 018 - 215	11167672	11125216	0.38	9.9	9.9	9.9	0.38
C2H6	A 018 - 215	ND	ND	ND	ND	ND	ND	ND
NMNEO	A 018 - 215	ND	ND	ND	ND	ND	ND	ND

Analyte	Sample ID	Conc # 1	Conc # 2	Conc # 3	Mean Conc ppm	COV 10%	
Trap Analysis							
TC	A 018 - 215	0.482	0.501	0.482	0.488	1.55	DF= 1
IC	A 018 - 215	0.424	0.494	0.479	0.466	6.24	

Water blank

TC	-0.110
IC	-0.070
TOC	0.00

Conc$_{(a)}$ in tank = MeanConc$_{(a)}$ * DF
Conc$_{(b)}$ in tank = MeanConc$_{(b)}$ * DF
Conc$_{(c)}$ in tank = MeanConc$_{(c)}$ * DF
Conc$_{(d)}$ in tank = MeanConc$_{(d)}$ * DF

* - by GC/TCD

SAMPLE INVENTORY REPORT

Method 25.3 Sampling Train

Project No.:	c9922	Lab No.:	A 018
Client:	CES	Sampling Date:	5-Feb-16

Laboratory ID	Client ID	Component ID	
Run # 1			
A 018 - 201	G - 201	Tank #	298
A 018 - 201	V - 201	Impinger	V - 201
Run # 2			
A 018 - 202	G - 202	Tank #	A116
A 018 - 202	V - 202	Impinger	V - 202
Run # 3			
A 018 - 203	G - 203	Tank #	91180
A 018 - 203	V - 203	Impinger	V - 203
Run # 4			
A 018 - 204	G - 204	Tank #	S017
A 018 - 204	V - 204	Impinger	V - 204
Run # 5			
A 018 - 205	G - 205	Tank #	S37
A 018 - 205	V - 205	Impinger	V - 205
Run # 6			
A 018 - 206	G - 206	Tank #	91187
A 018 - 206	V - 206	Impinger	V - 206

SAMPLE INVENTORY REPORT

Method 25.3 Sampling Train

Project No.:	c9922	Lab No.:	A 018
Client:	CES	Sampling Date:	5-Feb-16

Laboratory ID	**Client ID**	**Component ID**	
Run # 7			
A 018 - 207	G - 207	Tank #	A124
A 018 - 207	V - 207	Impinger	V - 207
Run # 8			
A 018 - 208	G - 208	Tank #	E0021
A 018 - 208	V - 208	Impinger	V - 208
Run # 9			
A 018 - 209	G - 209	Tank #	A126
A 018 - 209	V - 209	Impinger	V - 209
Run # 10			
A 018 - 210	G - 210	Tank #	A107
A 018 - 210	V - 210	Impinger	V - 210
Run # 11			
A 018 - 211	G - 211	Tank #	E0002
A 018 - 211	V - 211	Impinger	V - 211
Run # 12			
A 018 - 212	G - 212	Tank #	91185
A 018 - 212	V - 212	Impinger	V - 212

SAMPLE INVENTORY REPORT

Method 25.3 Sampling Train

Project No.:	c9922	Lab No.:	A 018
Client:	CES	Sampling Date:	5-Feb-16

Laboratory ID	**Client ID**	**Component ID**	
Run # 13			
A 018 - 213	G - 213	Tank #	S036
A 018 - 213	V - 213	Impinger	V - 213
Run # 14			
A 018 - 214	G - 214	Tank #	22083
A 018 - 214	V - 214	Impinger	V - 214
Run # 15			
A 018 - 215	G - 215	Tank #	S011
A 018 - 215	V - 215	Impinger	V - 215

c9922

Cct# AC8

CE Schmidt, PhD, Environmental Consultant
Chain of Custody Record

SCAQMD 2 Day 2

Form Serial Number CES F1-02106	For Information Regarding These Samples Please Contact:	Client Address and Phone Number 9890 Cherry Ave Fontana, CA 92335 909-479-4200	Laboratory Name Almega Environmental
Client Name Burrtec WV Gore Compliance Test	Dr. Charles E. Schmidt 19200 Live Oak Road, Red Bluff, CA 96080 530-529-4256 Fax 530-529-4878 E-Mail SCHMIDTCE@aol.com	Analysis Requested	Laboratory Address 10602 Walker Street Cypress, CA 90630
Project Manager Gary Koontz			Laboratory Phone 714-889-4000
Requested Completion Date			Laboratory Contact Mr. John Phillips

Station Number ID	Date	Time	COMP	GRAB	Can Label	Can ID Number	Vial Label	# OF CONTAINERS	Sample Container: Vial	Sample Container: Can	Sample Container: Bottle	SCAQMD 25.3	Helium Tracer		SF6 Tracer (EA3)	Can Pressure In (Inches HG)	Can Pressure Out (Inches HG)	Remarks
	2/5/2016	852		x	G- 201	0298	V- 201	2	x	x		x	x			-28	-5	
	2/5/2016	850		x	G- 202	A116	V- 202	2	x	x		x	x			-28	-5	
	2/5/2016	852		x	G- 203	91190	V- 203	2	x	x		x	x			-29	-5	
	2/5/2016	850		x	G- 204	5017	V- 204	2	x	x		x	x			-28	-8	
	2/5/2016	850		x	G- 205	5037	V- 205	2	x	x		x	x			-28	-4	
	2/5/2016	1046		x	G- 206	91189	V- 206	2	x	x		x	x			-28	-5	
	2/5/2016	1046		x	G- 207	A174	V- 207	2	x	x		x	x			-28	-9	
	2/5/2016	1044		x	G- 208	C0021	V- 208	2	x	x		x	x			-28	-5.5	
	2/5/2016	1044		x	G- 209	A126	V- 209	2	x	x		x	x			-29	-10	
	2/5/2016	1044		x	G- 210	A107	V- 210	2	x	x		x	x			-28	~~-10~~	-5
	2/5/2016	1247		x	G- 211	G0002	V- 211	2	x	x		x	x			-28	-5	
	2/5/2016	1246		x	G- 212	91185	V- 212	2	x	x		x	x			-28	-5	
	2/5/2016	1245		x	G- 213	5036	V- 213	2	x	x		x	x			-28	-5	
	2/5/2016	1244		x	G- 214	22083	V- 214	2	x	x		x	x			-28	-6	
	6	1355			2/5	Soil	2/5	2	✓	✓		X	✓			-28	0	

Sampler CESchmidt	Date/Time 1430 2/5/16	Relinquished by CESchmidt	Date/Time 1430 2/5/16	HAZWRAP/NEESA Y N	
Recieved by	Date/Time 02/05/16 1430	Relinquished by	Date/Time 02/06/16 16:10	QC Level 1 2 3	
Recieved by	Date/Time	Relinquished by	Date/Time	COC	
				Ana Req	
				Cust Seal	
				Sample Condition	
Recieved by Laboratory	Date/Time 2/5/16 16:30	Sample Shipped Via UPS FEDEX BUS [✓ Other]			
Remarks					

File: Burrtec WV Forms 25.3 P2 00.xlsb Form: 25.3 COC Flux D2

Almega
ENVIRONMENTAL

Standard Receipt
Sample LOG in Checklist

Project No: 27922

Lab ID: A0198

Method: M23 3/14c. M207.1

Sampling Date: 2/4 - 2/7/16

Location: C&S

Int:

Date & Time Rc'd: 5/5/16

Location: [illegible] LAB

Int. Du

Arrived By: (circle) FedEx UPS Drop Off (Int) Du Other

Condition of Package(s): (comment): ok

Package Type: Box [✓ Cooler] Other:

Number of Sample Container(s):

Correct Containers (per Method): [✓ Y] N

Preservation: (circle) [✓ ICE] DryICE ICEPacks None

Sample Conditions:

Sample Temp (C): 6.1

Ambient Temp (C): 21

Sample Temp (C): 6.1

Filter Condition: —

PH : <2.0

Components Sealed: [✓ Y] N

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other

Silica Gel Condition:

Tedlar Bags -
Condensation: Y N

Comments:

Container(s) Requested: Glass Plastic

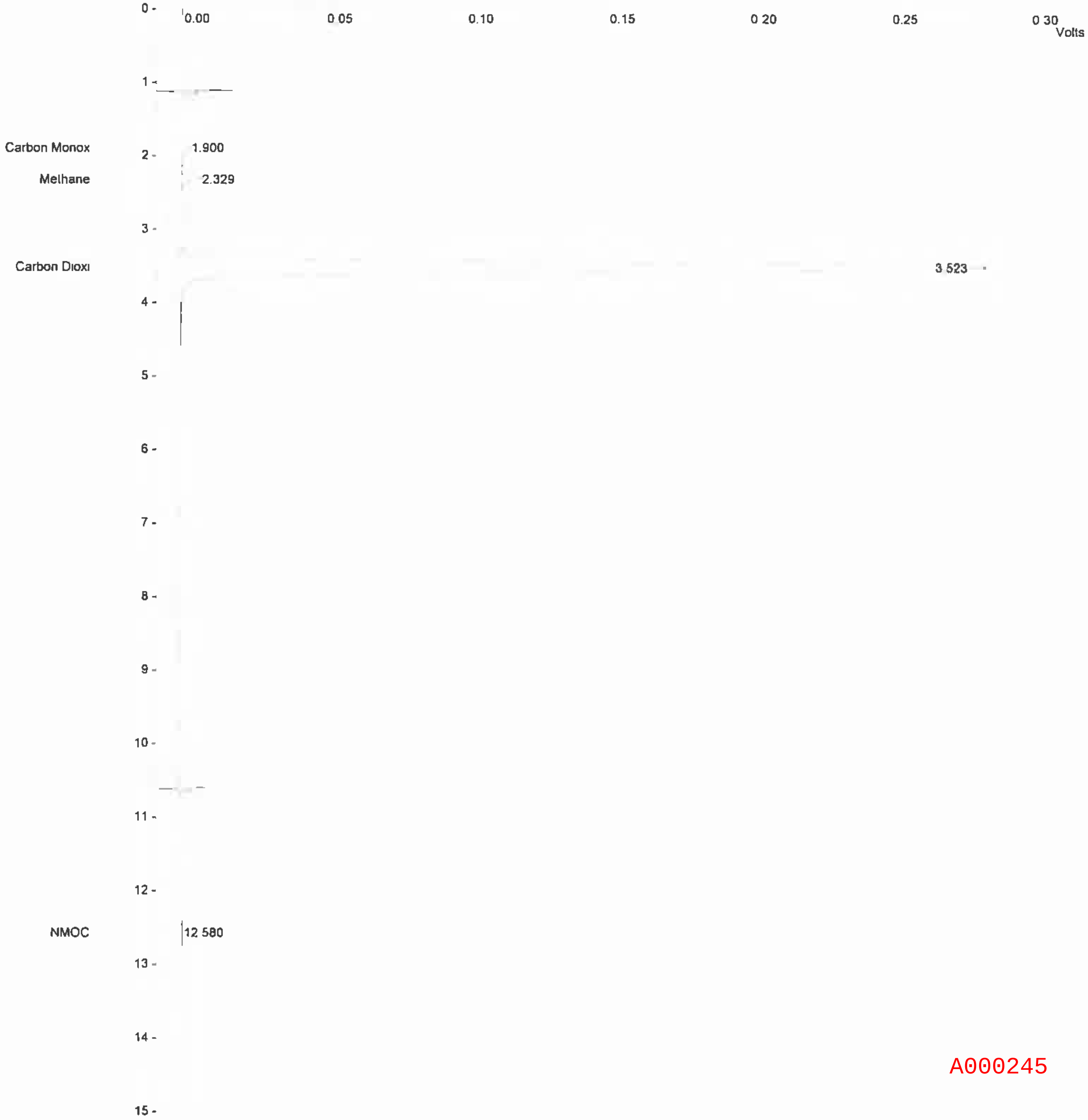
Additional Comments:

CHROMATOGRAM

TEST SAMPLES

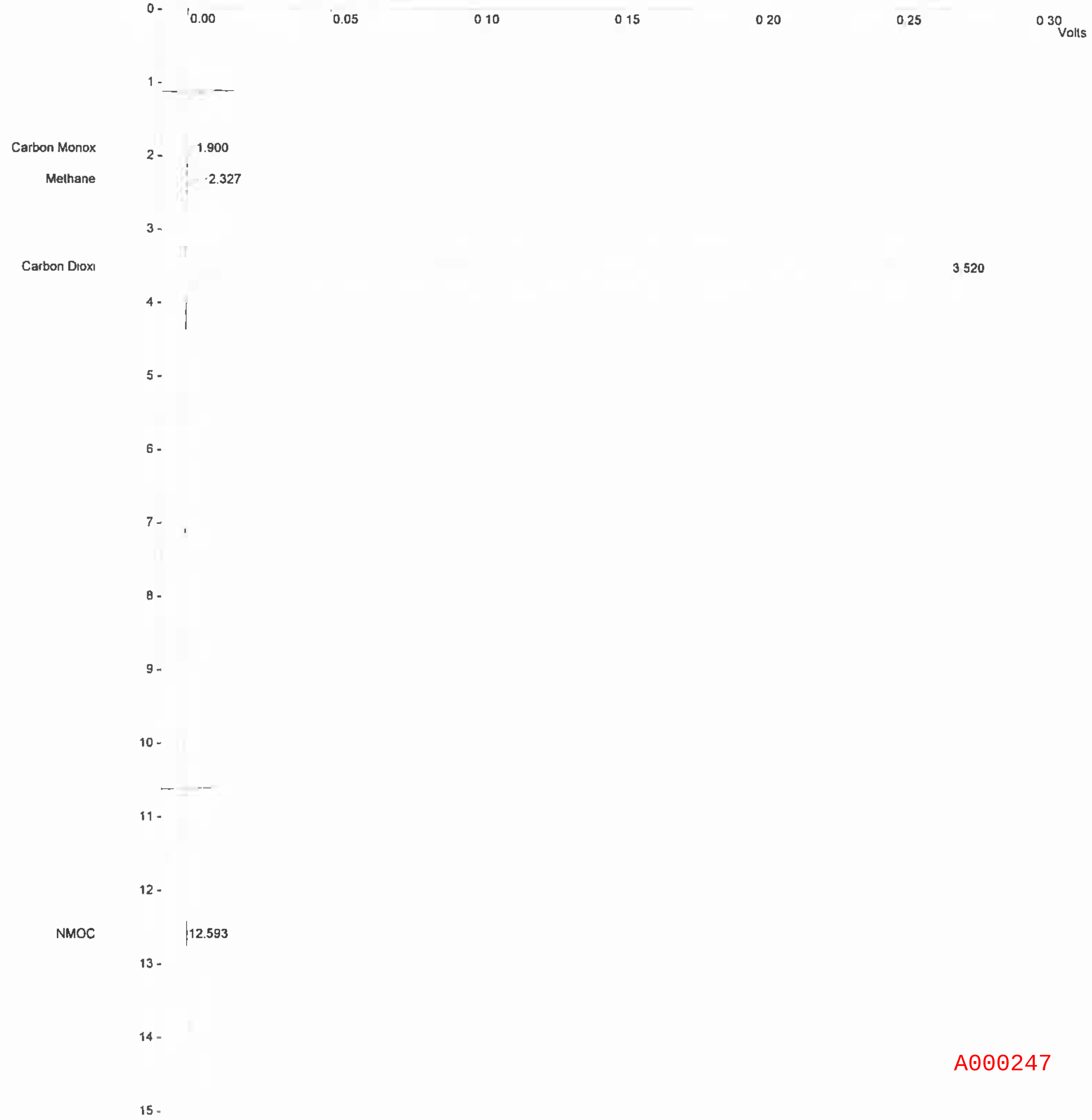
```
Print Date: Tue Feb 23 09:15:26 2016                Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-22-2016, 17;32;27, a 018 - 201.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 201

Injection Date: 2/22/2016 17:32     Calculation Date: 2/23/2016 09:15

Operator     : Douglass                    Detector Type: 0800 (10 Volts)
Workstation:                               Bus Address  : 88
Instrument  : Varian Star #1               Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10            Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                          Ret.     Time                            Width
 Peak      Peak            Result        Time    Offset       Area      Sep.    1/2     Status
  No.      Name            (ppmC)        (min)    (min)     (counts)    Code   (sec)    Codes
 ----  ------------  ----------  -------  -------  -----------  ----  -----   ------
    1 Carbon Monox       9.9013     1.900   -0.030        17929    BB     4.6
    2 Methane           16.1162     2.329    0.013        28718    BB     3.6
    3 Carbon Dioxi    1430.4655     3.523    0.021      2542433    BB     8.2
    4 Ethane                        7.541                                          M
    5 NMOC               0.8639    12.580    0.410         1482    BB    49.1
 ----  ------------  ----------  -------  -------  -----------  ----  -----   ------
      Totals:         1457.3469              0.412      2590562

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4          Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1            Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -124 microVolts            LSB:      1 microVolts

Noise (used): 33 microVolts - monitored before this run

Stream: 2       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*****************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 17;32;27, a 018 - 201.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 201

Injection Date: 2/22/2016 17:32    Calculation Date: 2/23/2016 09:15

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 134          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



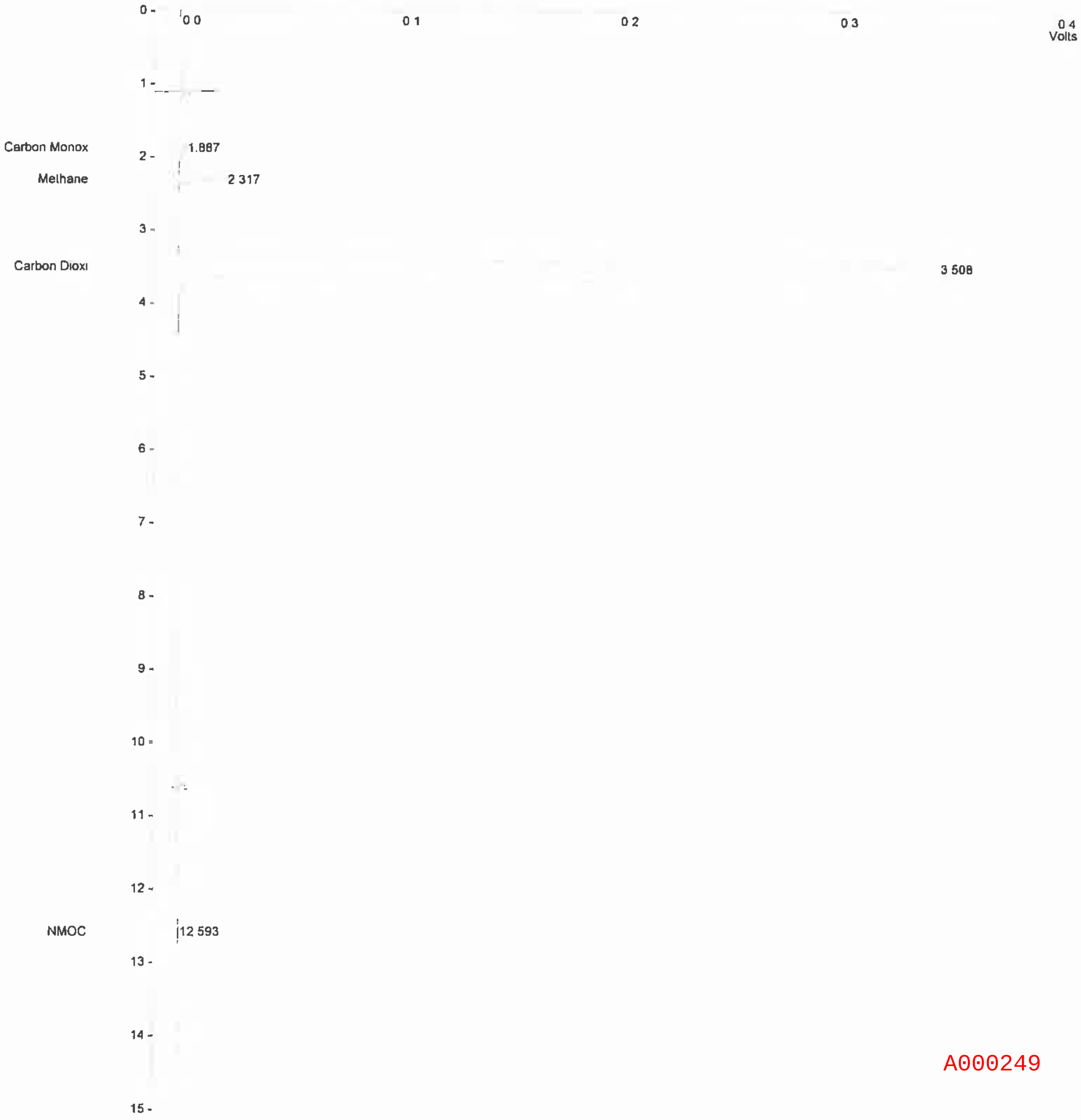
```
Print Date: Tue Feb 23 09:15:50 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 18;00;30, a 018 - 201 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 201 dup

Injection Date: 2/22/2016 18:00    Calculation Date: 2/23/2016 09:15

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area     Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)   Code (sec)  Codes
 ---- ------------ ---------- -------- -------- ----------- ---- ------ ------
    1 Carbon Monox    10.1054    1.900   -0.030       18298   BB    4.7
    2 Methane         15.9043    2.327    0.009       28340   BB    3.6
    3 Carbon Dioxi  1430.8099    3.520    0.018     2543046   BB    8.2
    4 Ethane                     7.541                                  M
    5 NMOC             0.7935   12.593    0.423        1362   BB   -1.0
 ---- ============ ========== -------- ======== =========== ---- ------ ------
      Totals:       1457.6131             0.420     2591046

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 9          Rejected Peaks: 5      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -271 microVolts          LSB:     1 microVolts

Noise (used): 16 microVolts - monitored before this run

Stream: 2      Injection Number: 1    Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 18;00;30, a 018 - 201 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 201 dup

Injection Date: 2/22/2016 18:00    Calculation Date: 2/23/2016 09:15

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument  : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 134         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



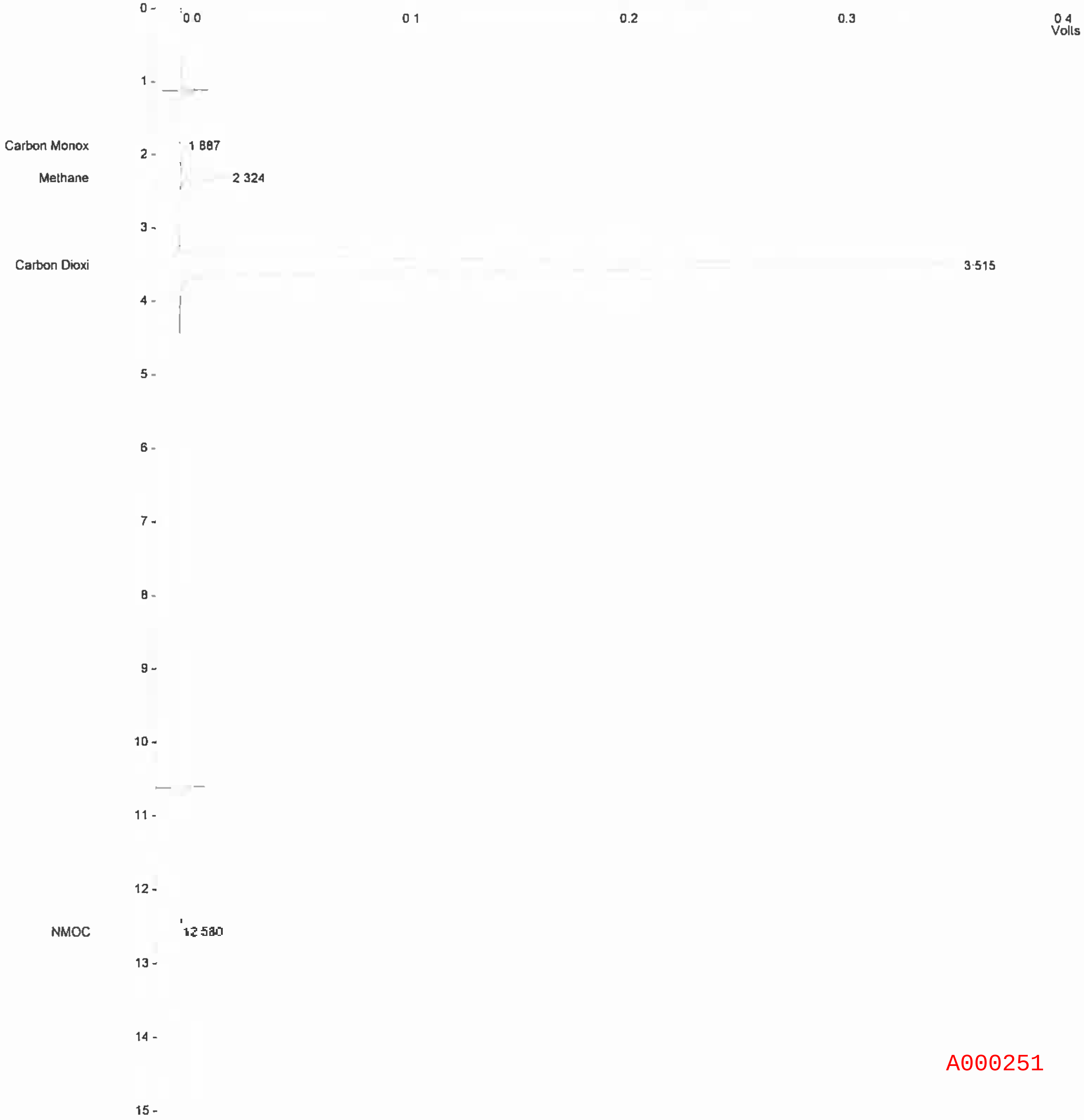
```
Print Date: Tue Feb 23 09:16:15 2016             Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-22-2016, 18:28:36, a 018 - 202.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 202

Injection Date: 2/22/2016 18:28     Calculation Date: 2/23/2016 09:15

Operator     : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address   : 88
Instrument  : Varian Star #1           Sample Rate   : 1.25 Hz
Channel      : 2 = foreflush 10        Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                         Ret.     Time                         Width
 Peak       Peak            Result       Time    Offset       Area       Sep.   1/2     Status
  No.       Name            (ppmC)       (min)    (min)     (counts)     Code  (sec)    Codes
 ----  ------------  ----------   -------  -------  ----------   ----  -----   ------
    1  Carbon Monox     10.4081     1.887  -0.043       18846      BB    4.5
    2  Methane          51.7051     7.317  -0.001       92134      BB    3.7
    3  Carbon Dioxi   1840.3383     3.508   0.006     3270919      BB    8.3
    4  Ethane                       7.541                                        M
    5  NMOC              0.9693    12.593   0.423        1663      BB   21.8
 ----  ------------  ----------   -------  -------  ----------   ----  -----   ------
       Totals:        1903.4208              0.385     3383562

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 5           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -277 microVolts           LSB:      1 microVolts

Noise (used): 15 microVolts - monitored before this run

Stream: 3       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

        c9922 CES

Appended Notes:

         c9922 CES
*********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 18;28;36, a 018 - 202.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 202

Injection Date: 2/22/2016 18:28    Calculation Date: 2/23/2016 09:15

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 173          Zero Offset = 2%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



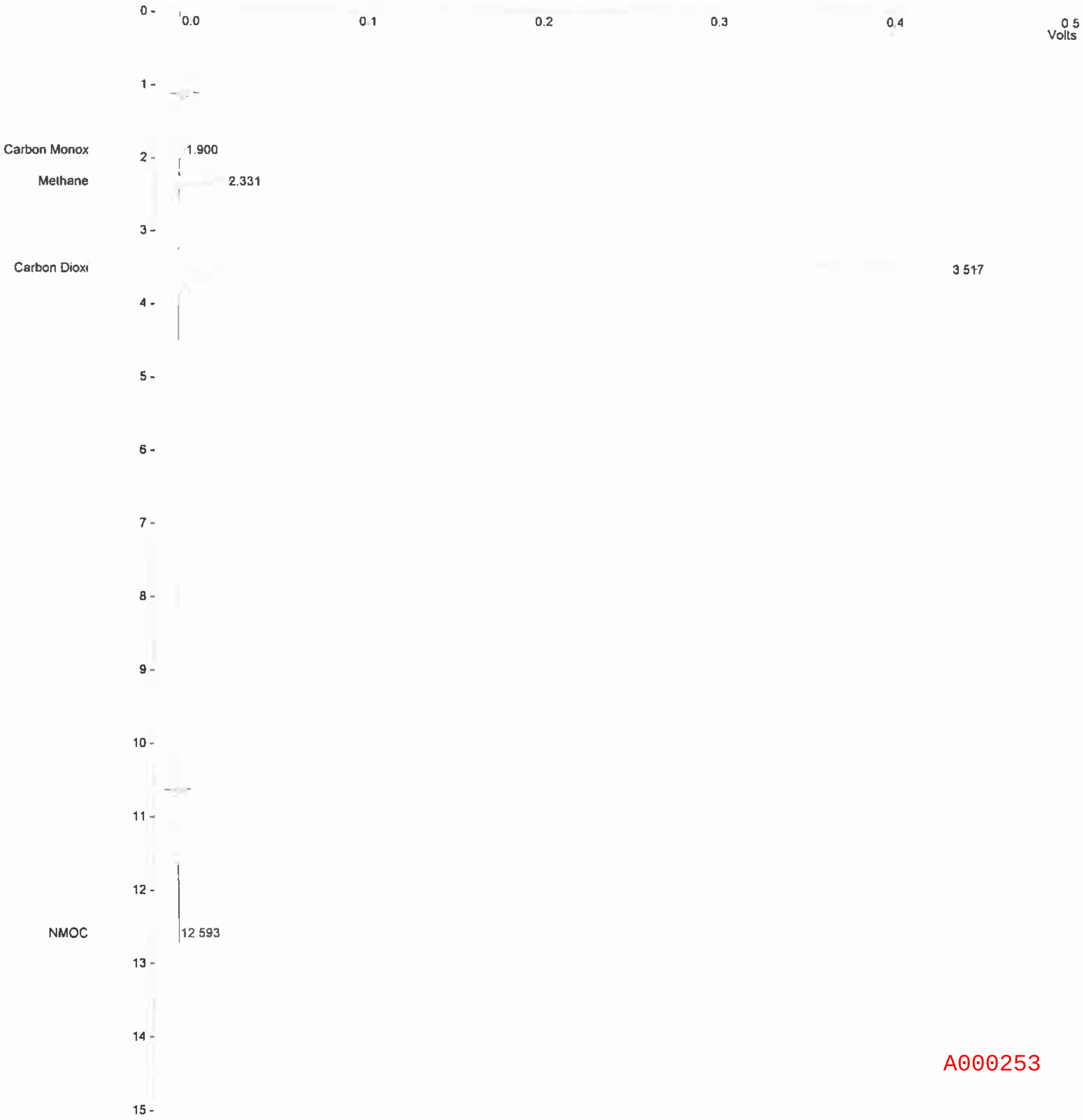
```
Print Date: Tue Feb 23 09:16:48 2016                Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-22-2016, 18;56;35, a 018 - 202 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 202 dup

Injection Date: 2/22/2016 18:56     Calculation Date: 2/23/2016 09:16

Operator     : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address   : 88
Instrument  : Varian Star #1           Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10        Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                        Width
 Peak       Peak         Result       Time    Offset        Area      Sep.  1/2    Status
  No.       Name         (ppmC)      (min)     (min)      (counts)    Code (sec)   Codes
 ---- ------------ ----------- ------- ------- ----------  ---- -----  ------
    1 Carbon Monox     10.6475    1.887  -0.043       19280    BB    4.8
    2 Methane          51.7862    2.324   0.006       92278    BB    3.7
    3 Carbon Dioxi   1844.3534    3.515   0.013     3278056    BB    8.2
    4 Ethane                      7.541                                       M
    5 NMOC              0.9495   12.580   0.410        1629    BB   29.3
 ---- ------------ ----------- ------- ------- ----------  ---- -----  ------
      Totals:        1907.7366            0.386     3391243

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -198 microVolts          LSB:      1 microVolts

Noise (used): 49 microVolts - monitored before this run

Stream: 3        Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
****************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 18;56;35, a 018 - 202 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 202 dup

Injection Date: 2/22/2016 18:56    Calculation Date: 2/23/2016 09:16

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 174          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



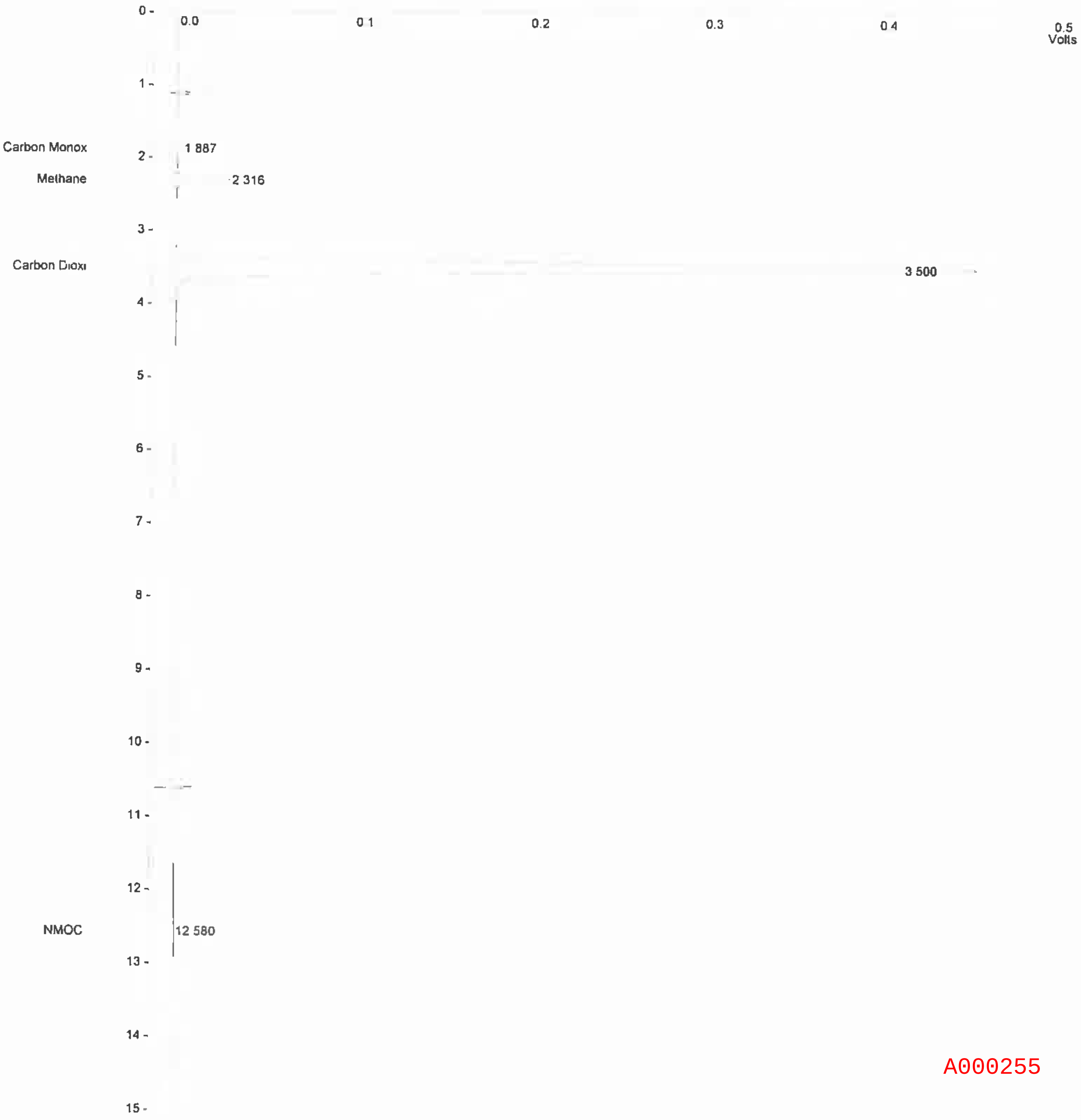
```
Print Date: Tue Feb 23 09:17:29 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 19:24:32, a 018 - 203.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 203

Injection Date: 2/22/2016 19:24    Calculation Date: 2/23/2016 09:17

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 8B
Instrument  : Varian Star #1        Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                          Width
 Peak      Peak          Result        Time   Offset       Area      Sep.   1/2    Status
  No.      Name          (ppmC)        (min)   (min)     (counts)    Code  (sec)   Codes
 ---- ------------ ----------      ------- -------  ----------  ----  -----   ------
    1 Carbon Monox    11.5113       1.900  -0.030       20844    BB     5.5
    2 Methane         66.2114       2.331   0.013      117982    BB     3.7
    3 Carbon Dioxi  2275.2651       3.517   0.015     4043935    BB     8.2
    4 Ethane                        7.541                                         M
    5 NMOC             6.9080      12.593   0.423       11854    BB    48.5
 ---- ------------ ----------      ------- -------  ----------  ----  -----   ------
      Totals:       2359.8958               0.421     4194615

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -240 microVolts          LSB:     1 microVolts

Noise (used): 27 microVolts - monitored before this run

Stream: 4       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 19;24;32, a 018 - 203.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 203

Injection Date: 2/22/2016 19:24    Calculation Date: 2/23/2016 09:17

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 215         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



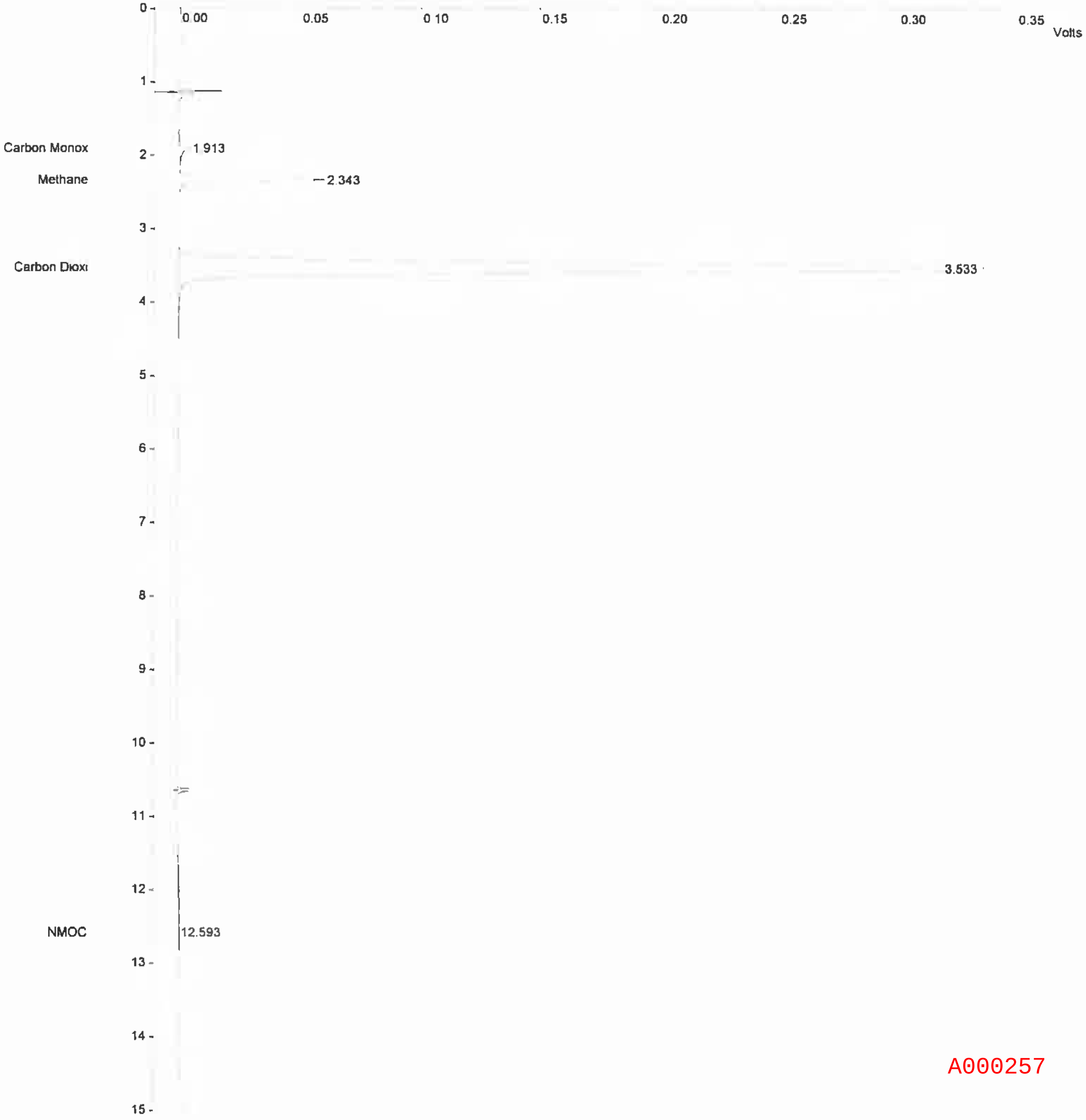
```
Print Date: Tue Feb 23 09:17:41 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-22-2016, 19;52;16, a 018 - 203 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 203 dup

Injection Date: 2/22/2016 19:52    Calculation Date: 2/23/2016 09:17

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak    Peak        Result     Time  Offset       Area    Sep.  1/2   Status
 No.     Name        (ppmC)     (min)  (min)     (counts)  Code (sec)  Codes
 ---- ------------ ----------- -------- ------- ----------- ---- ----- ------
    1 Carbon Monox     11.8524    1.887  -0.043      21462   BB    5.4
    2 Methane          66.6420    2.316  -0.002     118750   BB    3.6
    3 Carbon Dioxi   2284.7971    3.500  -0.002    4060877   BB    8.2
    4 Ethane                      7.541                                M
    5 NMOC              6.9483   12.580   0.410      11923   BB   36.3
 ---- ------------ ----------- -------- ------- ----------- ---- ----- ------
      Totals:        2370.2398            0.363    4213012

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -13 microVolts          LSB:     1 microVolts

Noise (used): 31 microVolts - monitored before this run

Stream: 4       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 19;52;16, a 018 - 203 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 203 dup

Injection Date: 2/22/2016 19:52    Calculation Date: 2/23/2016 09:17

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 217          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



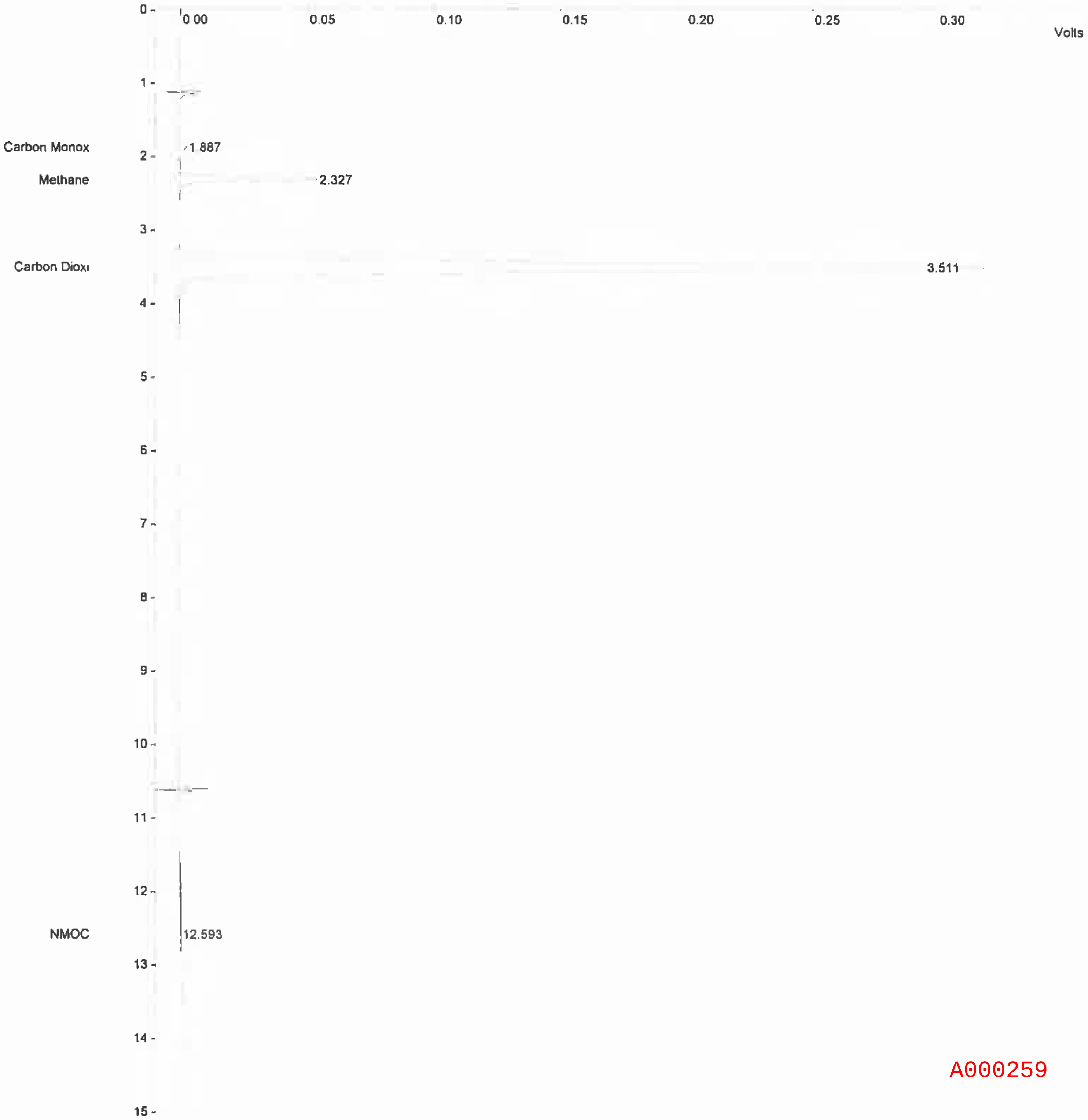
```
Print Date: Tue Feb 23 14:17:22 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 11:54:43, a 018 - 204.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 204

Injection Date: 2/23/2016 11:54    Calculation Date: 2/23/2016 14:16

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address   : 88
Instrument : Varian Star #1            Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                         Ret.     Time                         Width
 Peak       Peak          Result         Time    Offset        Area      Sep.   1/2    Status
  No.       Name          (ppmC)         (min)    (min)      (counts)    Code  (sec)   Codes
 ---- ------------- ----------  -------- -------- ----------  ---- -----   ------
    1 Carbon Monox     10.4023     1.913   -0.017       18836    BB    3.5
    2 Methane         131.5478     2.343    0.025      234406    BB    3.6
    3 Carbon Dioxi   1692.1643     3.533    0.031     3007563    BB    8.2
    4 Ethane                       7.541                                         M
    5 NMOC              7.1584    12.593    0.423       12283    BB  -38.0
 ---- ------------- ==========  -------- ======== ==========  ---- -----   ------
      Totals:        1841.2728              0.462     3273088

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 46 microVolts           LSB:      1 microVolts

Noise (used): 28 microVolts - monitored before this run

Stream: 1       Injection Number: 2    Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 11;54;43, a 018 - 204.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 204

Injection Date: 2/23/2016 11:54    Calculation Date: 2/23/2016 14:16

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 159          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



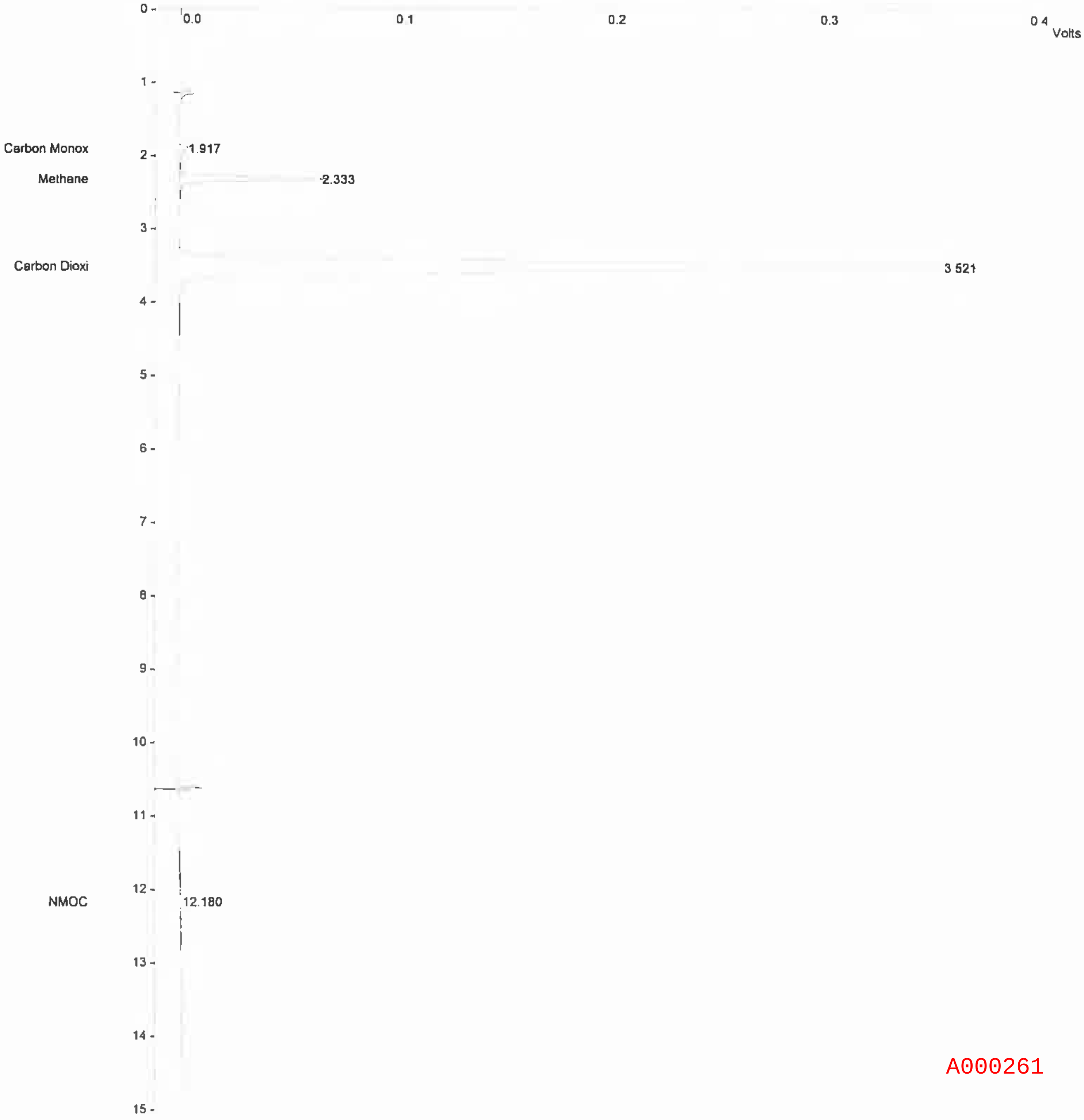
```
Print Date: Tue Feb 23 13:26:01 2016               Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb 16\2-23-2016, 12;19;34, a 018 - 204 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 204 dup

Injection Date: 2/23/2016 12:19     Calculation Date: 2/23/2016 13:25

Operator     : Douglass                  Detector Type: 0800 (10 Volts)
Workstation:                             Bus Address   : 88
Instrument  : Varian Star #1             Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10          Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                          Width
 Peak       Peak          Result      Time    Offset        Area       Sep.   1/2    Status
  No.       Name          (ppmC)      (min)    (min)      (counts)     Code  (sec)   Codes
 ----  ------------  -----------  --------  --------  ----------   ----  -----  ------
    1 Carbon Monox     10.9347      1.887    -0.043       19800      BB     4.8
    2 Methane         119.6617      2.327     0.009      213226      BB     3.6
    3 Carbon Dioxi   1598.1343      3.511     0.009     2840439      BB     8.7
    4 Ethane                        7.541                                           M
    5 NMOC              7.1257     12.593     0.423       12227      BB    62.9
 ----  ------------  -----------  --------  --------  ----------   ----  -----  ------
      Totals:        1735.8564              0.398     3085692

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -158 microVolts          LSB:      1 microVolts

Noise (used): 29 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 12;19;34, a 018 - 204 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 204 dup

Injection Date: 2/23/2016 12:19    Calculation Date: 2/23/2016 13:25

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min    Attenuation = 151          Zero Offset = 2%
Start Time  =   0.000   min      End Time    = 15.013  min   Min / Tick  = 1.00
```



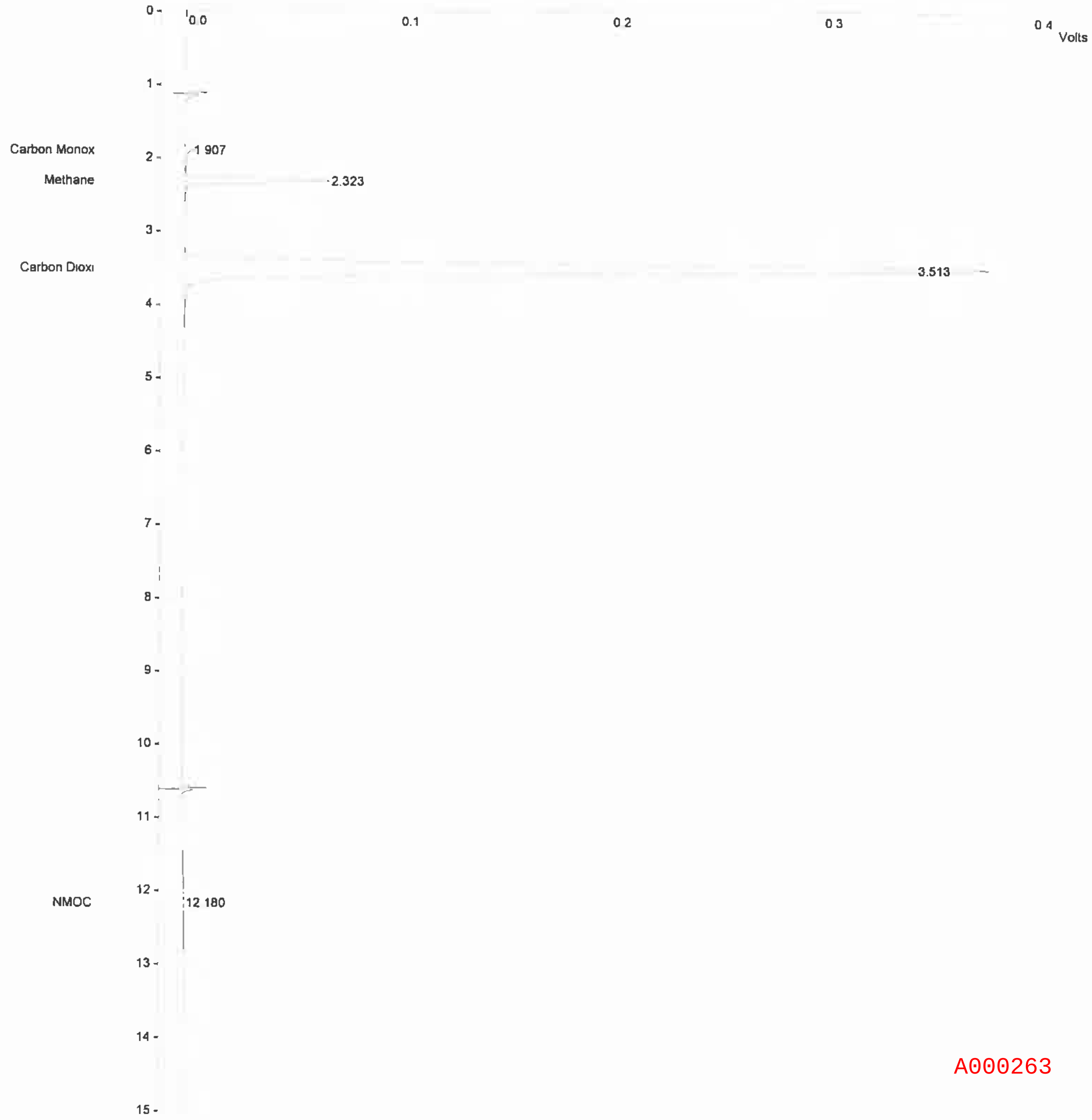
```
Print Date: Tue Feb 23 14:14:22 2016             Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 13:15:26, a 018 - 205 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 205 dup

Injection Date: 2/23/2016 13:15     Calculation Date: 2/23/2016 14:08

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument  : Varian Star #1        Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-35B8-d6h-2lol **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.    Time                        Width
 Peak      Peak          Result         Time   Offset        Area     Sep.   1/2    Status
  No.      Name          (ppmC)        (min)    (min)      (counts)   Code  (sec)   Codes
 ----  ------------  -----------  --------  -------  -----------  ----  -----  ------
    1  Carbon Monox      13.6281     1.917   -0.013        24677    BV    4.9
    2  Methane          155.0331     2.333    0.015       276254    VB    3.7
    3  Carbon Dioxi    1905.4196     3.521    0.019      3386591    BB    8.3
    4  Ethane                        7.541                                         M
    5  NMOC              12.0490    12.180    0.010        20675    BB   96.1
 ----  ------------  -----------  --------  -------  -----------  ----  -----  ------
       Totals:         2086.1298              0.031      3708197

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -93 microVolts          LSB:     1 microVolts

Noise (used): 29 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 13;15;26, a 018 - 205 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 205 dup

Injection Date: 2/23/2016 13:15    Calculation Date: 2/23/2016 14:08

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 179          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



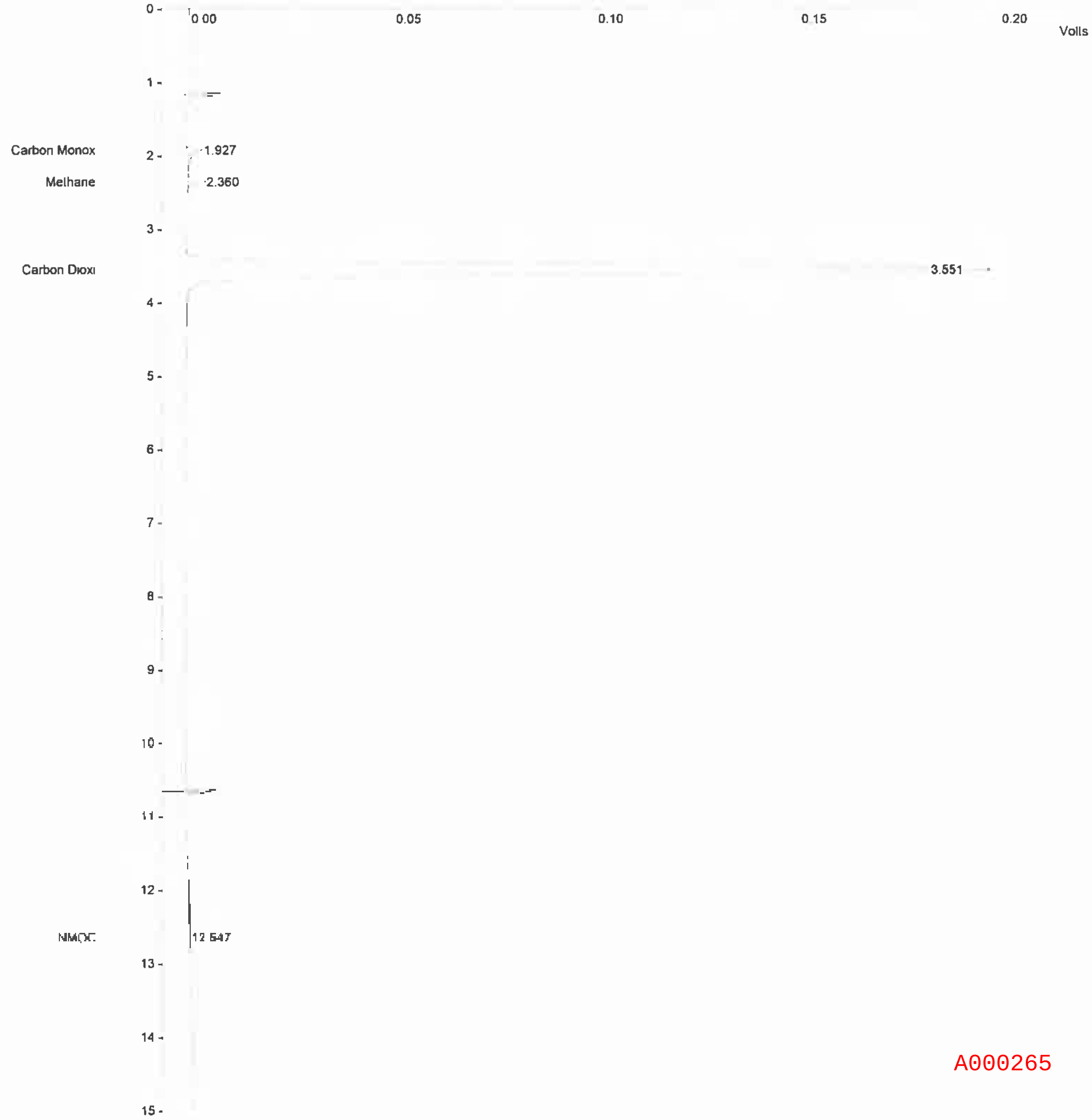
```
Print Date: Tue Feb 23 14:14:09 2016            Page 1 of 1

Title          : SCAQMD Methods 25.x
Run File       : g:\2016\feb_16\2-23-2016, 12;47;34, a 018 - 205.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 205

Injection Date: 2/23/2016 12:47     Calculation Date: 2/23/2016 14:08

Operator     : Douglass                    Detector Type: 0800 (10 Volts)
Workstation:                               Bus Address   : 88
Instrument : Varian Star #1                Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10            Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                   Ret.    Time                     Width
 Peak      Peak          Result    Time   Offset       Area    Sep.  1/2   Status
  No.      Name          (ppmC)    (min)   (min)     (counts)  Code (sec)  Codes
 ---- ------------ ----------- ------- ------- ---------- ---- -----  ------
    1 Carbon Monox     13.6301   1.907  -0.023      24681   BV   4.7
    2 Methane         154.5124   2.323   0.005     275326   VB   3.7
    3 Carbon Dioxi   1901.2263   3.513   0.011    3379139   BB   8.2
    4 Ethane                     7.541                                   M
    5 NMOC             11.8546  12.180   0.010      20342   BB 164.7
 ---- ------------ =========== ------- ======= ========== ---- -----  ------
      Totals:        2081.2234           0.003    3699488

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -118 microVolts          LSB:     1 microVolts

Noise (used): 29 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 12;47;34, a 018 - 205.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 205

Injection Date: 2/23/2016 12:47    Calculation Date: 2/23/2016 14:08

Operator   : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                       Bus Address  : 88
Instrument : Varian Star #1        Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min  Attenuation = 179          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick   = 1.00
```



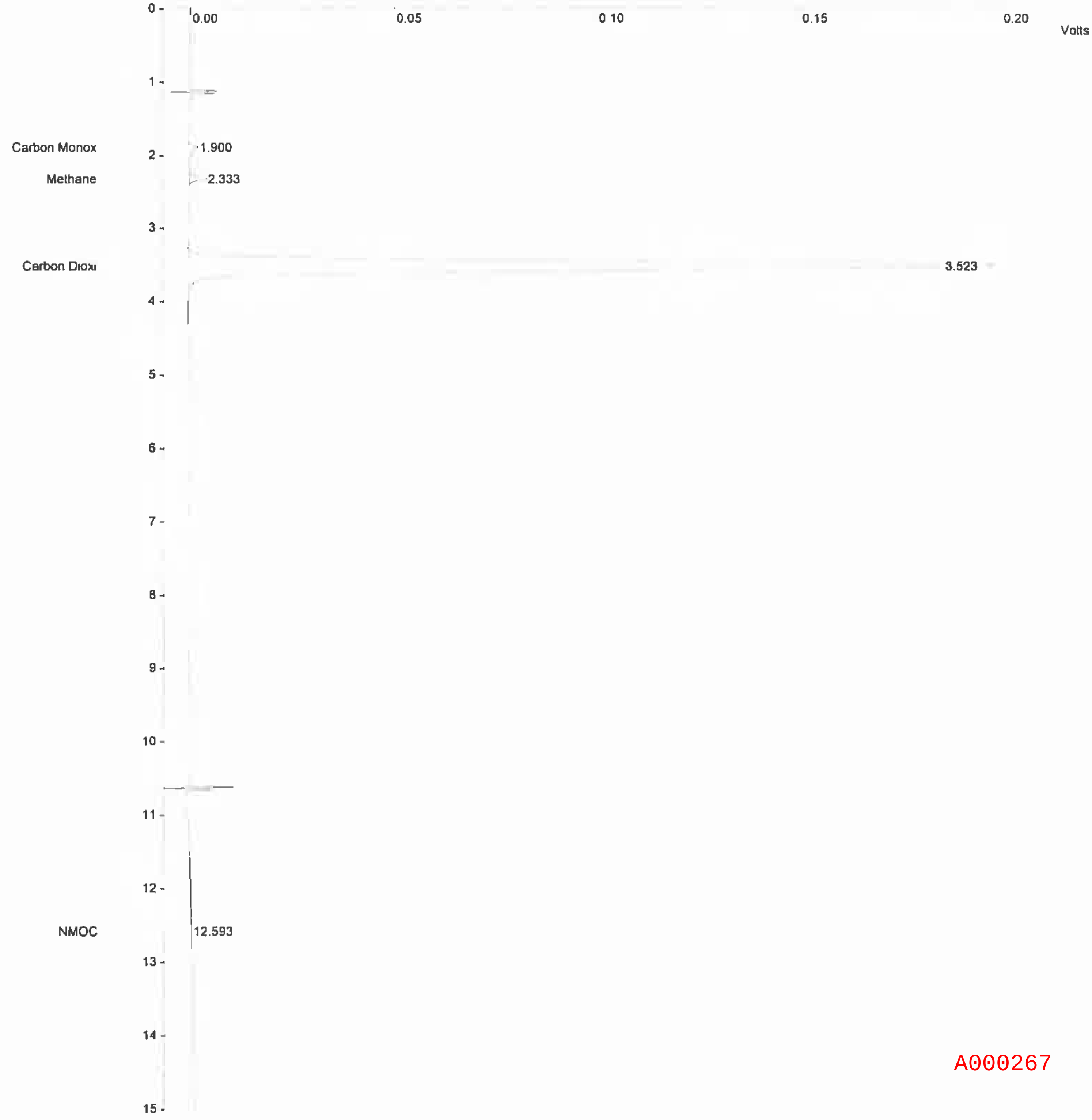
```
Print Date: Tue Feb 23 15:04:12 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 13;43;24, a 018 - 206.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 206

Injection Date: 2/23/2016 13:43    Calculation Date: 2/23/2016 15:03

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                    Ret.    Time                       Width
 Peak      Peak        Result      Time    Offset       Area     Sep.   1/2    Status
  No.      Name        (ppmC)      (min)    (min)     (counts)   Code  (sec)   Codes
 ---- ------------ -----------  -------- -------- ----------  ---- -----   ------
    1 Carbon Monox    11.0103     1.927   -0.003       19937    BB    3.6
    2 Methane          9.7083     2.360    0.042       17299    BB    3.6
    3 Carbon Dioxi   991.6379     3.551    0.049     1767484    BB    8.2
    4 Ethane                      7.541                                        M
    5 NMOC             2.8803    12.647    0.477        4942    BB  -22.7
 ---- ------------ ==========  -------- ======= ==========  ---- -----   ------
      Totals:       1015.2368              0.565     1804662

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -119 microVolts          LSB:      1 microVolts

Noise (used): 47 microVolts - monitored before this run

Stream: 1      Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 13;43;24, a 018 - 206.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 206

Injection Date: 2/23/2016 13:43    Calculation Date: 2/23/2016 15:03

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 93           Zero Offset = 3%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



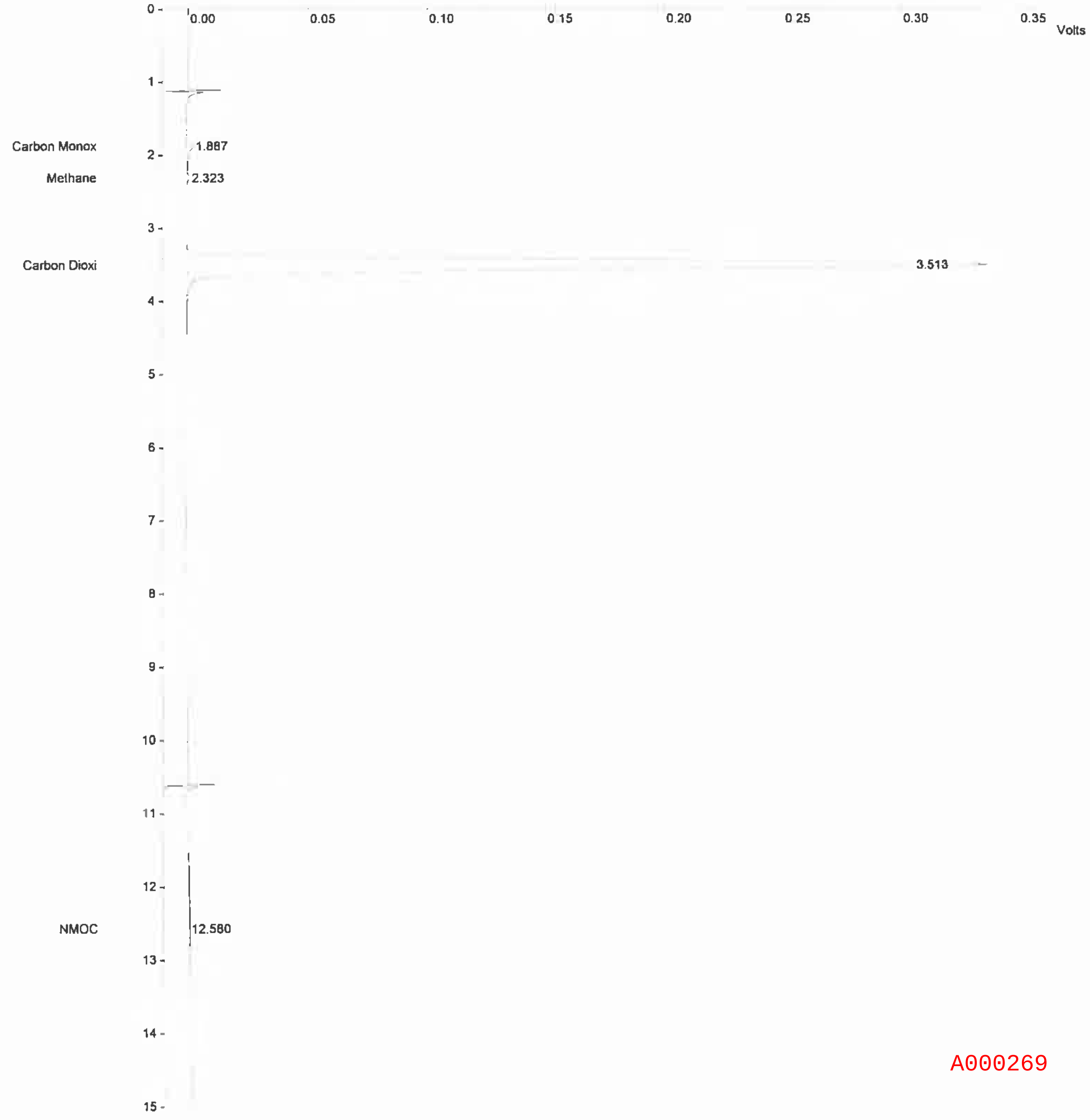
```
Print Date: Tue Feb 23 15:04:47 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-23-2016, 14;08;10, a 018 - 206 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 206 dup

Injection Date: 2/23/2016 14:08     Calculation Date: 2/23/2016 15:04

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21el **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                        Width
 Peak       Peak         Result      Time   Offset       Area     Sep.    1/2    Status
 No.        Name         (ppmC)     (min)   (min)      (counts)   Code   (sec)   Codes
 ----  ------------  -----------  -------  -------  -----------  ----  -----  ------
    1  Carbon Monox      11.7370    1.900   -0.030        21253    BB    4.6
    2  Methane            9.6014    2.333    0.015        17109    BB    3.6
    3  Carbon Dioxi     992.6587    3.523    0.021      1764299    BB    8.2
    4  Ethane                       7.541                                          M
    5  NMOC               2.9726   12.593    0.423         5101    BB   31.1
 ----  ------------  -----------  -------  -------  -----------  ----  -----  ------
       Totals:         1016.9697             0.429      1807762

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4            Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -198 microVolts          LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 14;08;10, a 018 - 206 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 206 dup

Injection Date: 2/23/2016 14:08    Calculation Date: 2/23/2016 15:04

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 93           Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



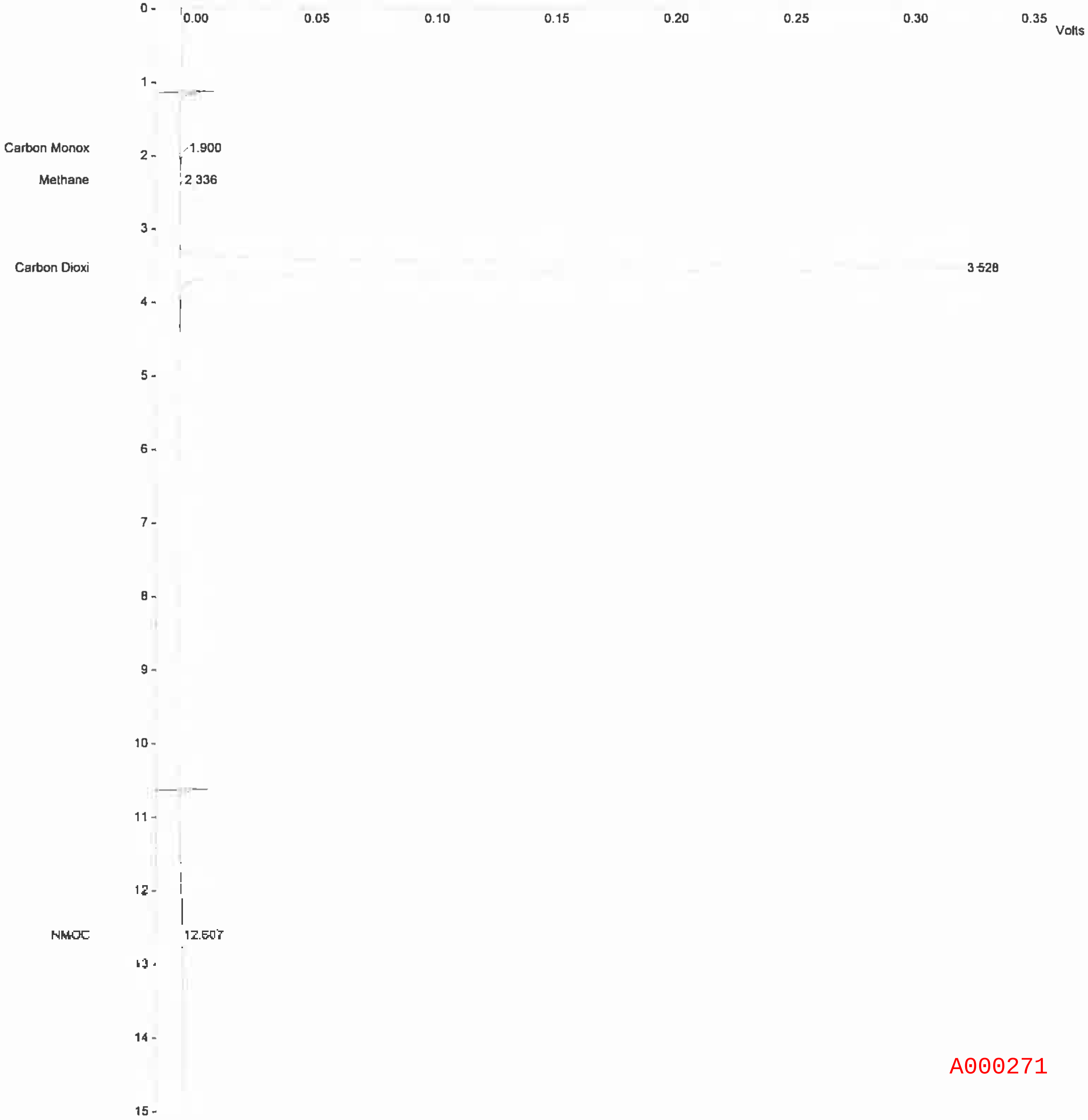
```
Print Date: Tue Feb 23 15:31:19 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 14;35;40, a 018 - 207.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 207

Injection Date: 2/23/2016 14:35    Calculation Date: 2/23/2016 15:31

Operator   : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 - Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area    Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------  ------- ------- ----------  ---- -----  ------
    1 Carbon Monox    10.8207    1.887  -0.043      19594    BB   4.5
    2 Methane          2.7770    2.323   0.005       4948    BB   3.6
    3 Carbon Dioxi  1684.9385    3.513   0.011    2994720    BB   8.2
    4 Ethane                     7.541                                 M
    5 NMOC             4.6119   12.580   0.410       7914    BB  11.4
 ---- ------------ ----------  ------- ------- ----------  ---- -----  ------
      Totals:       1703.1481            0.383    3027176

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -138 microVolts          LSB:     1 microVolts

Noise (used): 18 microVolts - monitored before this run

Stream: 1      Injection Number: 1    Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 14;35;40, a 018 - 207.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 207

Injection Date: 2/23/2016 14:35    Calculation Date: 2/23/2016 15:31

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min    Attenuation = 159          Zero Offset = 2%
Start Time  =   0.000   min      End Time    = 15.013  min   Min / Tick  = 1.00
```



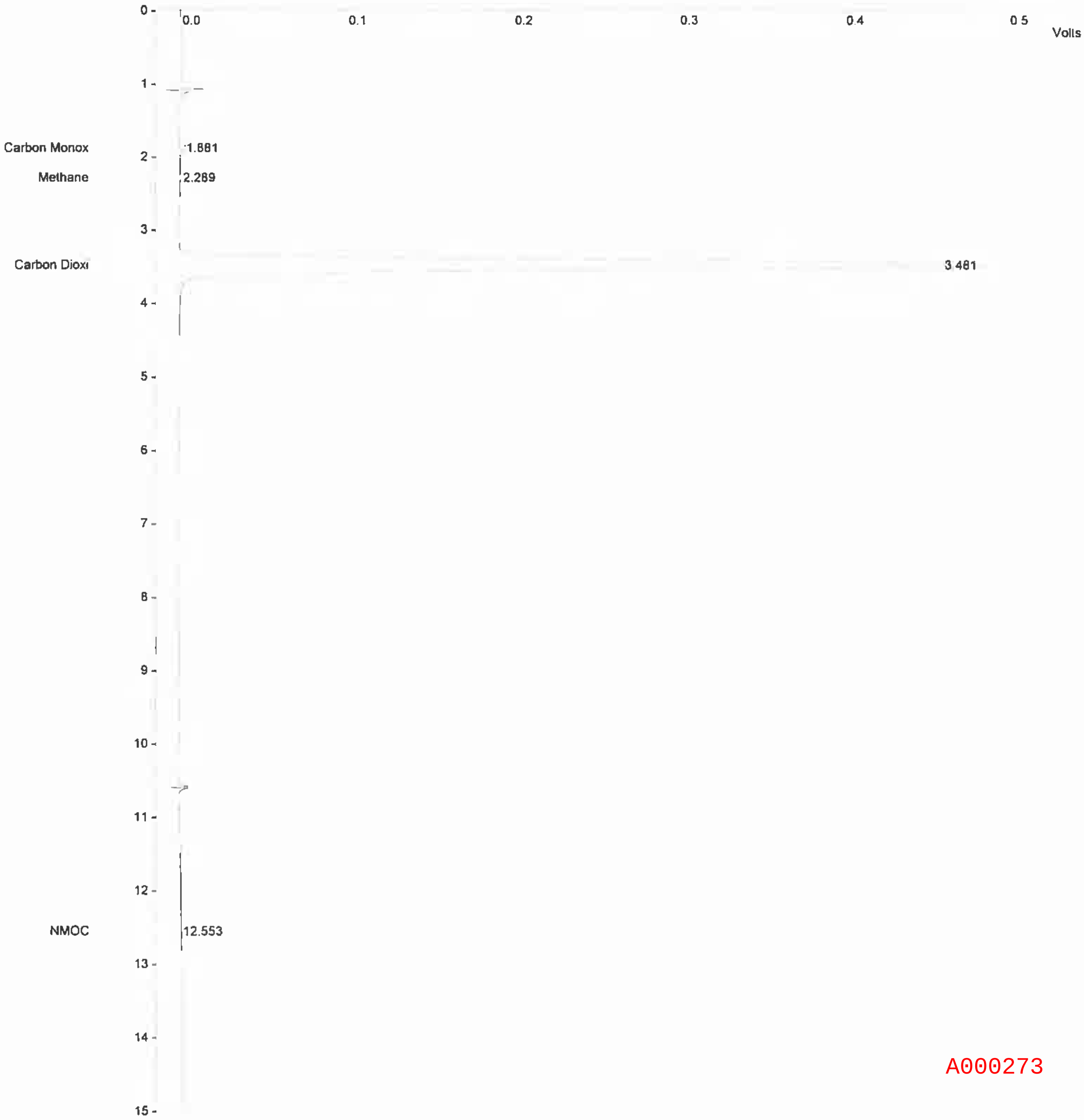
```
Print Date: Tue Feb 23 15:30:41 2016                    Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 15;03;41, a 018 - 207 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 207 dup

Injection Date: 2/23/2016 15:03     Calculation Date: 2/23/2016 15:30

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.     Time                         Width
 Peak       Peak          Result        Time    Offset        Area     Sep.    1/2     Status
  No.       Name          (ppmC)        (min)    (min)      (counts)   Code   (sec)    Codes
 ----  ------------  ----------     -------  -------  ----------   ----  -----    ------
    1  Carbon Monox     11.2599       1.900   -0.030       20389     BB     4.5
    2  Methane           2.7631       2.336    0.018        4924     BB     3.5
    3  Carbon Dioxi   1681.5281       3.528    0.026     2988659     BB     8.2
    4  Ethane                         7.541                                          M
    5  NMOC              4.5942      12.607    0.437        7883     BB   255.3
 ----  ------------  ----------     -------  -------  ----------   ----  -----    ------
       Totals:        1700.1453                0.451     3021855

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4            Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -181 microVolts           LSB:      1 microVolts

Noise (used): 27 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 15;03;41, a 018 - 207 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 207 dup

Injection Date: 2/23/2016 15:03    Calculation Date: 2/23/2016 15:30

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 159          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



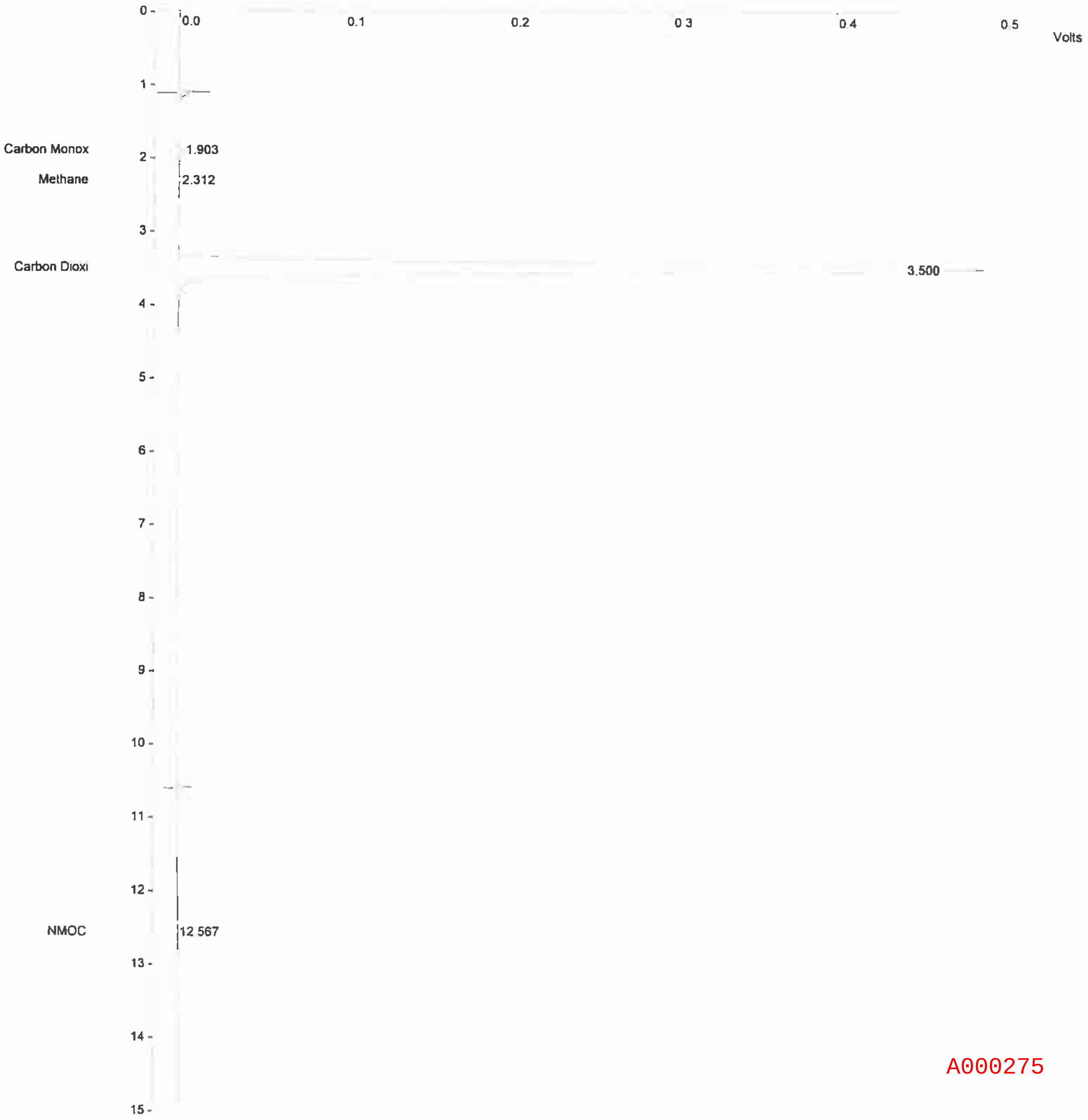
```
Print Date: Tue Feb 23 16:24:11 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 15:31:40, a 018 - 208.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 208

Injection Date: 2/23/2016 15:31    Calculation Date: 2/23/2016 16:23

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                    Width
 Peak      Peak         Result       Time   Offset      Area    Sep.  1/2    Status
  No.      Name         (ppmC)      (min)   (min)     (counts)  Code (sec)   Codes
 ---- ------------ ----------  -------- -------  ----------  ---- -----  ------
    1 Carbon Monox    15.2339     1.881  -0.049       27585    BV   5.7
    2 Methane          4.2013     2.289  -0.029        7486    VB   4.7
    3 Carbon Dioxi  2441.9438     3.481  -0.021     4340181    BB   8.3   C
    4 Ethane                      7.541                                  M
    5 NMOC             5.4264    12.553   0.383        9311    BB  46.1
 ---- ------------ ----------  -------- -------  ----------  ---- -----  ------
      Totals:       2466.8054             0.284     4384563

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -153 microVolts          LSB:      1 microVolts

Noise (used): 29 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 15;31;40, a 018 - 208.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 208

Injection Date: 2/23/2016 15:31    Calculation Date: 2/23/2016 16:23

Operator    : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                       Bus Address  : 88
Instrument  : Varian Star #1       Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10     Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 229         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



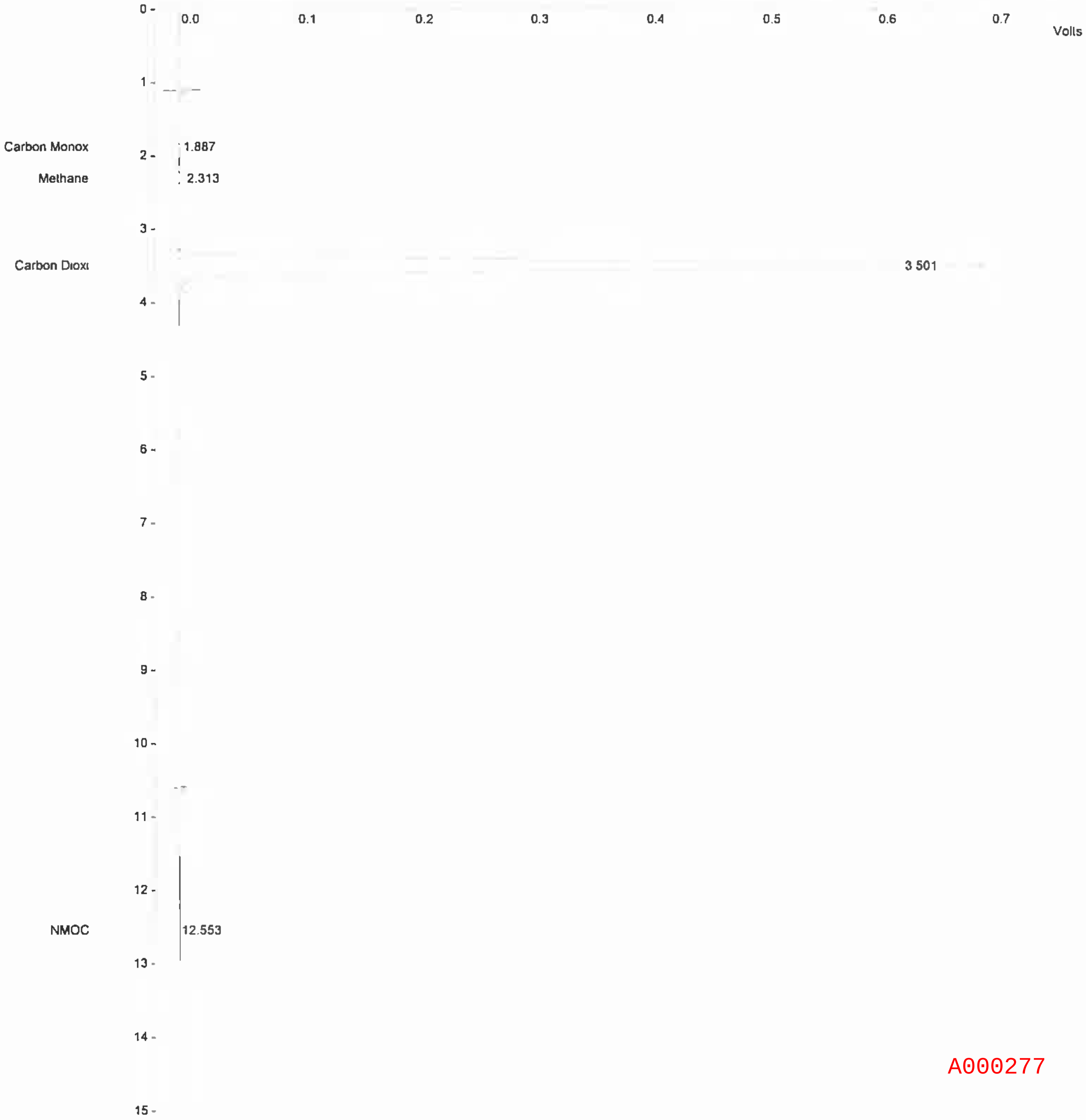
```
Print Date: Tue Feb 23 16:24:02 2016                    Page 1 of 1

Title          : SCAQMD Methods 25.x
Run File       : g:\2016\feb_16\2-23-2016, 15;59;35, a 018 - 208 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID      : A 018 - 208 dup

Injection Date: 2/23/2016 15:59       Calculation Date: 2/23/2016 16:23

Operator     : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                            Bus Address    : 88
Instrument : Varian Star #1             Sample Rate    : 1.25 Hz
Channel      : 2 = Foroflush 10         Run Time       : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                         Ret.      Time                         Width
 Peak       Peak            Result       Time     Offset       Area      Sep.    1/2    Status
  No.       Name            (ppmC)       (min)     (min)     (counts)    Code   (sec)   Codes
 ----   ------------    ----------     -------   -------   ----------    ----   -----   ------
    1   Carbon Monox       14.9678       1.903    -0.027        27103      BV     5.6
    2   Methane             4.1158       2.312    -0.006         7334      VB     4.7
    3   Carbon Diox      2453.0818       3.500    -0.002      4359977      BB     8.2   C
    4   Ethane                           7.541                                          M
    5   NMOC                5.6455      12.567     0.397         9687      BB    56.6
 ----   ------------    ==========     -------   =======   ==========    ----   -----   ------
        Totals:          2477.8109                 0.362      4404101

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :            0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -66 microVolts           LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CRS

Appended Notes:

        c9922 CBS
*****************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 15;59;35, a 018 - 208 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 208 dup

Injection Date: 2/23/2016 15:59    Calculation Date: 2/23/2016 16:23

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 232          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



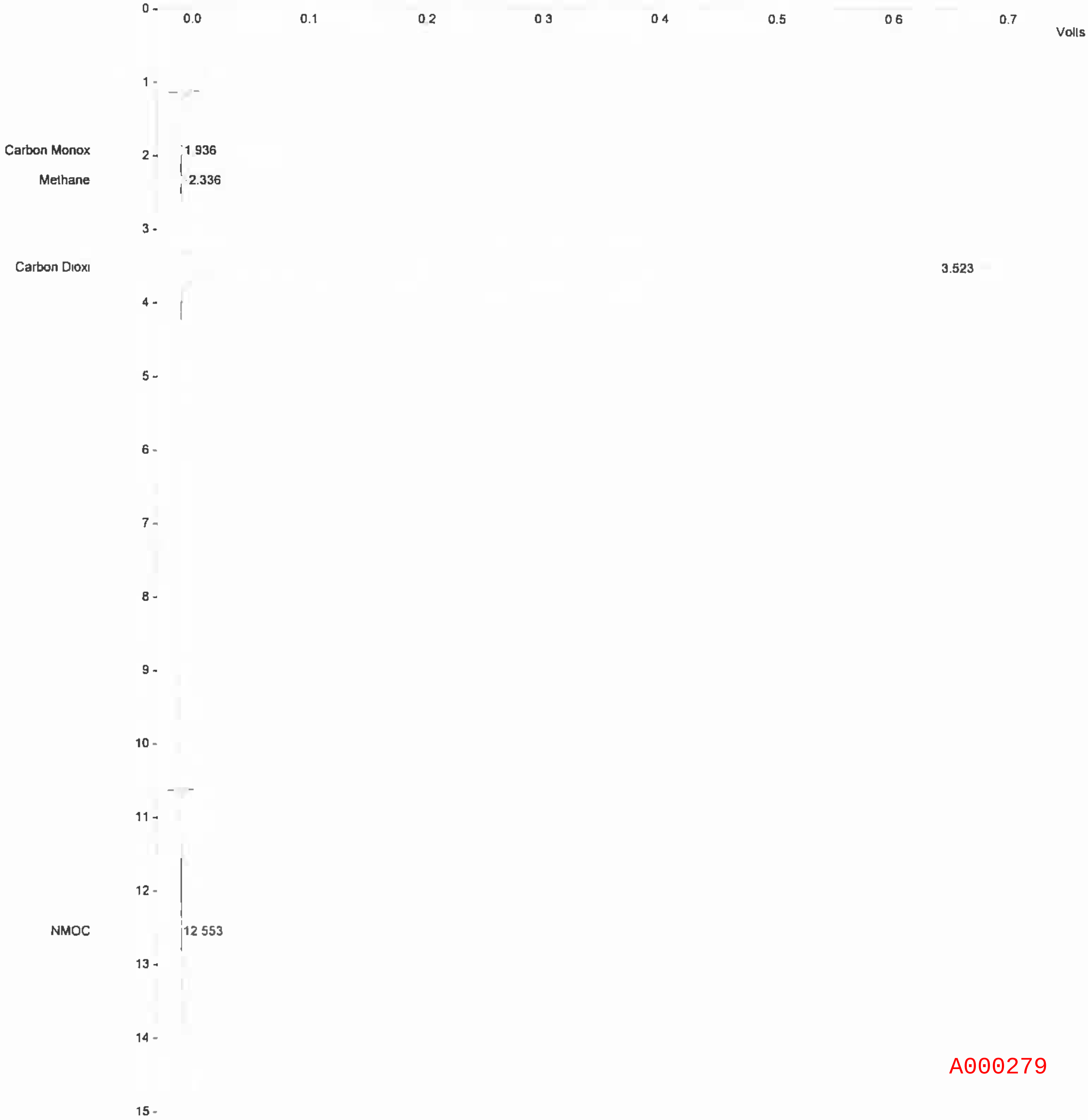
```
Print Date: Wed Feb 24 09:48:31 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-23-2016, 16;24;39, a 018 - 209.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 209

Injection Date: 2/23/2016 16:24      Calculation Date: 2/24/2016 09:48

Operator     : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                            Bus Address   : 88
Instrument   : Varian Star #1           Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10         Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.     Time                          Width
 Peak      Peak           Result     Time    Offset        Area       Sep.   1/2     Status
  No.      Name           (ppmC)     (min)    (min)      (counts)     Code  (sec)    Codes
 ---- ------------- ----------- -------- -------- -----------  ---- -----  ------
    1 Carbon Monox      10.1037    1.887   -0.043       18295    BB    6.2
    2 Methane           12.7814    2.313   -0.005       22775    BB    3.6
    3 Carbon Dioxi    3471.5920    3.501   -0.001     6170223    BB    8.2   C
    4 Ethane                       7.541                                     M
    5 NMOC               8.3244   12.553    0.383       14284    BB   11.6
 ---- ------------- ----------- -------- -------- -----------  ---- -----  ------
      Totals:         3502.8015             0.334     6225577

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :            0 counts

Detected Peaks: 9            Rejected Peaks: 5        Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -118 microVolts           LSB:       1 microVolts

Noise (used): 12 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

      c9922 CES

Appended Notes:

       c9922 CES
***************************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 16;24;39, a 018 - 209.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 209

Injection Date: 2/23/2016 16:24    Calculation Date: 2/24/2016 09:48

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min    Attenuation = 328          Zero Offset = 2%
Start Time  =   0.000   min      End Time    = 15.013  min   Min / Tick  = 1.00
```



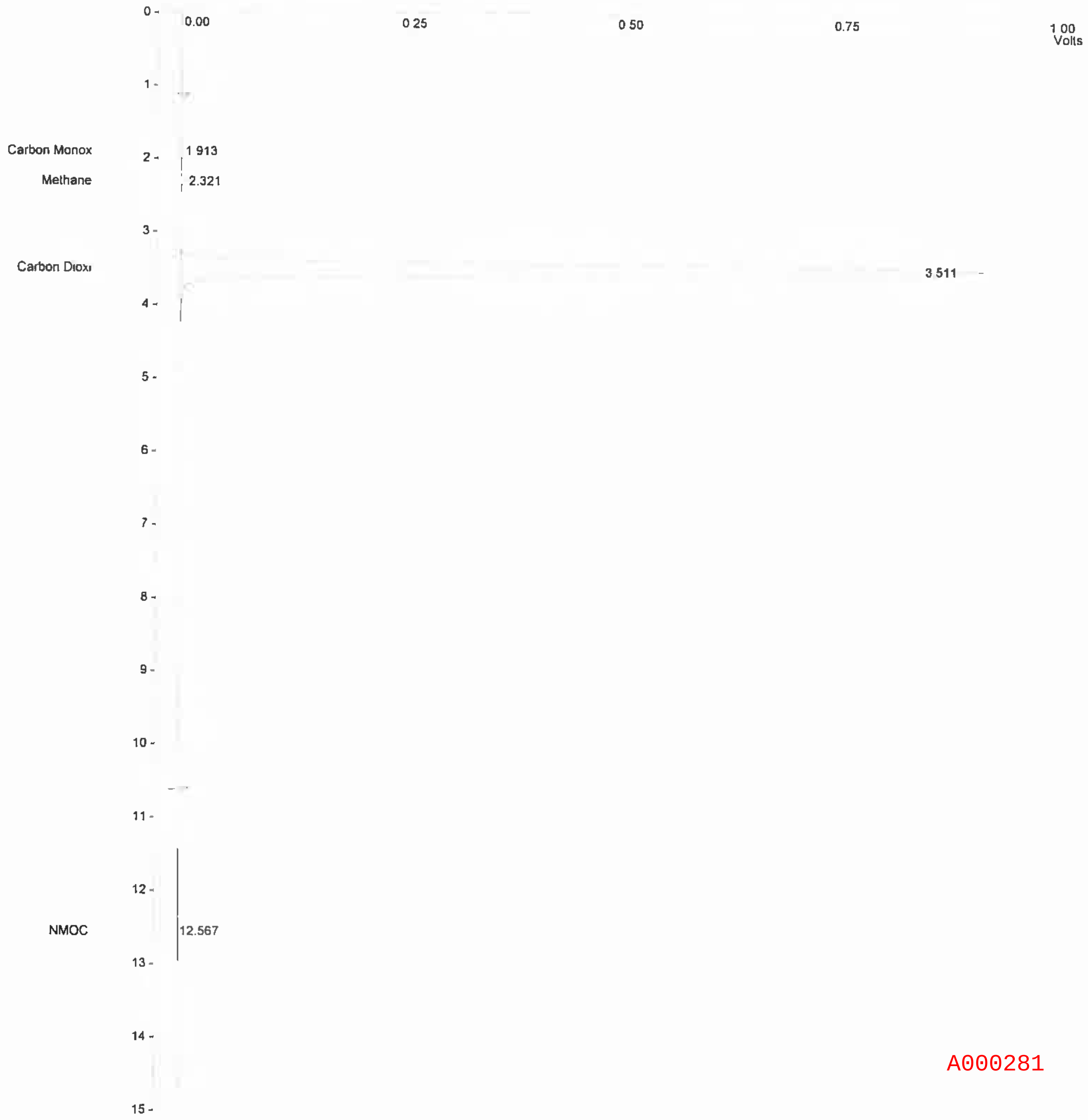
```
Print Date: Wed Feb 24 09:47:35 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 16:47:44, a 018 - 209 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 209 dup

Injection Date: 2/23/2016 16:47     Calculation Date: 2/24/2016 09:46

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument   : Varian Star #1        Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                       Width
 Peak      Peak           Result      Time   Offset       Area     Sep.   1/2    Status
 No.       Name           (ppmC)      (min)   (min)     (counts)   Code  (sec)   Codes
 ----  ------------  -----------  -------  -------  ----------  ----  -----  ------
    1  Carbon Monox       9.4992    1.936    0.006       17201    BV    6.7
    2  Methane           13.3759    2.336    0.018       23835    VB    3.8
    3  Carbon Dioxi    3469.0703    3.523    0.021     6165741    BB    8.3   C
    4  Ethane                       7.541                                   M
    5  NMOC               8.3421   12.553    0.383       14314    BB   85.0
 ----  ------------  -----------  -------  -------  ----------  ----  -----  ------
       Totals:         3500.2875             0.428     6221091

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :            0 counts

Detected Peaks: 4            Rejected Peaks: 0        Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -94 microVolts              LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

        c9922 CES

Appended Notes:

         c9922 CES
*******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 16;47;44, a 018 - 209 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 209 dup

Injection Date: 2/23/2016 16:47    Calculation Date: 2/24/2016 09:46

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 327          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



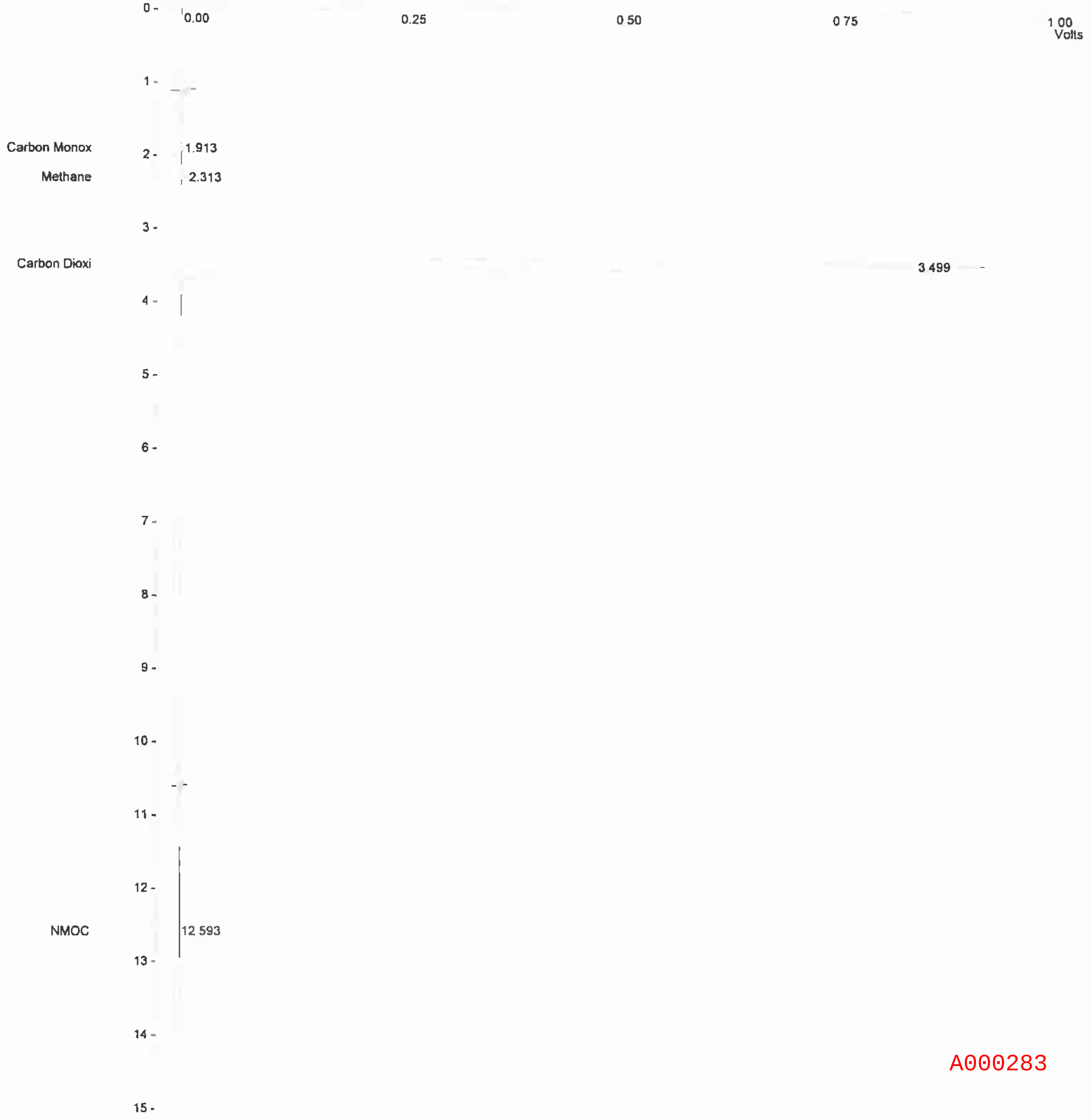
```
Print Date: Wed Feb 24 09:48:55 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-23-2016, 17;15;48, a 018 - 210.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 210

Injection Date: 2/23/2016 17:15     Calculation Date: 2/24/2016 09:48

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 86
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                        Width
 Peak      Peak          Result        Time   Offset      Area      Sep.   1/2    Status
  No.      Name          (ppmC)       (min)   (min)     (counts)    Code  (sec)   Codes
 ----  -- ---------  ----------   -------  -------  ------------  ----  -----   ------
    1 Carbon Monox     11.1832      1.913   -0.017       20250      BB    5.7
    2 Methane          17.0043      2.321    0.003       30300      BB    3.7
    3 Carbon Dioxi   4663.3223      3.511    0.009     8288341      BB    8.2    C
    4 Ethane                        7.541                                        M
    5 NMOC             10.3926     12.567    0.397       17833      BB  119.9
 ----  ------------  ----------   -------  -------  ------------  ----  -----   ------
      Totals:        4701.9024              0.392     8356724

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -102 microVolts          LSB:      1 microVolts

Noise (used): 49 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*****************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 17;15;48, a 018 - 210.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 210

Injection Date: 2/23/2016 17:15    Calculation Date: 2/24/2016 09:48

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address   : 88
Instrument : Varian Star #1           Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =     1.32 cm/min   Attenuation = 439          Zero Offset = 2%
Start Time  =    0.000   min      End Time    = 15.013  min   Min / Tick  = 1.00
```



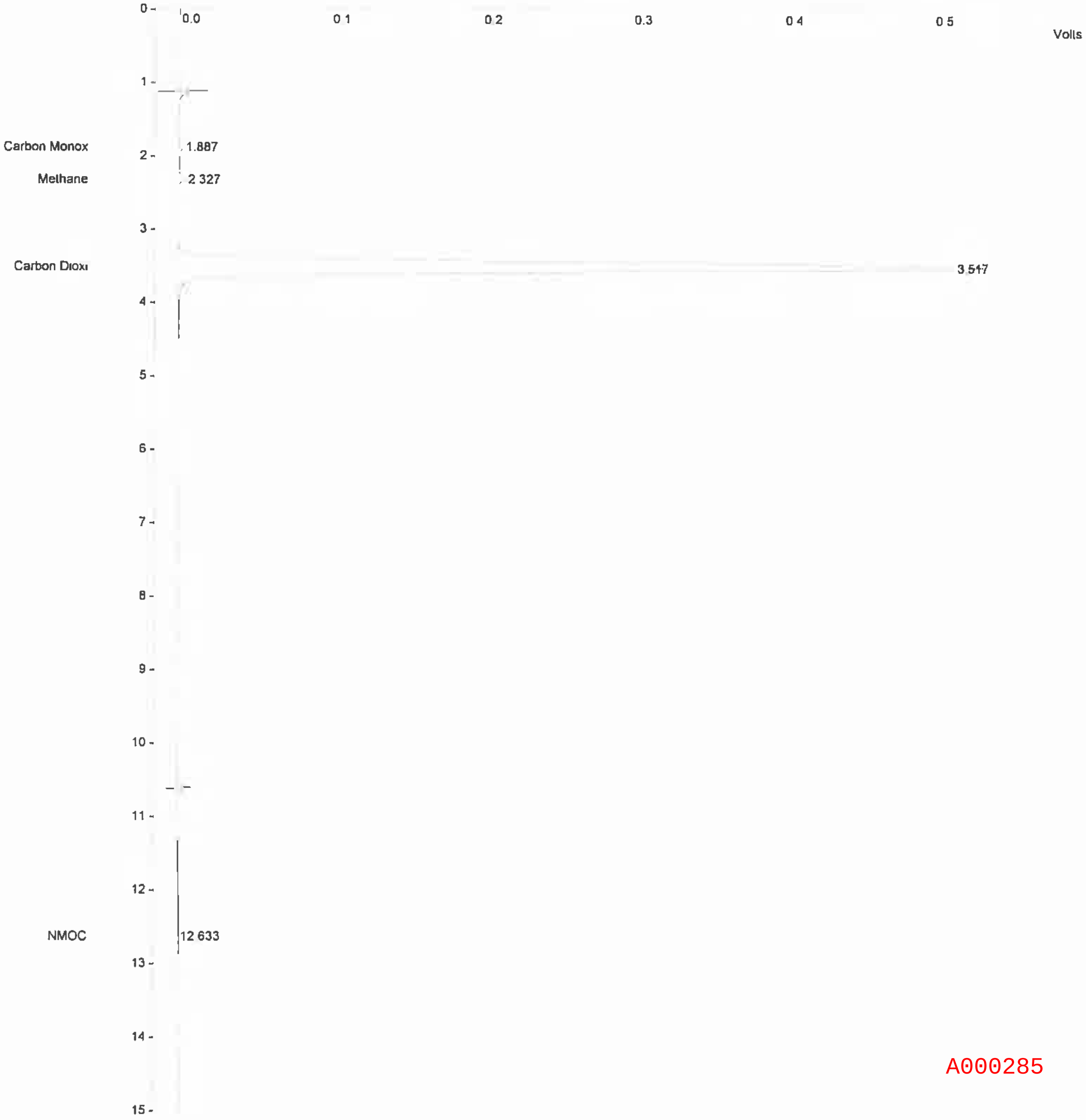
```
Print Date: Wed Feb 24 09:50:30 2016                  Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-23-2016, 17;40;40, a 018 - 210 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 210 dup

Injection Date: 2/23/2016 17:40     Calculation Date: 2/24/2016 09:50

Operator    : Douglass                  Detector Type: 0800 (10 Volts)
Workstation:                            Bus Address   : 88
Instrument  : Varian Star #1            Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10          Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21ol **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                         Width
 Peak       Peak          Result       Time   Offset        Area      Sep.   1/2    Status
  No.       Name          (ppmC)       (min)   (min)      (counts)    Code  (sec)   Codes
 ----  ------------  ----------    -------  -------   ----------    ----  -----   ------
    1  Carbon Monox     11.7719      1.913   -0.017        21316     BB     6.0
    2  Methane          18.5058      2.313   -0.005        32976     BB     3.5
    3  Carbon Dioxi   4669.2002      3.499   -0.003      8298788     BB     8.2   C
    4  Ethane                        7.541                                         M
    5  NMOC             10.5161     12.593    0.423        18045     BB  -61.4
 ----  ------------  ----------    -------  -------   ----------    ----  -----   ------
       Totals:        4709.9940              0.398      8371125

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :            0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -105 microVolts          LSB:      1 microVolts

Noise (used): 37 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

      c9922 CES

Appended Notes:

       c9922 CES
*********************************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 17;40;40, a 018 - 210 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 210 dup

Injection Date: 2/23/2016 17:40    Calculation Date: 2/24/2016 09:50

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 440         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



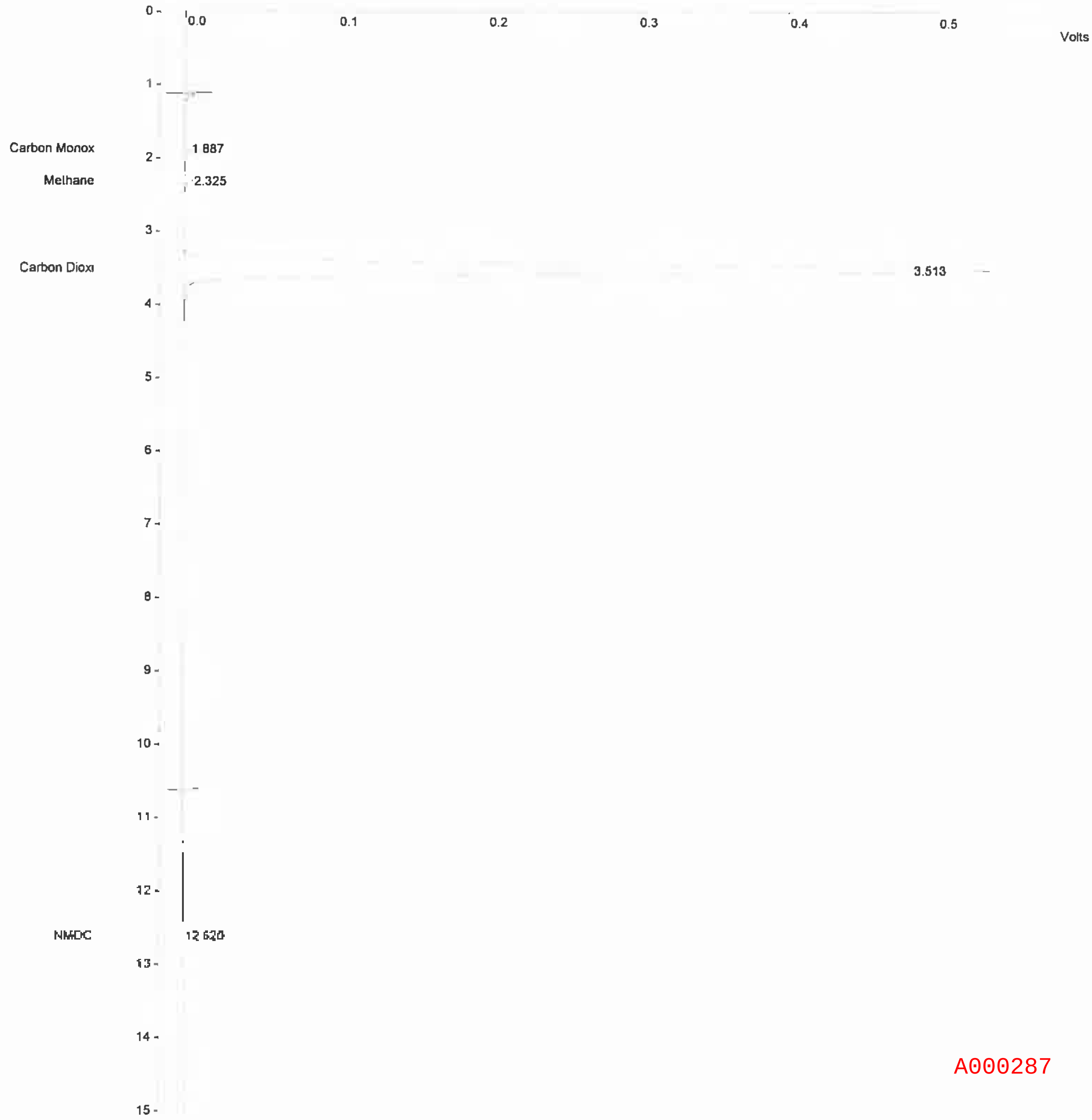
```
Print Date: Wed Feb 24 14:37:55 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-24-2016, 13;04;49, a 018 - 211.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 211

Injection Date: 2/24/2016 13:04     Calculation Date: 2/24/2016 14:37

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                  Ret.    Time                     Width
 Peak     Peak        Result      Time   Offset      Area    Sep.   1/2   Status
  No.     Name        (ppmC)      (min)   (min)    (counts)  Code  (sec)  Codes
 ---- ------------ ----------- -------- -------  ---------- ---- -----  ------
    1 Carbon Monox    10.7514    1.887  -0.043       19468   BB    3.6
    2 Methane         11.0412    2.327   0.009       19674   BB    3.6
    3 Carbon Dioxi  2680.4832    3.517   0.015     4764148   BB    8.2   C
    4 Ethane                     7.541                                   M
    5 NMOC             6.0516   12.633   0.463       10384   BB   30.3
 ---- ------------ ----------- -------- -------  ---------- ---- -----  ------
      Totals:       2708.3274            0.444     4813674

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -168 microVolts          LSB:     1 microVolts

Noise (used): 46 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9972 CES

Appended Notes:

        c9972 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 13;04;49, a 018 - 211.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 211

Injection Date: 2/24/2016 13:04    Calculation Date: 2/24/2016 14:37

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 253           Zero Offset = 2%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick   = 1.00
```



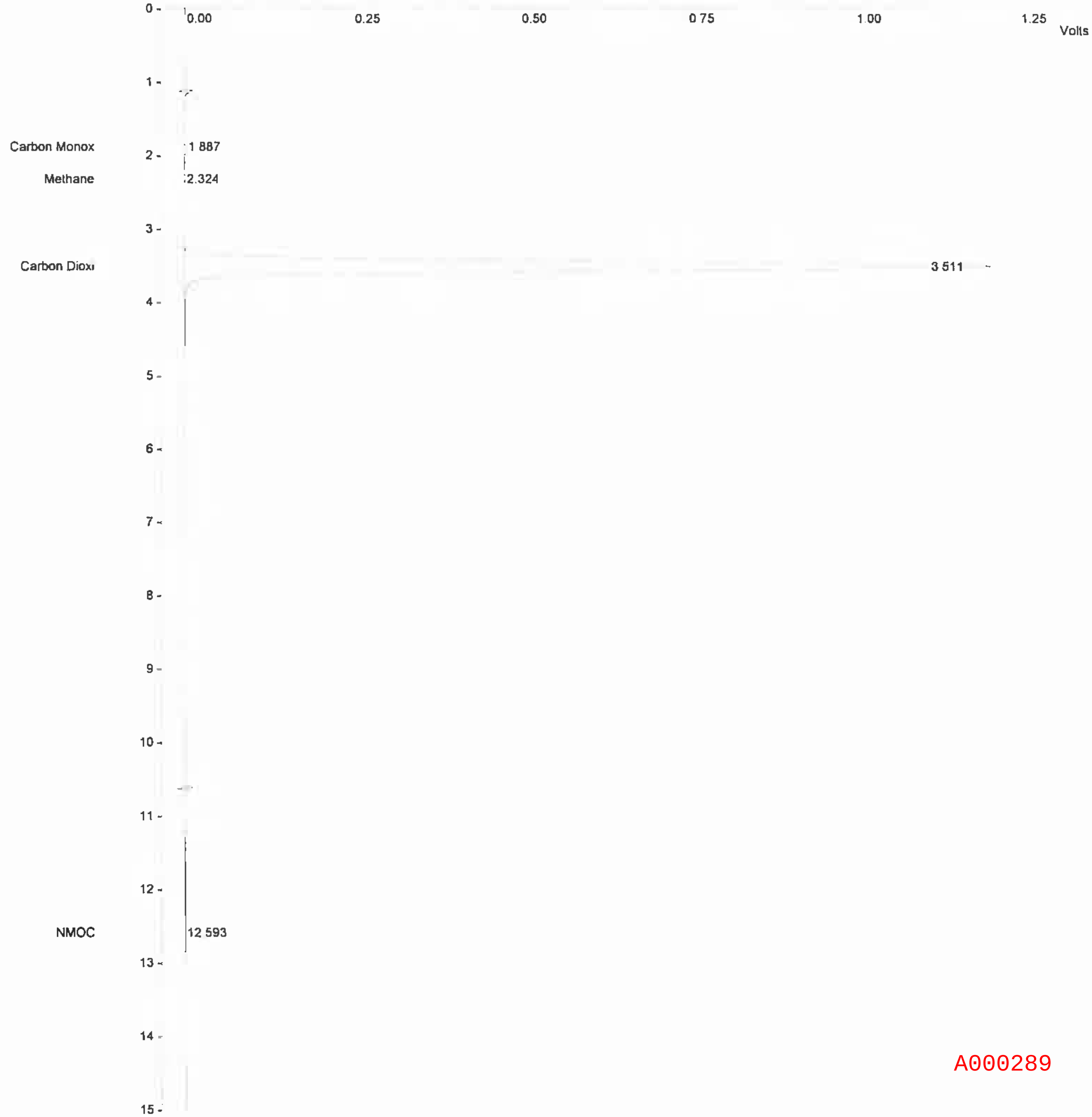
```
Print Date: Wed Feb 24 14:37:42 2016                  Page 1 of 1

Title          : SCAQMD Methods 25.x
Run File       : g:\2016\feb 16\2-24-2016, 13;32;46, a 018 - 211 dup.run
Method File    : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID      : A 018 - 211 dup

Injection Date: 2/24/2016 13:32      Calculation Date: 2/24/2016 14:37

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3568-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                    Ret.    Time                        Width
 Peak      Peak        Result       Time   Offset       Area     Sep.    1/2    Status
  No.      Name        (ppmC)      (min)    (min)     (counts)   Code   (sec)   Codes
 ---- ------------ ----------   ------- -------  ----------   ----  -----   ------
    1 Carbon Monox    11.4589     1.887  -0.043       20749     BB     3.7
    2 Methane         11.0994     2.325   0.007       19778     BB     3.6
    3 Carbon Dioxi  2681.1135     3.513   0.011     4765269     BB     8.2   C
    4 Ethane                      7.541                                     M
    5 NMOC             6.2231    12.620   0.450       10678     BB    38.3
 ---- ------------ ----------   ------- -------  ----------   ----  -----   ------
      Totals:       2709.8949             0.425     4816474

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -136 microVolts          LSB:      1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:     0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
***********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-24-2016, 13;32;46, a 018 - 211 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 211 dup

Injection Date: 2/24/2016 13:32    Calculation Date: 2/24/2016 14:37

Operator    : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 253          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



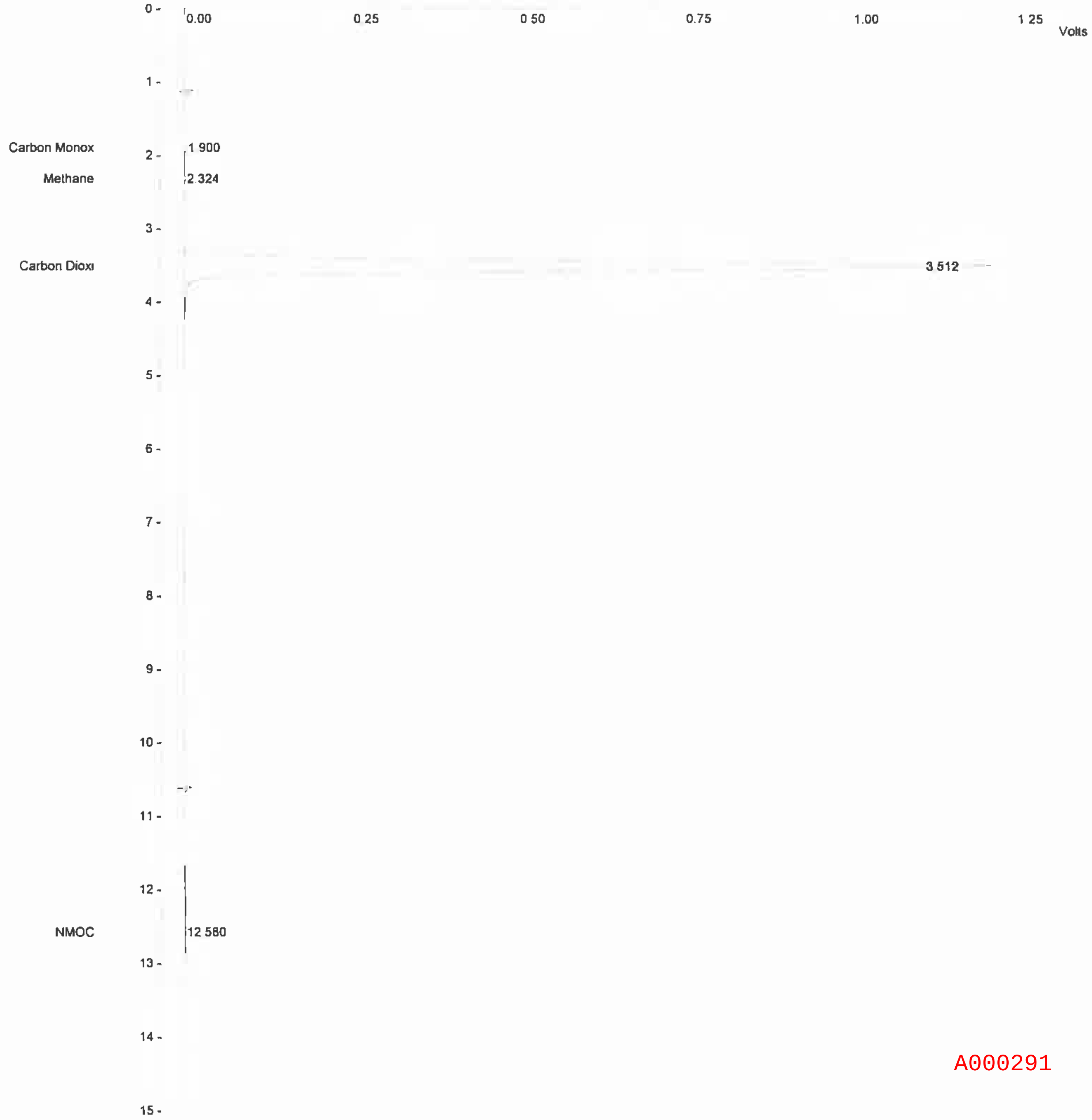
```
Print Date: Wed Feb 24 14:58:47 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 14;00;50, a 018 - 212.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 212

Injection Date: 2/24/2016 14:00    Calculation Date: 2/24/2016 14:58

Operator     : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 8B
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                          Width
 Peak      Peak          Result      Time   Offset        Area       Sep.   1/2    Status
  No.      Name          (ppmC)     (min)   (min)       (counts)     Code  (sec)   Codes
 ---- ------------ ----------- -------- -------  -----------  ---- -----   ------
    1 Carbon Monox     13.9280    1.887  -0.043        25220    BB    5.5
    2 Methane           4.0844    2.324   0.006         7278    BB    3.5
    3 Carbon Dioxi  6070.7837    3.511   0.009     10789888    BB    8.3   C
    4 Ethane                      7.541                                     M
    5 NMOC             11.0737   12.593   0.423        19002    BB   69.0
 ---- ------------ ----------- -------- -------  -----------  ---- -----   ------
      Totals:        6099.8698            0.395     10841388

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -317 microVolts          LSB:     1 microVolts

Noise (used): 42 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-24-2016, 14;00;50, a 018 - 212.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 212

Injection Date: 2/24/2016 14:00    Calculation Date: 2/24/2016 14:58

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 571         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



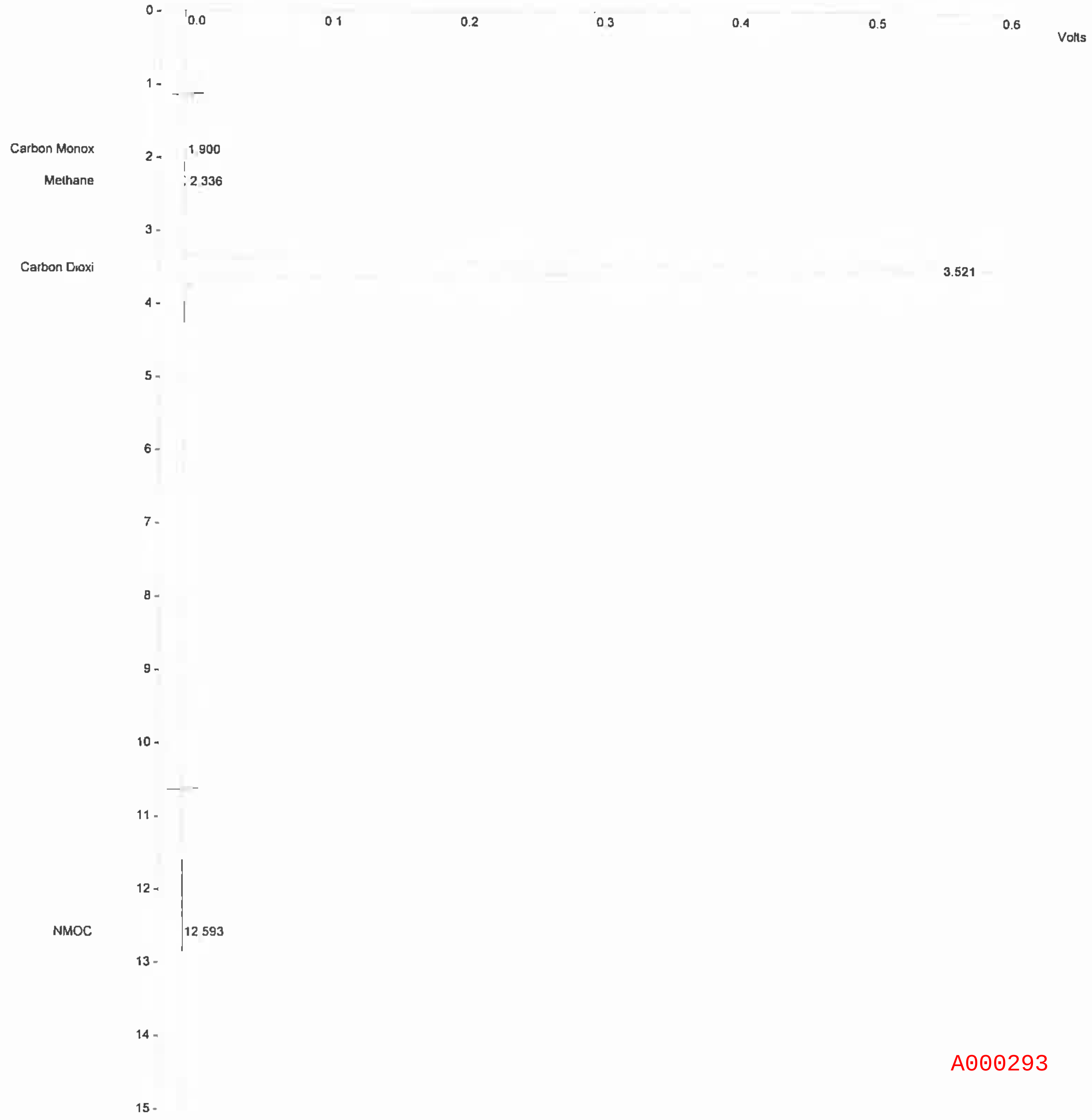
```
Print Date: Wed Feb 24 14:58:59 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb 16\2-24-2016, 14;28;52, a 018 - 212 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 212 dup

Injection Date: 2/24/2016 14:28    Calculation Date: 2/24/2016 14:58

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                   Ret.     Time                      Width
 Peak      Peak          Result    Time    Offset        Area    Sep.  1/2    Status
  No.      Name          (ppmC)    (min)    (min)      (counts)  Code (sec)   Codes
 ---- ------------ ----------  ------- -------  ----------  ---- -----  ------
    1 Carbon Monox    13.9529    1.900  -0.030       25265    BB   5.5
    2 Methane          4.0348    2.324   0.006        7190    BB   3.5
    3 Carbon Dioxi  6082.5781    3.512   0.010    10810851    BB   8.2   C
    4 Ethane                     7.541                                  M
    5 NMOC            10.5753   12.580   0.410       18146    BB 162.6
 ---- ------------ ----------  ------- -------  ----------  ---- -----  ------
      Totals:      6111.1411             0.396    10861452

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -251 microVolts          LSB:      1 microVolts

Noise (used): 24 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 14;28;52, a 018 - 212 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 212 dup

Injection Date: 2/24/2016 14:28    Calculation Date: 2/24/2016 14:58

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 572          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



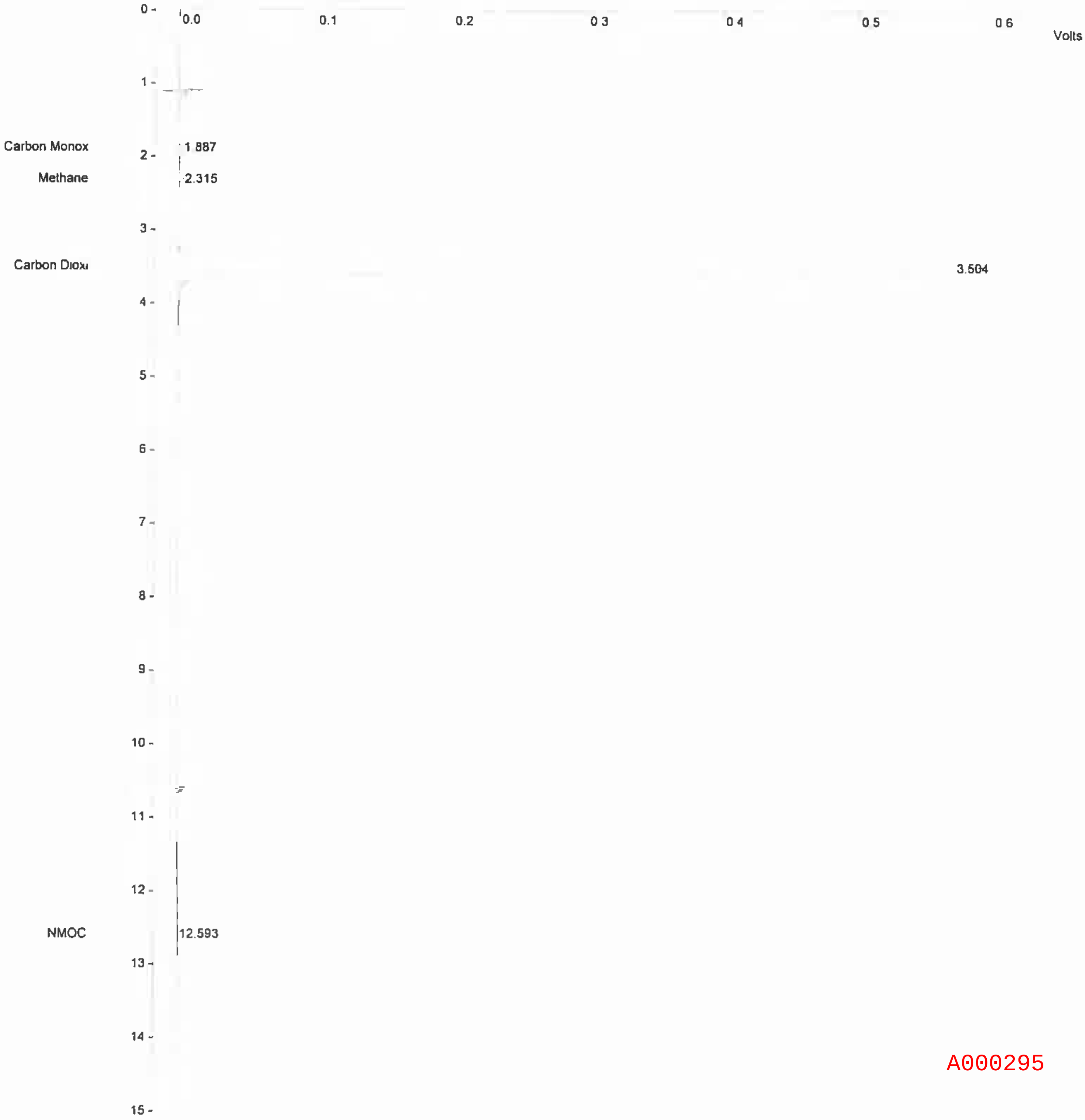
```
Print Date: Wed Feb 24 15:40:30 2016                    Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-24-2016, 14;51;49, a 018 - 213.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : A 018 - 213

Injection Date: 2/24/2016 14:51     Calculation Date: 2/24/2016 15:40

Operator     : Douglass                   Detector Type: 0800 (10 Volts)
Workstation:                              Bus Address  : 08
Instrument : Varian Star #1               Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10           Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-35B8-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                         Ret.     Time                         Width
 Peak        Peak            Result      Time    Offset       Area      Sep.    1/2     Status
  No.        Name            (ppmC)     (min)    (min)      (counts)    Code   (sec)    Codes
 ----  ------------  ----------  --------  --------  -----------  ----  -----   ------
    1  Carbon Monox      9.9789     1.900    -0.030        18069    BB    7.2
    2  Methane           7.0213     2.336     0.018        12511    BB    3.7
    3  Carbon Dioxi   2967.9646     3.521     0.019      5275103    BB    8.2    C
    4  Ethane                       7.541                                        M
    5  NMOC              4.6914    12.593     0.423         8050    BB   20.9
 ----  ------------  ----------  --------  --------  -----------  ----  -----   ------
       Totals:        2989.6562               0.430      5313733

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :            0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1            Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -214 microVolts          LSB:      1 microVolts

Noise (used): 24 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-24-2016, 14;51;49, a 018 - 213.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : A 018 - 213

Injection Date: 2/24/2016 14:51    Calculation Date: 2/24/2016 15:40

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 279         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min  Min / Tick  = 1.00
```



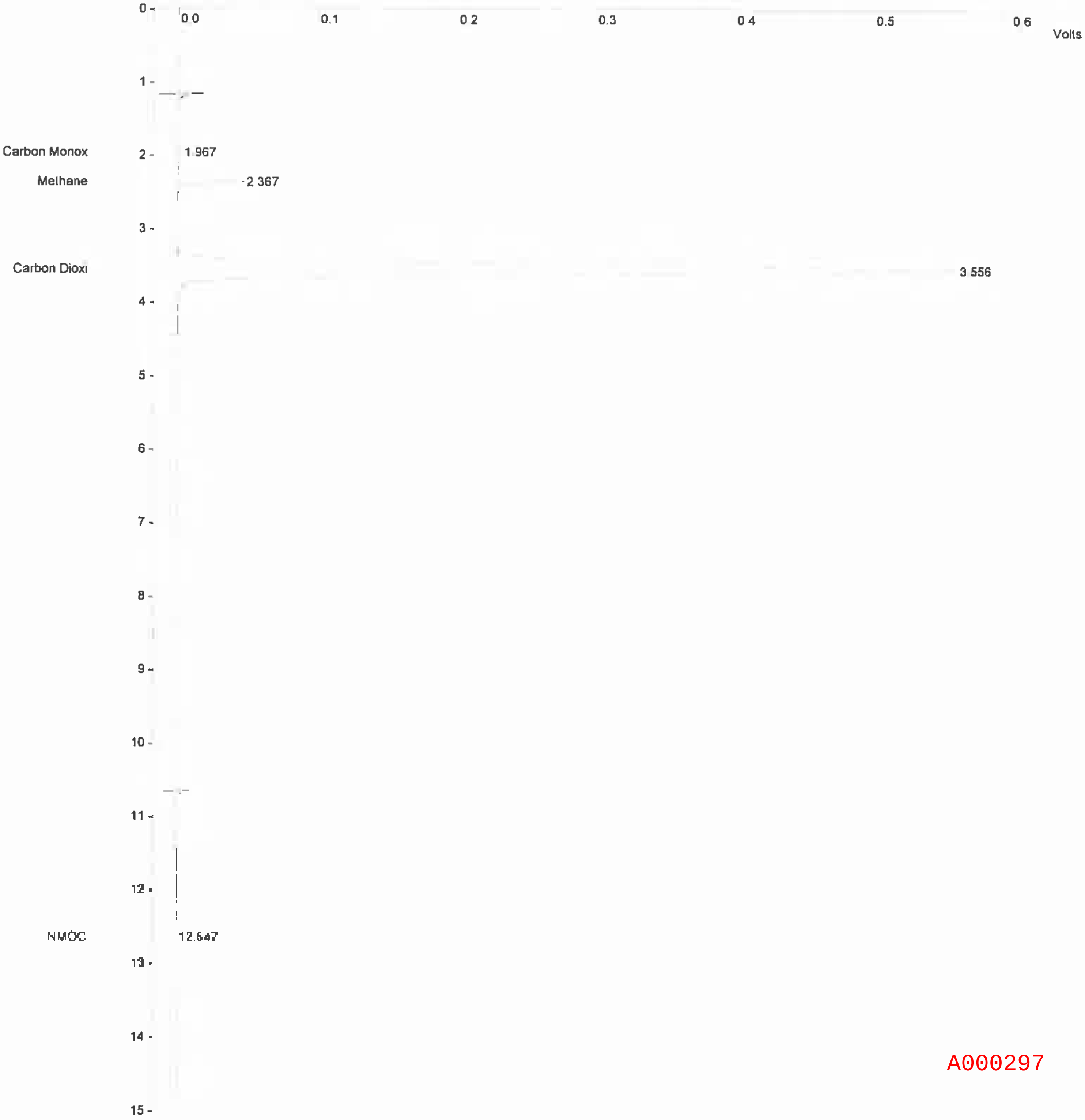
```
Print Date: Wed Feb 24 15:39:31 2016                  Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 15:19:46, a 018 - 213 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID    : A 018 - 213 dup

Injection Date: 2/24/2016 15:19     Calculation Date: 2/24/2016 15:38

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                     Width
 Peak      Peak           Result       Time   Offset      Area     Sep.  1/2    Status
  No.      Name           (ppmC)      (min)   (min)     (counts)   Code (sec)   Codes
 ----  ------------  ----------  -------  -------  -----------  ---- -----   ------
    1  Carbon Monox     10.2192    1.887   -0.043        18504    BB    4.6
    2  Methane           6.9564    2.315   -0.003        12396    BB    3.6
    3  Carbon Dioxi   2970.4929    3.504    0.002      5279596    BB    8.2   C
    4  Ethane                      7.541                                      M
    5  NMOC              4.7620   12.593    0.423         8171    BB -74.3
 ----  ------------  ----------  -------  -------  -----------  ---- -----   ------
       Totals:        2992.4305             0.379      5318667

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 6           Rejected Peaks: 2       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -383 microVolts          LSB:      1 microVolts

Noise (used): 19 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range; No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 15;19;45, a 018 - 213 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 213 dup

Injection Date: 2/24/2016 15:19    Calculation Date: 2/24/2016 15:38

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 280         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



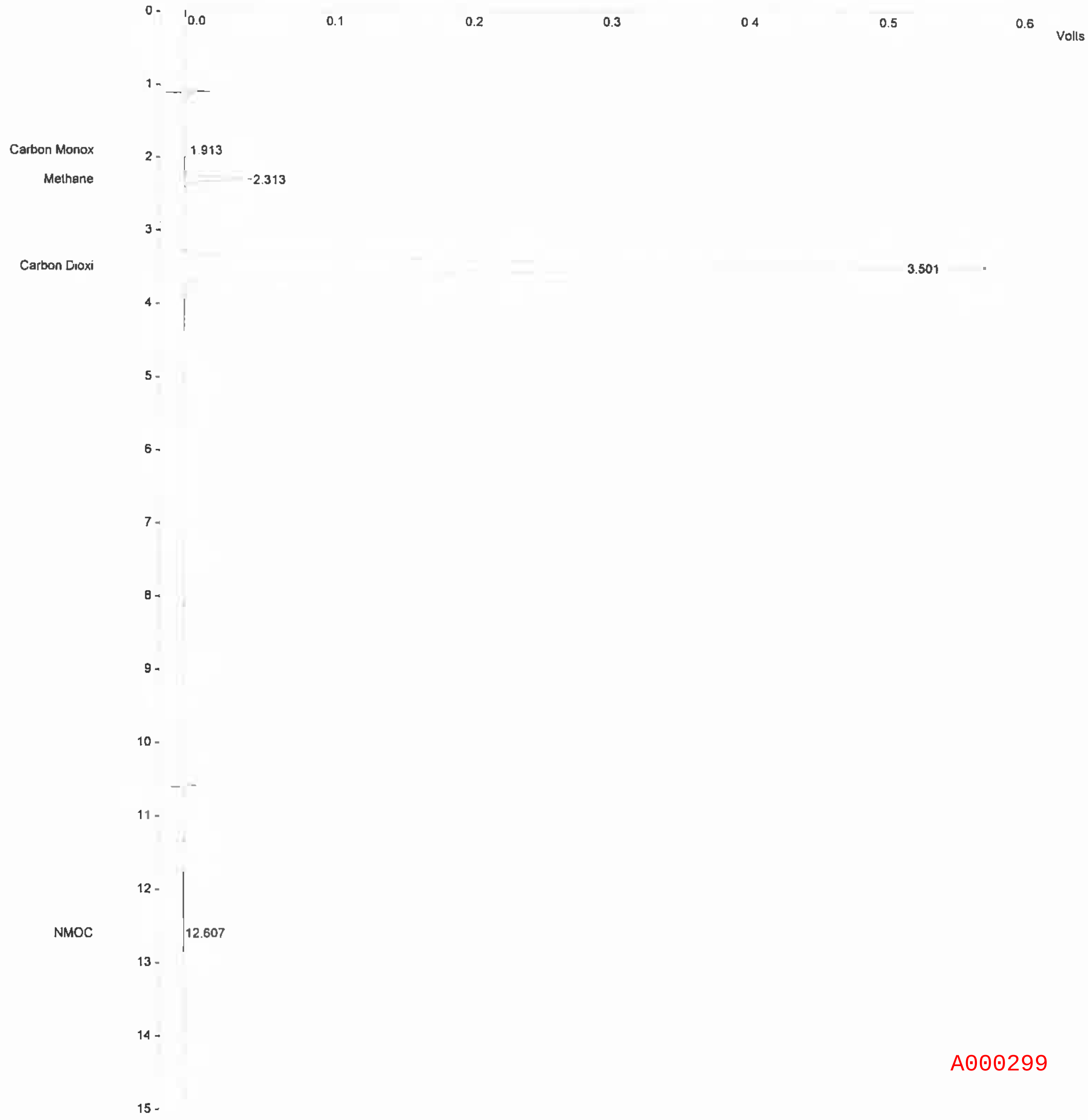
```
Print Date: Wed Feb 24 16:30:59 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-24-2016, 15;45;59, a 018 - 214.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 214

Injection Date: 2/24/2016 15:45     Calculation Date: 2/24/2016 16:30

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                     Width
 Peak      Peak           Result     Time   Offset       Area    Sep.  1/2    Status
  No.      Name           (ppmC)     (min)   (min)     (counts)  Code (sec)   Codes
 ----  ------------  -----------  -------  -------  ----------- ----  -----  ------
    1  Carbon Monox     12.1406    1.967    0.037       21984    BB     5.2
    2  Methane         106.2401    2.367    0.049      189310    BB     3.7
    3  Carbon Dioxi   2903.4189    3.556    0.054     5160383    BB     8.2   C
    4  Ethane                      7.541                                     M
    5  NMOC              3.9484   12.647    0.477        6775    BB    31.0
 ----  ------------  ===========  -------  =======  =========== ----  -----  ------
       Totals:        3025.7480            0.617     5378452

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -218 microVolts          LSB:      1 microVolts

Noise (used): 30 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

      c9922 CES

Appended Notes:

       c9922 CES
*********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 15;45;59, a 018 - 214.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 214

Injection Date: 2/24/2016 15:45    Calculation Date: 2/24/2016 16:30

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 274          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



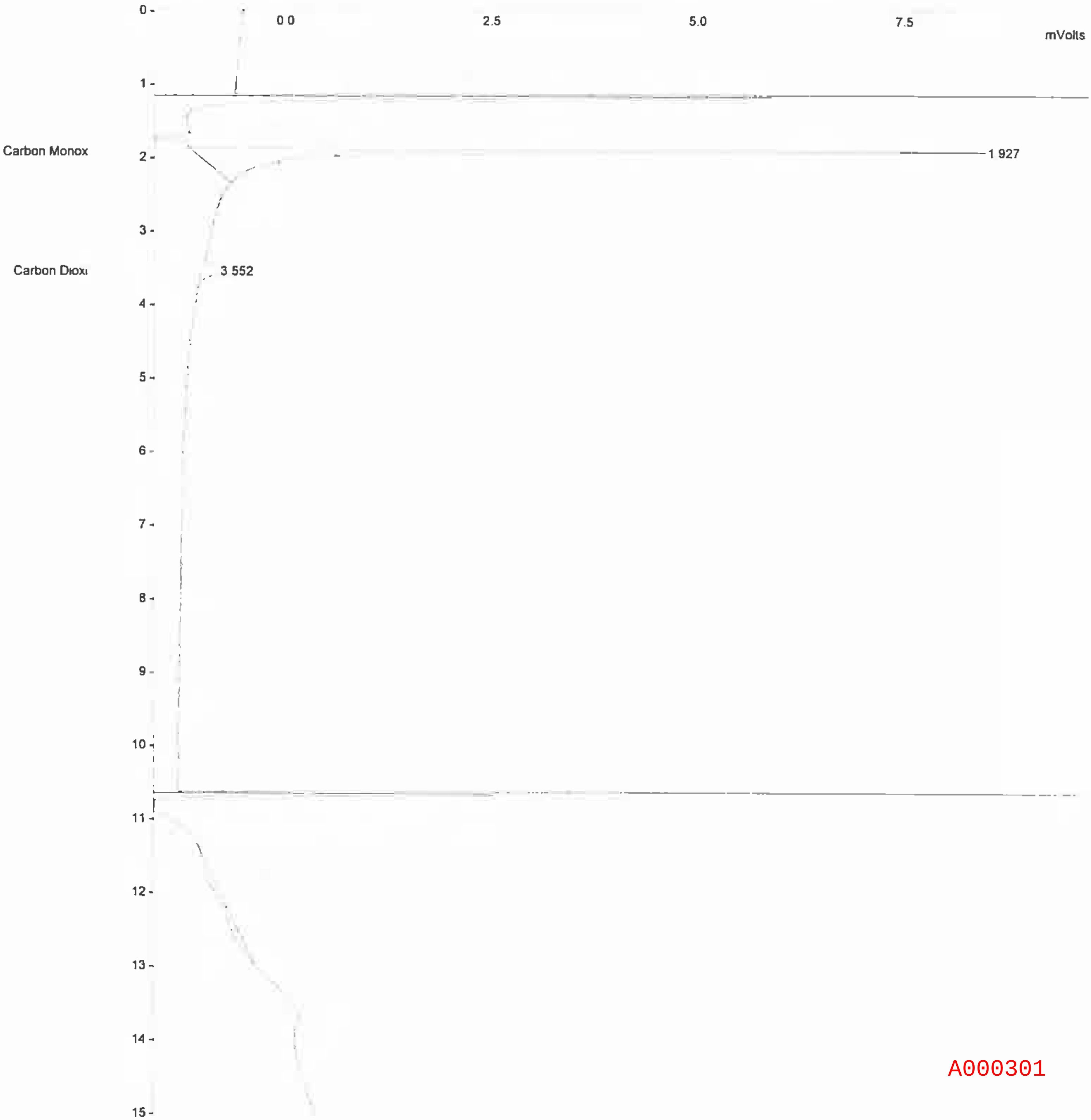
```
Print Date: Wed Feb 24 16:30:10 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 16;09;39, a 018 - 214 dup.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 214 dup

Injection Date: 2/24/2016 16:09     Calculation Date: 2/24/2016 16:29

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                         Ret.     Time                           Width
 Peak       Peak           Result        Time    Offset        Area      Sep.    1/2     Status
  No.       Name           (ppmC)        (min)    (min)      (counts)    Code   (sec)    Codes
 ----  ------------  ----------   -------  -------  ----------   ----  -----    ------
    1  Carbon Monox      12.0728     1.913   -0.017       21861     BB    4.8
    2  Methane          104.6719     2.313   -0.005      186515     BB    3.6
    3  Carbon Dioxi    2905.7051     3.501   -0.001     5164446     BB    8.2    C
    4  Ethane                        7.541                                       M
    5  NMOC               4.0072    12.607    0.437        6876     BB   17.7
 ----  ------------  ----------   -------  -------  ----------   ----  -----    ------
       Totals:         3026.4570              0.414     5379698

Status Codes:
M - Missing peak
C - Out of calibration range

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -243 microVolts           LSB:      1 microVolts

Noise (used): 47 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Calib. out of range: No Recovery Action Specified

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 16;09;39, a 018 - 214 dup.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 214 dup

Injection Date: 2/24/2016 16:09    Calculation Date: 2/24/2016 16:29

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 275          Zero Offset = 2%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



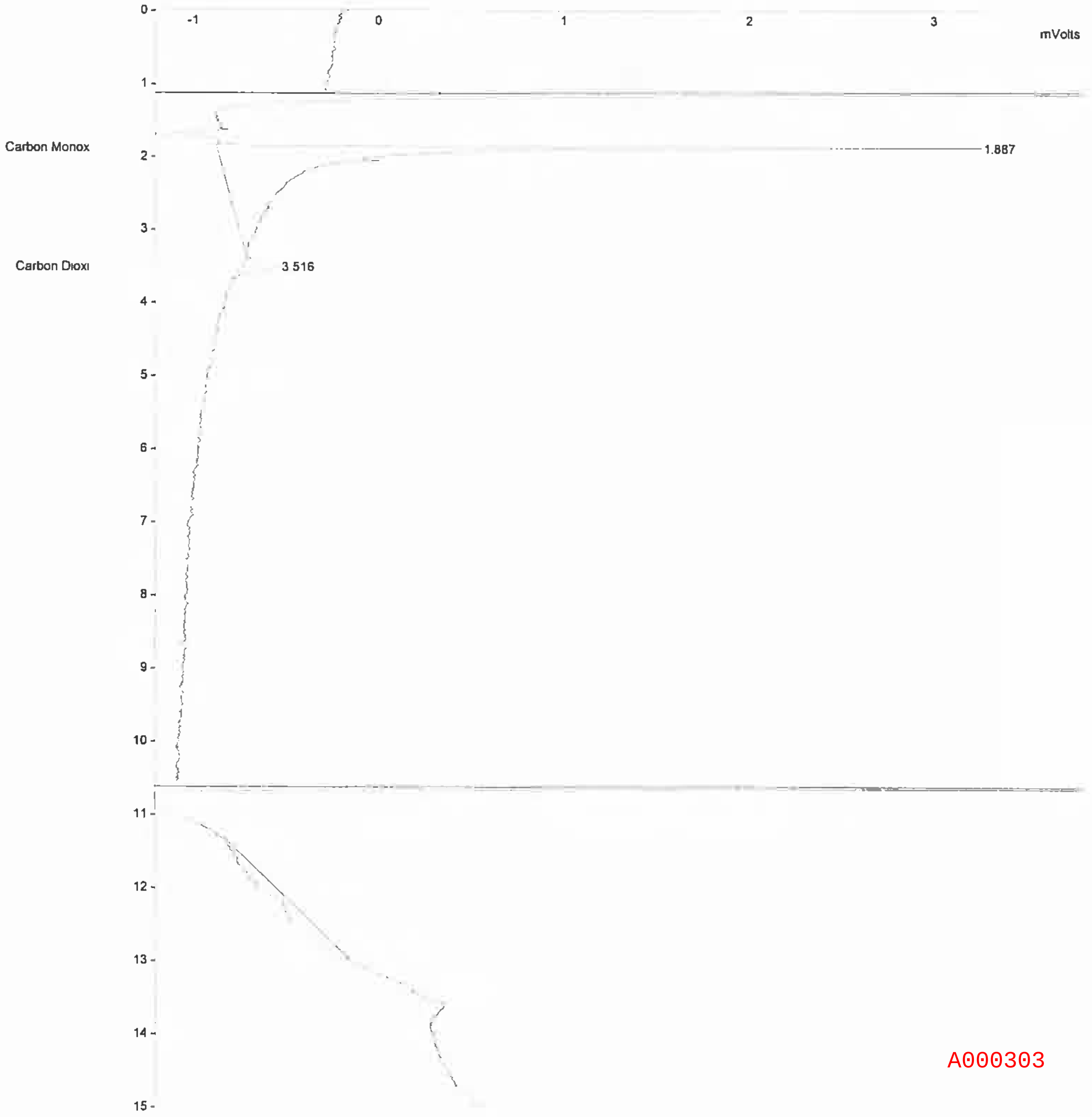
```
Print Date: Wed Feb 24 13:36:07 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 11;47;27, a 018 - 215.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 215

Injection Date: 2/24/2016 11:47     Calculation Date: 2/24/2016 13:36

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address   : 88
Instrument  : Varian Star #1           Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.     Time                          Width
 Peak      Peak            Result      Time    Offset       Area      Sep.    1/2     Status
  No.      Name            (ppmC)     (min)    (min)      (counts)    Code   (sec)    Codes
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
    1  Carbon Monox     21.3768    1.927   -0.003       38708    BB     2.3
    2  Methane                     2.318                                      M
    3  Carbon Dioxi      1.2047    3.552    0.050        2141    BB     7.7
    4  Ethane                      7.541                                      M
    5  NMOC                       12.170                                      M
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
       Totals:          22.5815             0.047       40849

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 2       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -364 microVolts          LSB:      1 microVolts

Noise (used): 18 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 11;47;27, a 018 - 215.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 215

Injection Date: 2/24/2016 11:47    Calculation Date: 2/24/2016 13:36

Operator     : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address   : 88
Instrument : Varian Star #1           Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 4            Zero Offset = 14%
Start Time  =   0.000    min    End Time     = 15.013  min   Min / Tick  = 1.00
```



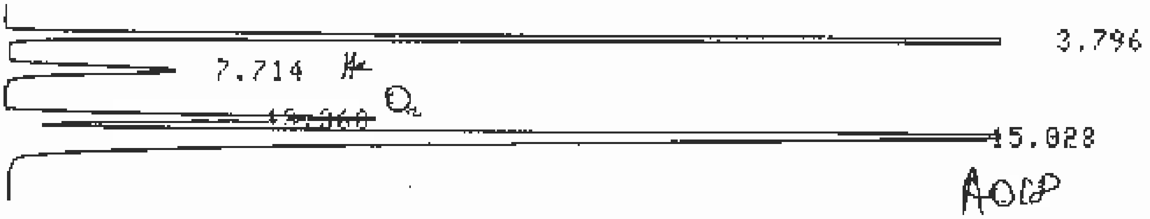
```
Print Date: Wed Feb 24 13:36:44 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-24-2016, 12;12;33, a 018 - 215.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID   : A 018 - 215

Injection Date: 2/24/2016 12:12    Calculation Date: 2/24/2016 13:36

Operator   : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area    Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------  ------- ------- ----------  ---- -----  ------
    1 Carbon Monox    19.2650    1.887  -0.043      34884    BB   2.3
    2 Methane                    2.318                                 M
    3 Carbon Dioxi     1.0199    3.516   0.014       1813    BB   7.5
    4 Ethane                     7.541                                 M
    5 NMOC                      12.170                                 M
 ---- ------------ ----------  ------- ------- ----------  ---- -----  ------
      Totals:         20.2849           -0.029      36697

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 3           Rejected Peaks: 1      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -160 microVolts          LSB:      1 microVolts

Noise (used): 29 microVolts - monitored before this run

Stream: 1      Injection Number: 2    Sampling Time:    0.00 min

Original Notes:

       c9922 CES

Appended Notes:

        c9922 CES
*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 12;12;33, a 018 - 215.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : A 018 - 215

Injection Date: 2/24/2016 12:12    Calculation Date: 2/24/2016 13:36

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 2            Zero Offset = 23%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



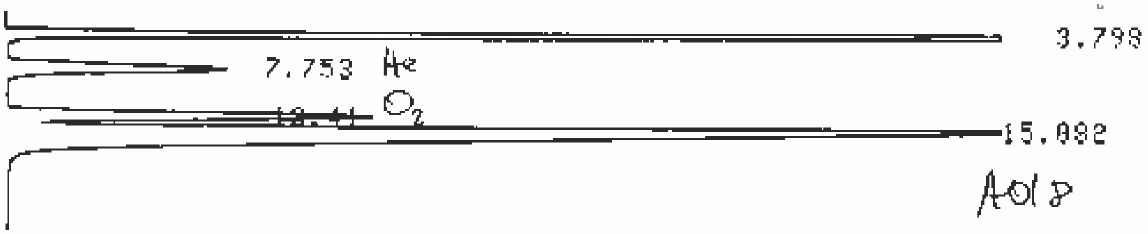
A018
-201

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD        41
REPORT NO   185

PKNO       TIME        AREA   MK  IDNO      CONC        NAME

  1       3.804     9333816                  35.3546
  2       7.718     1439286                   5.4522
  3      13.35      2635303                   9.9828
  4      15        12990720   V              49.2104
                  ----------            -------------
         TOTAL     26398324                 100
```



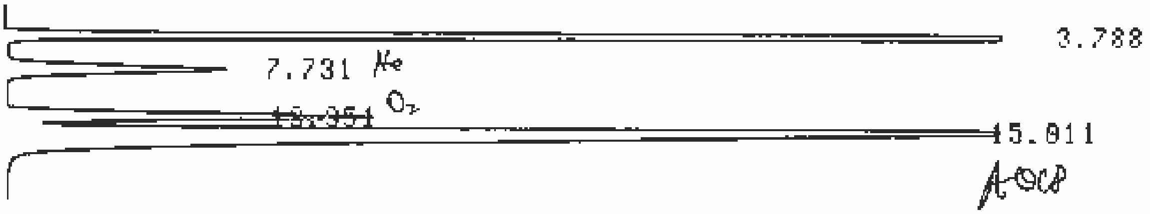
A018
-201

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD        41
REPORT NO   186

PKNO       TIME        AREA   MK  IDNO      CONC        NAME

  1       3.796     9366197                  35.284
  2       7.714     1438104                   5.4176
  3      13.368     2650934                   9.9865
  4      15.028    13089929   V              49.3119
                  ----------            -------------
         TOTAL     26545164                 100
```



A018
-202

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                    FILE         0
SAMPLE NO    0                    METHOD          41
REPORT NO    187

PKNO        TIME        AREA   MK   IDNO       CONC         NAME

   1       3.798    9605514                      35.3128
   2       7.753    1899338                       6.9825
   3      13.41     2652613                       9.7518
   4      15.082   13043780    V                 47.9529
                  ----------           -------------
          TOTAL     27201244                 100
```



A008
-202

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                    FILE         0
SAMPLE NO    0                    METHOD          41
REPORT NO    188

PKNO        TIME        AREA   MK   IDNO       CONC         NAME

   1       3.788    9588169                      35.5102
   2       7.731    1883610                       6.976
   3      13.351    2611304                       9.6711
   4      15.011   12918094    V                 47.8427
                  ----------           -------------
          TOTAL     27001176                 100
```

089

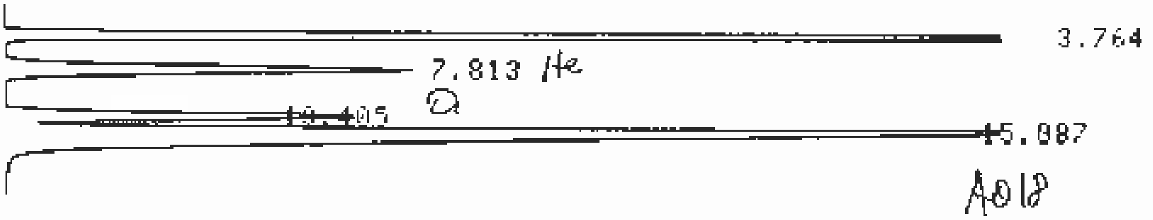
223-02007-02

131215

⊕ Shimadzu

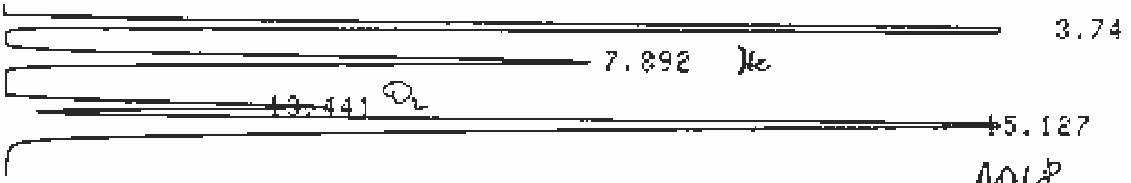
A018
-203

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD         41
REPORT NO    189

PKNO       TIME       AREA   MK  IDNO      CONC        NAME

   1      3.762   10285465                  35.4214
   2      7.803    3482875                  11.9944
   3     13.363    2497756                   8.6018
   4     15.029   12771366   V              43.9824
                  ---------           -------------
         TOTAL     29037458                100
```



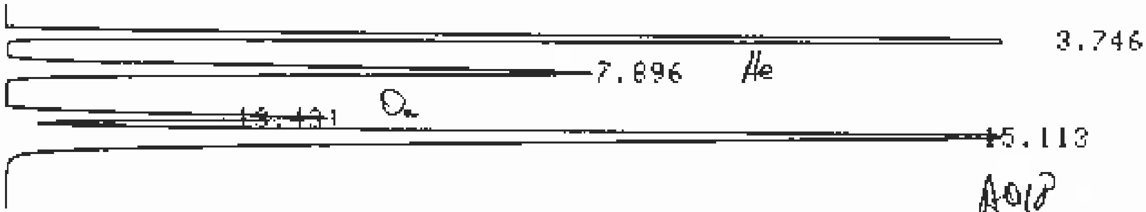
A018
-203

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD         41
REPORT NO    190

PKNO       TIME       AREA   MK  IDNO      CONC        NAME

   1      3.764   10284785                  35.224
   2      7.813    3494237                  11.9673
   3     13.405    2513687                   8.609
   4     15.087   12905561   V              44.1997
                  ---------           -------------
         TOTAL     29198268                100
```



A018
-204

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD         41
REPORT NO    191

PKNO        TIME        AREA  MK   IDNO       CONC         NAME

   1        3.74    10970060                 35.0127
   2        7.892    5112867                 16.3185
   3       13.441    2330011                  7.4366
   4       15.127   12918707   V             41.2321
                   ---------           -------------
         TOTAL      31331640                100
```



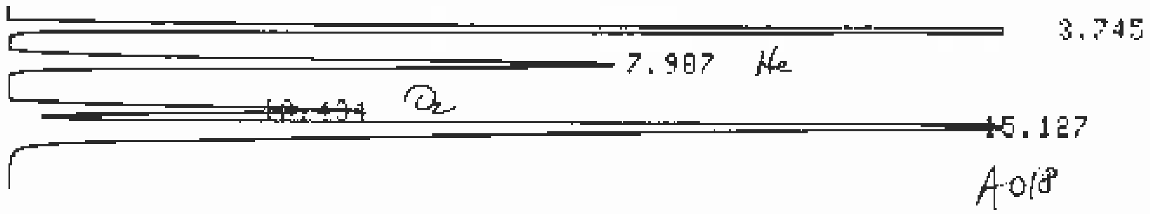
A018
-204
dup

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD         41
REPORT NO    192

PKNO        TIME        AREA  MK   IDNO       CONC         NAME

   1        3.746   10963355                 35.1526
   2        7.896    5084896                 16.3041
   3       13.431    2313238                  7.4171
   4       15.113   12826360   V             41.1261
                   ---------           -------------
         TOTAL      31187846                100
```

223-02037-02

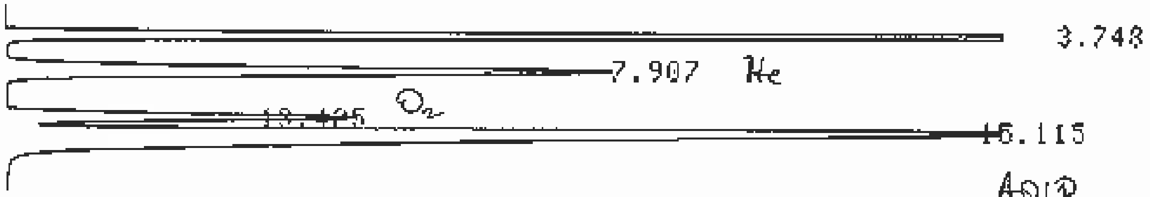
131215

⊕ Shimadzu



A018
-205

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE        0
SAMPLE NO    0                    METHOD        41
REPORT NO    193

PKNO        TIME        AREA   MK   IDNO       CONC          NAME

   1       3.745   11103322                  35.2153
   2       7.907    5289012                  16.7746
   3      13.434    2542097                   8.0625
   4      15.127   12595435   V              39.9476
                  ---------           -------------
        TOTAL     31529862                 100
```



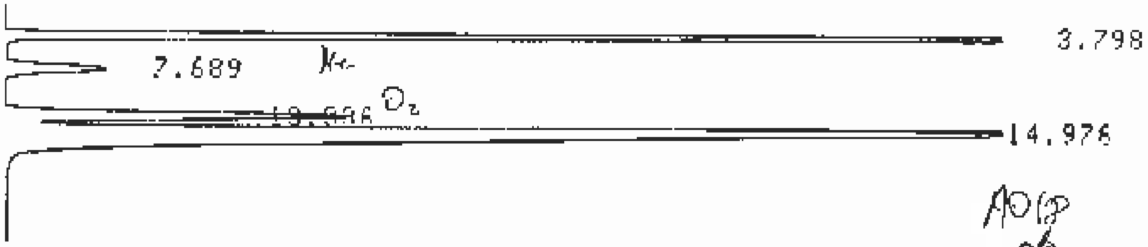
A018
-205
dup

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                    FILE        0
SAMPLE NO    0                    METHOD        41
REPORT NO    194

PKNO        TIME        AREA   MK   IDNO       CONC          NAME

   1       3.748   11097840                  35.2928
   2       7.907    5274793                  16.7746
   3      13.425    2533271                   8.0562
   4      15.115   12539187   V              39.8765
                  ---------           -------------
        TOTAL     31445088                 100
```

091
223-02017-02
131215
Shima

A018
-206

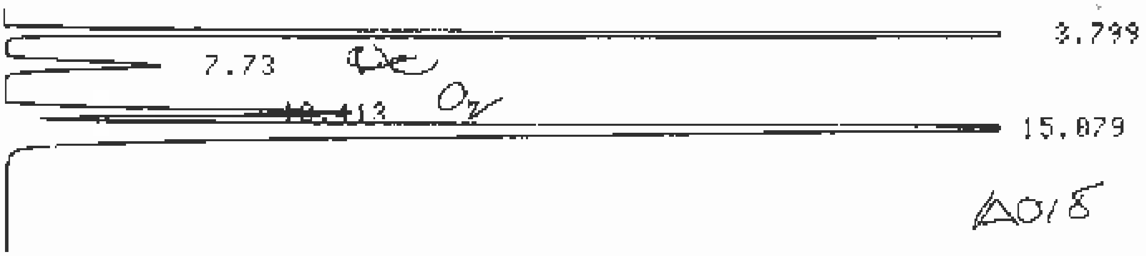
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                     FILE         0
SAMPLE NO    0                     METHOD          41
REPORT NO    195

PKNO       TIME       AREA   MK   IDNO      CONC         NAME

   1       3.812    9229514                   35.6772
   2       7.709     864465                    3.3416
   3      13.368    2476052                    9.5713
   4      15.006   13299462   V               51.4098
                  ----------           -------------
          TOTAL     25869492                100
```



A018
-206
dup

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                     FILE         0
SAMPLE NO    0                     METHOD          41
REPORT NO    196

PKNO       TIME       AREA   MK   IDNO      CONC         NAME

   1       3.798    9132028                   35.6716
   2       7.689     857089                    3.348
   3      13.336    2460221                    9.6101
   4      14.976   13150963   V               51.3703
                  ----------           -------------
          TOTAL     25600300                100
```

092



A018
207

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   202

PKNO       TIME       AREA  MK  IDNO      CONC        NAME

   1      3.799   9232237                35.3124
   2      7.73    1334574                 5.1046
   3     13.413   2493691                 9.5381
   4     15.079  13083936   V            50.0448
                 ----------          -------------
       TOTAL     26144438                100
```

A018
207

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   203

PKNO       TIME       AREA  MK  IDNO      CONC        NAME

   1      3.796   9055280                35.4427
   2      7.7     1297074                 5.0768
   3     13.326   2435543                 9.5328
   4     14.989  12761139   V            49.9476
                 ----------          -------------
       TOTAL     25549034                100
```

A018
- 208

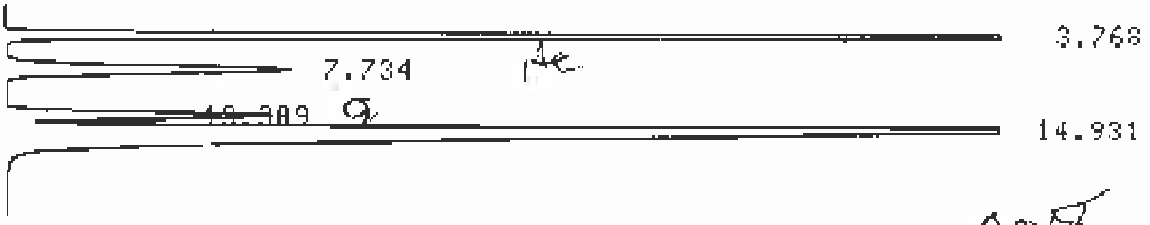
```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE        0
SAMPLE NO    0                        METHOD        41
REPORT NO    206

PKNO       TIME       AREA   MK  IDNO      CONC        NAME

   1      3.773    9736692                35.5169
   2      7.741    2471312                 9.0147
   3     13.324    2425989                 8.8494
   4     14.984   12780235   V            46.619
                 ---------          -------------
       TOTAL      27414226               100
```

A018
- 208
dup

```
CHROMATOGRAM   1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE        0
SAMPLE NO    0                        METHOD        41
REPORT NO    207

PKNO       TIME       AREA   MK  IDNO      CONC        NAME

   1      3.774    9745916                35.54
   2      7.743    2473394                 9.0196
   3     13.324    2427495                 8.8522
   4     14.982   12775616   V            46.5882
                 ---------          -------------
       TOTAL      27422418               100
```

A018
-209

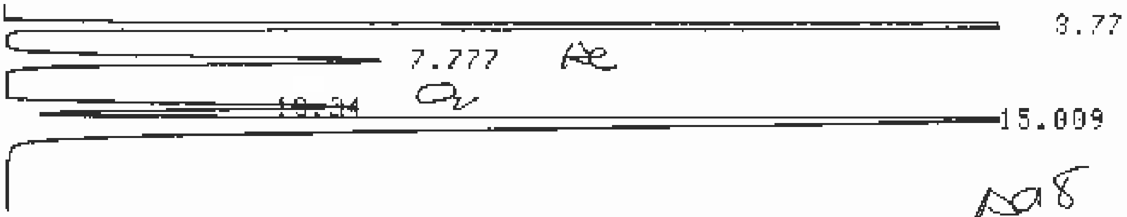
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                    FILE         0
SAMPLE NO    0                    METHOD          41
REPORT NO    208

PKNO        TIME        AREA   MK   IDNO       CONC          NAME

   1       3.773    9736550                  35.3868
   2       7.74     2430629                   8.8339
   3      13.322    1888466                   6.8635
   4      14.946   13459008   V              48.9158
                  ----------              -------------
          TOTAL    27514652                 100
```



A018
-209

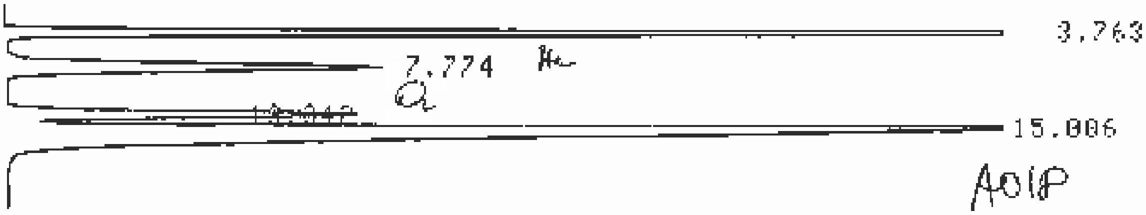
```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                    FILE         0
SAMPLE NO    0                    METHOD          41
REPORT NO    209

PKNO        TIME        AREA   MK   IDNO       CONC          NAME

   1       3.768    9733244                  35.4232
   2       7.734    2426392                   8.8306
   3      13.309    1887392                   6.869
   4      14.931   13430024   V              48.8772
                  ----------              -------------
          TOTAL    27477048                 100
```

2
131215
⊕ Shimadzu



A08
-210

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD        41
REPORT NO   210

PKNO       TIME       AREA  MK  IDNO       CONC        NAME

  1        3.77    9960402                  35.1921
  2        7.777   3203980                  11.3203
  3       13.34    2475956                   8.748
  4       15.009  12662608   V              44.7395
                 ---------             -------------
       TOTAL      28302944                100
```



A018
-210
dup

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD        41
REPORT NO   211

PKNO       TIME       AREA  MK  IDNO       CONC        NAME

  1        3.763  10066567                  35.2064
  2        7.774   3239606                  11.3301
  3       13.342   2500499                   8.7451
  4       15.006  12786368   V              44.7185
                 ---------             -------------
       TOTAL      28593040                100
```

097

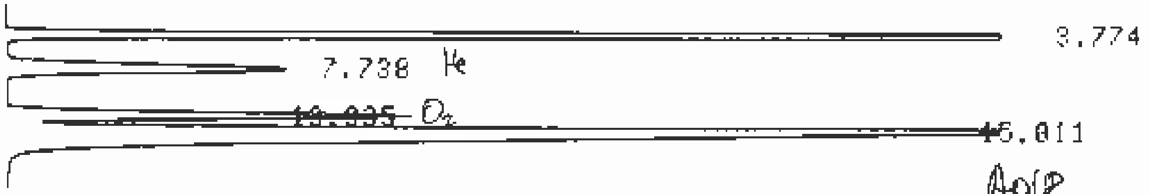
223-02037-02

131215

Shimadzu

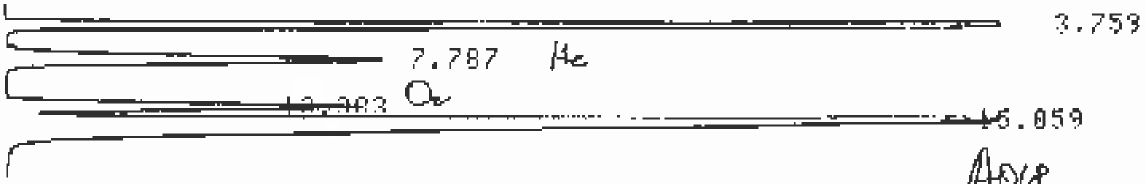
A018
-211

```
CHROMATOGRAM   1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD         41
REPORT NO   212

PKNO      TIME       AREA   MK  IDNO     CONC        NAME

  1      3.775    9867732                 35.4457
  2      7.738    2396728                  8.6093
  3     13.328    2890363                 10.3824
  4     14.999   12684152   V             45.5626
                 ---------            -------------
        TOTAL    27838972                100
```



A018
-211

```
CHROMATOGRAM   1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                        FILE        0
SAMPLE NO   0                        METHOD         41
REPORT NO   213

PKNO      TIME       AREA   MK  IDNO     CONC        NAME

  1      3.774    9854967                 35.4633
  2      7.738    2383142                  8.5758
  3     13.335    2904967                 10.4536
  4     15.011   12646118   V             45.5073
                 ---------            -------------
        TOTAL    27789192                100
```



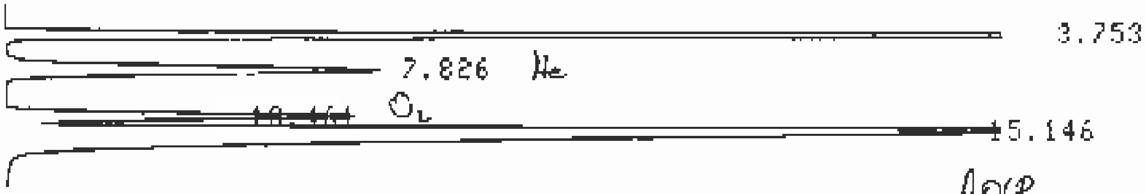
He

O_2

A018

-212

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD         41
REPORT NO    214

PKNO       TIME        AREA   MK   IDNO       CONC         NAME

   1      3.759   10140116                  35.1889
   2      7.787    3246904                  11.2676
   3     13.383    2520209                   8.7458
   4     15.059   12908987    V             44.7976
                ----------         -------------
        TOTAL     28816214                100
```



He

O_2

A018

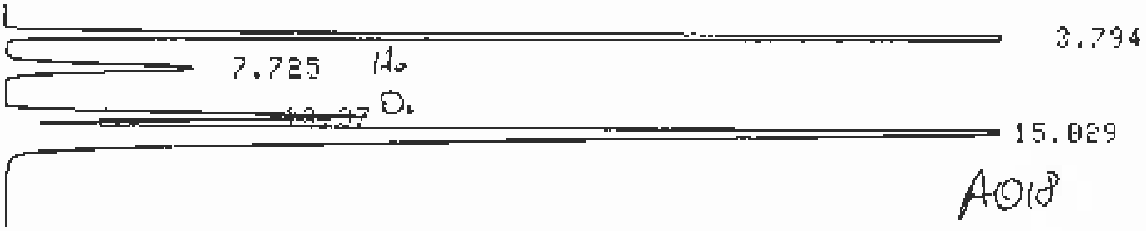
-212

dp

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD         41
REPORT NO    215

PKNO       TIME        AREA   MK   IDNO       CONC         NAME

   1      3.753   10147648                  35.1767
   2      7.826    3273763                  11.3485
   3     13.461    2522993                   8.7459
   4     15.146   12903256    V             44.729
                ----------         -------------
        TOTAL     28847656                100
```

A018
-213

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                          FILE          0
SAMPLE NO    0                          METHOD          41
REPORT NO    216

PKNO       TIME        AREA   MK   IDNO       CONC         NAME

   1      3.789    9457919                    35.353
   2      7.715    1598527                     5.9752
   3     13.355    2582489                     9.6532
   4     15.011   13113851    V               49.0186
                  ---------              --------------
        TOTAL     26752784                   100
```



A018
-213
Jy

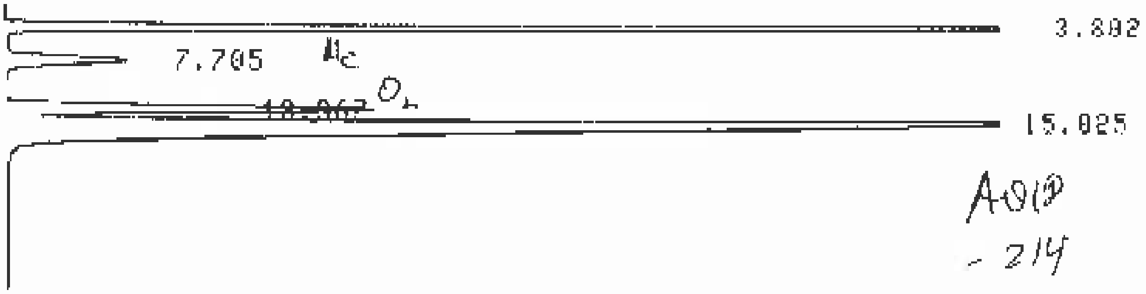
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                          FILE          0
SAMPLE NO    0                          METHOD          41
REPORT NO    217

PKNO       TIME        AREA   MK   IDNO       CONC         NAME

   1      3.794    9462296                    35.3708
   2      7.725    1599700                     5.9798
   3     13.37     2587756                     9.6732
   4     15.029   13101931    V               48.9761
                  ---------              --------------
        TOTAL     26751682                   100
```

099

223-02037-02

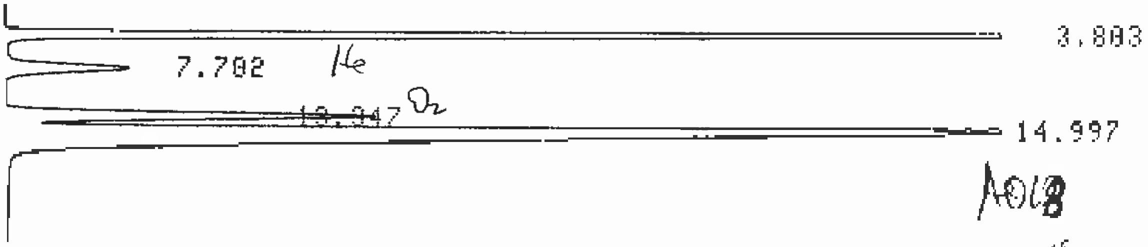
131215

⊕ Shimadzu



A012
- 214

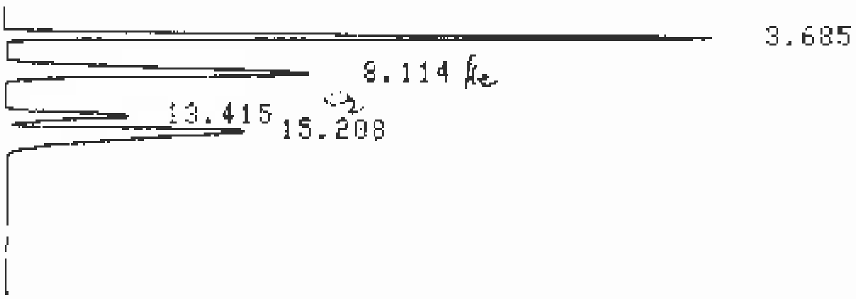
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   218

PKNO       TIME        AREA  MK  IDNO      CONC        NAME

   1      3.802    9168945                  35.4562
   2      7.705    1048183                   4.0533
   3     13.367    2618317                  10.125
   4     15.025   13024438   V              50.3654
                 ----------           --------------
         TOTAL    25859882                 100
```



A018
- 214
dup

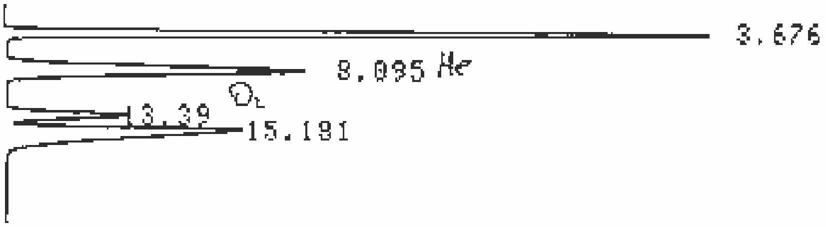
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                          FILE        0
SAMPLE NO   0                          METHOD        41
REPORT NO   219

PKNO       TIME        AREA  MK  IDNO      CONC        NAME

   1      3.803    9242205                  35.6331
   2      7.702    1053211                   4.0606
   3     13.347    2624679                  10.1194
   4     14.997   13017040   V              50.1869
                 ----------           --------------
         TOTAL    25937134                 100
```

223-02037-02



A018
-215

```
C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE        0
SAMPLE NO   0                         METHOD        41
REPORT NO   221

PKNO       TIME        AREA   MK   IDNO      CONC          NAME

   1       3.685   13925297                   35.1999
   2       8.114   11167672                   28.2293
   3      13.415    3683880                    9.312
   4      15.208   10783746   V               27.2588
                   ---------            ------------
          TOTAL    39560592                100
```



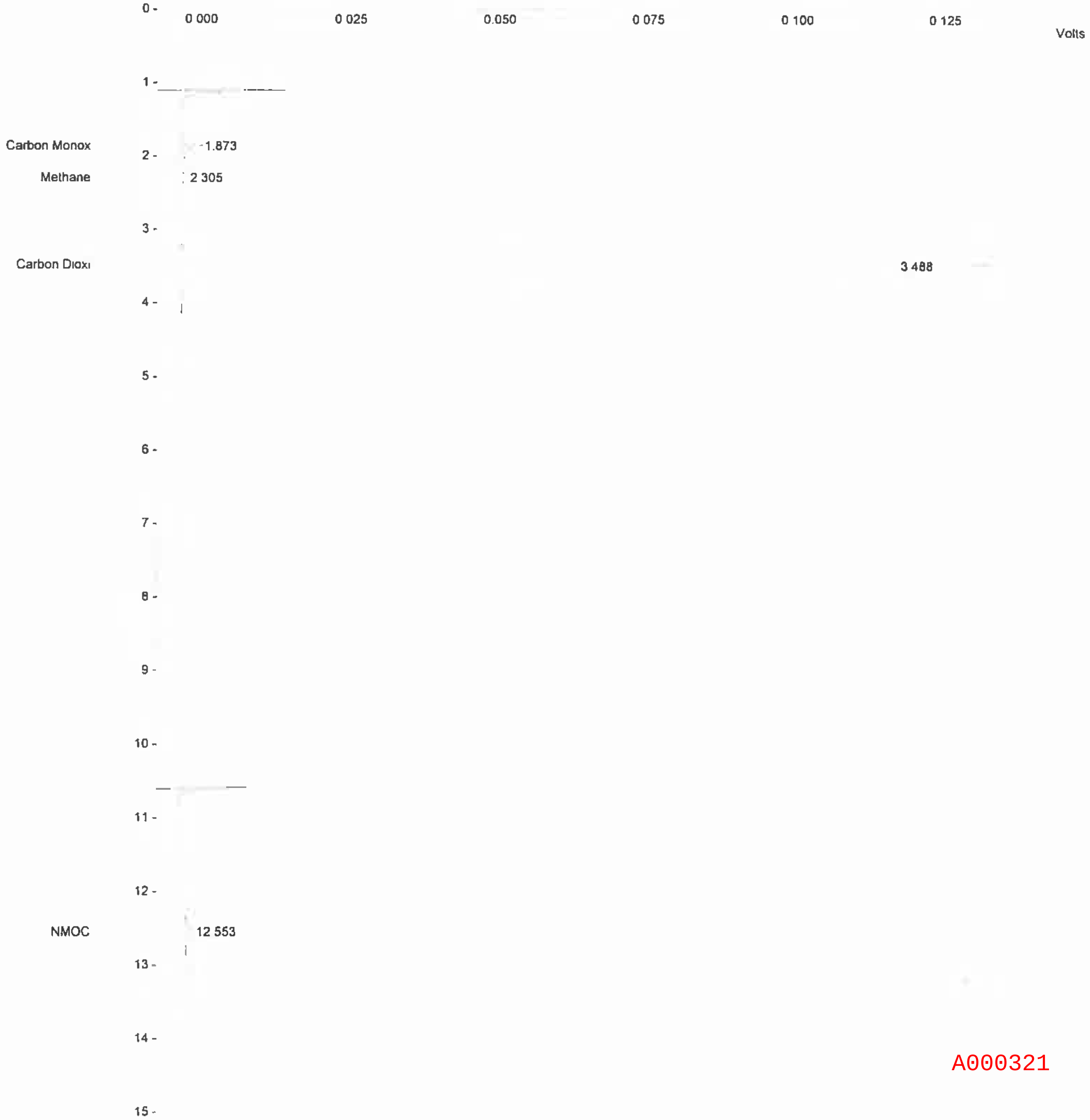
A018
-215
dup

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                         FILE        0
SAMPLE NO   0                         METHOD        41
REPORT NO   222

PKNO       TIME        AREA   MK   IDNO      CONC          NAME

   1       3.676   13868208                   35.181
   2       8.095   11125216                   28.2226
   3      13.39     3675344                    9.3236
   4      15.181   10750821   V               27.2728
                   ---------            ------------
          TOTAL    39419584                100
```

QAQC

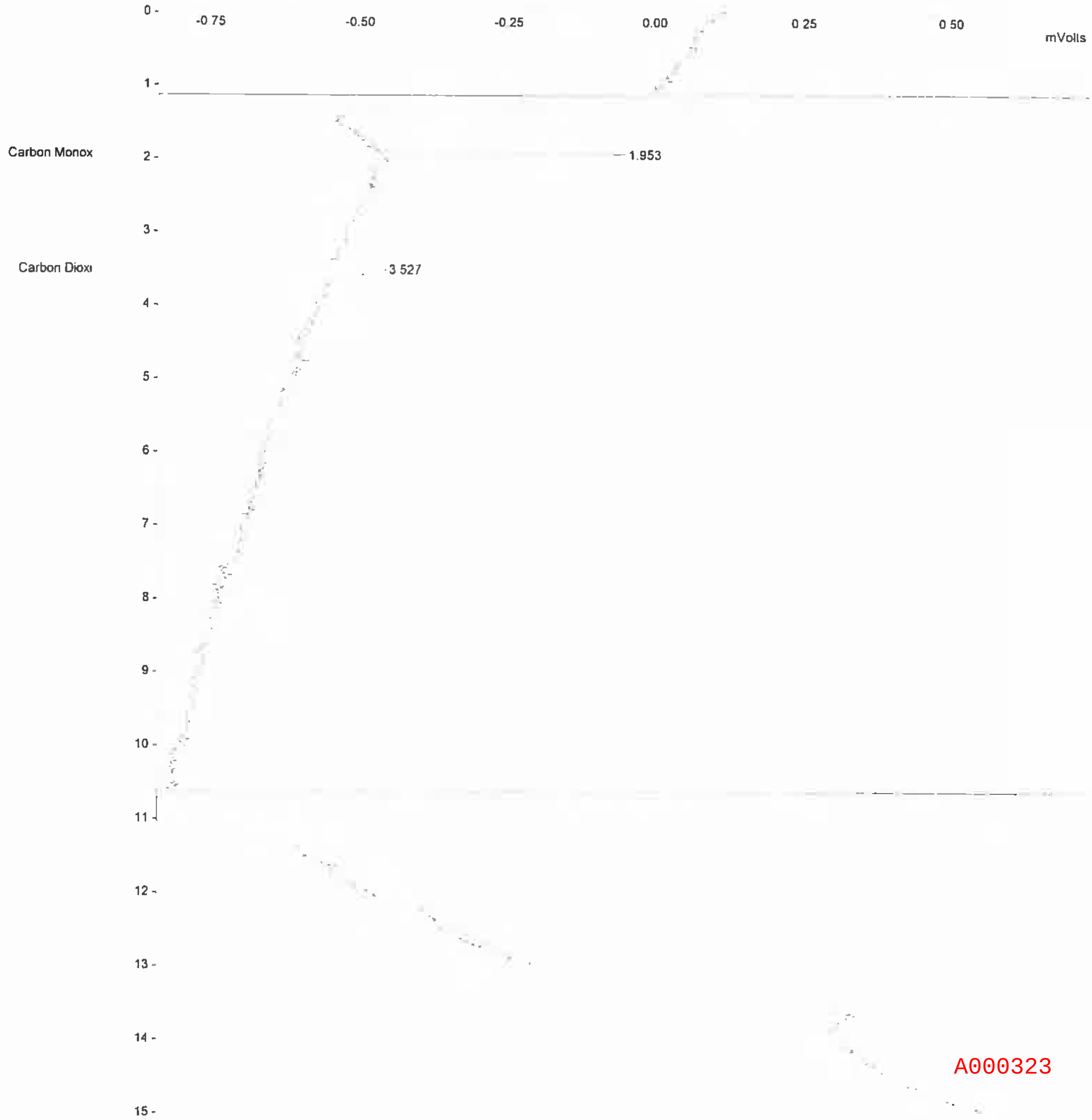
```
Print Date: Mon Feb 29 13:40:19 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 09;35;12, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : lab air

Injection Date: 2/22/2016 09:35    Calculation Date: 2/29/2016 13:40

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                        Width
 Peak      Peak          Result       Time   Offset      Area      Sep.    1/2    Status
  No.      Name          (ppmC)      (min)   (min)     (counts)    Code  (sec)   Codes
 ---- ------------- ----------- -------- -------- ----------- ---- -----  ------
    1 Carbon Monox       6.6068    1.873   -0.057       11963   BB    2.0
    2 Methane            2.2919    2.305   -0.013        4084   BB    3.5
    3 Carbon Dioxi     672.4500    3.488   -0.014     1195177   BB    8.2
    4 Ethane                       7.541                                      M
    5 NMOC               8.9687   12.553    0.320       15390   BB    8.8
 ---- ------------- =========== -------- ======== =========== ==== =====  ======
      Totals:          690.3174             0.236     1226614

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 4           Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 329 microVolts           LSB:     1 microVolts

Noise (used): 16 microVolts - monitored before this run

Stream: 1       Injection Number: 2      Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 09;35;12, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : lab air

Injection Date: 2/22/2016 09:35    Calculation Date: 2/29/2016 13:40

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 64          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



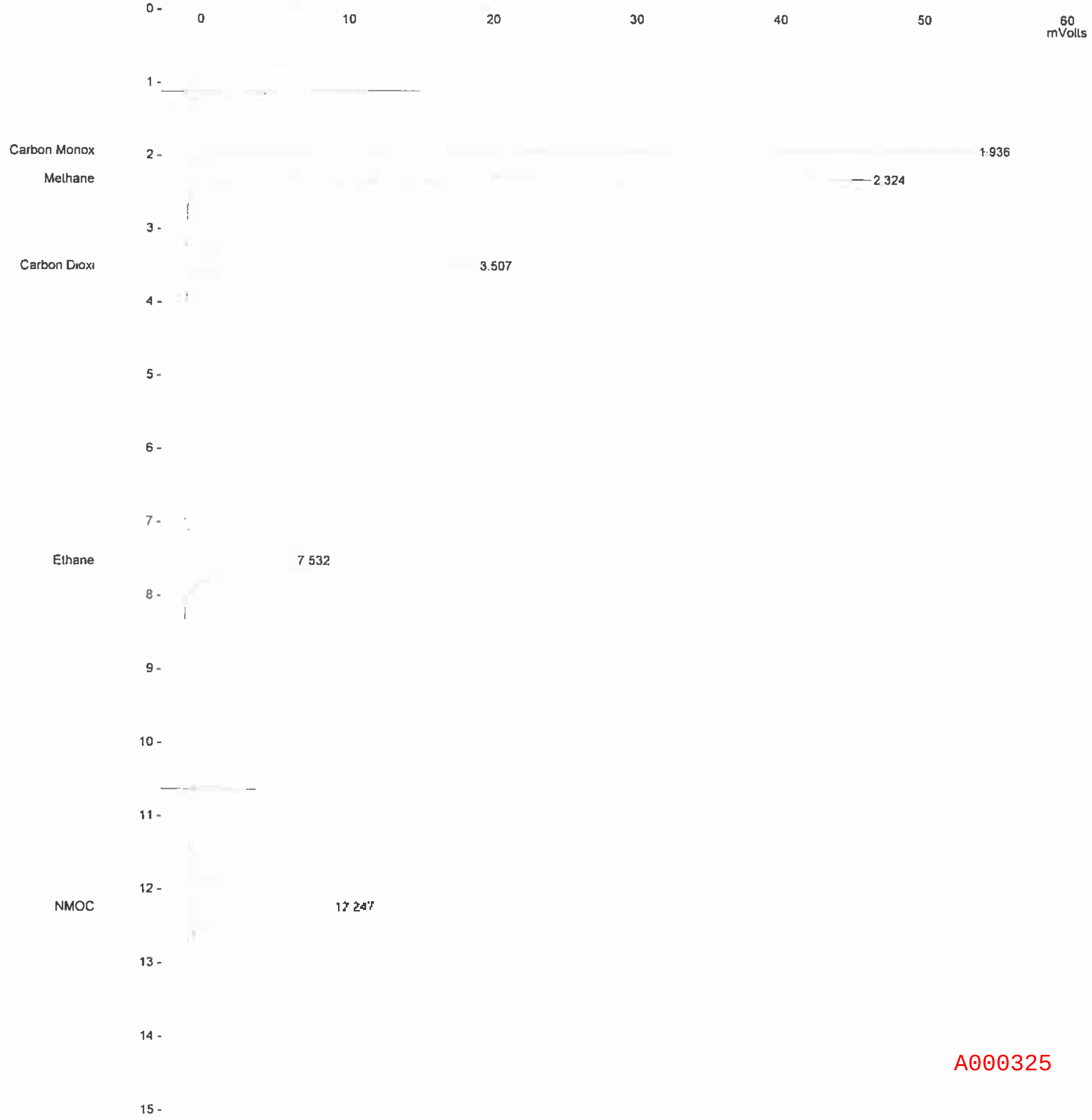
```
Print Date: Mon Feb 29 13:40:26 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 09;58;26, n2 blank e0009.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank e0009

Injection Date: 2/22/2016 09:58     Calculation Date: 2/29/2016 13:40

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.    Time                     Width
 Peak      Peak          Result         Time   Offset       Area    Sep.  1/2    Status
  No.      Name          (ppmC)         (min)   (min)     (counts)  Code (sec)   Codes
 ---- ------------ ----------- -------- ------- ----------- ---- ----- ------
    1 Carbon Monox      0.6579    1.953   0.023        1191   BB   2.8
    2 Methane                     2.318                                   M
    3 Carbon Dioxi      0.5307    3.527   0.025         943   BB   9.2
    4 Ethane                      7.541                                   M
    5 NMOC                       12.233                                   M
 ---- ------------ ----------- -------- ------- ----------- ---- ----- ------
      Totals:           1.1886            0.048        2134

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 3          Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 144 microVolts          LSB:     1 microVolts

Noise (used): 23 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 09;58;26, n2 blank e0009.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank e0009

Injection Date: 2/22/2016 09:58    Calculation Date: 2/29/2016 13:40

Operator    : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                       Bus Address  : 88
Instrument : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10     Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 33%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



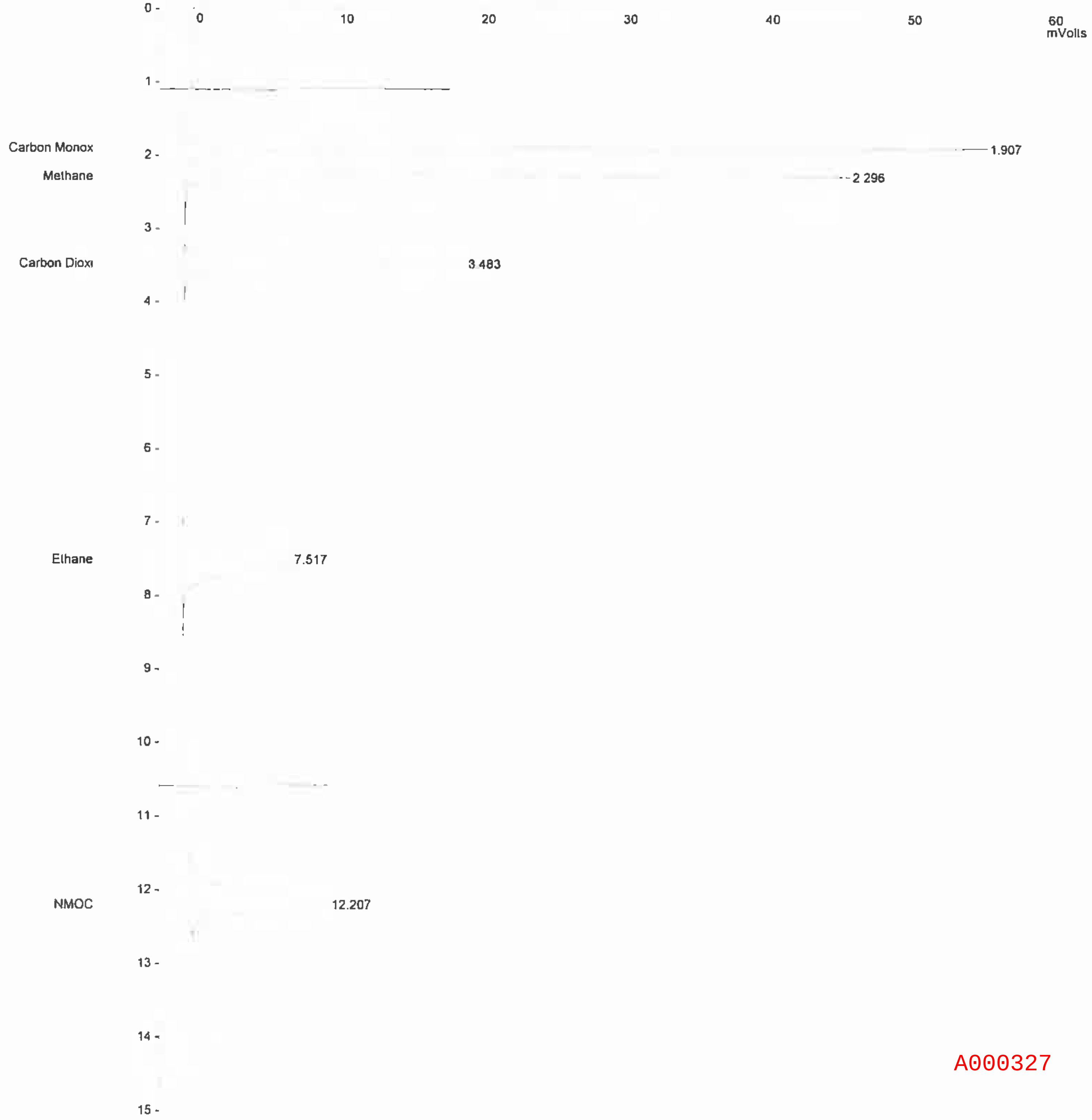
```
Print Date: Mon Feb 29 13:41:02 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 11;20;40, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 100ppm mix

Injection Date: 2/22/2016 11:20    Calculation Date: 2/29/2016 13:40

Operator   : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak    Peak       Result     Time   Offset      Area    Sep.  1/2    Status
  No.    Name       (ppmC)     (min)   (min)    (counts)  Code  (sec)  Codes
 ---- ------------ ----------- ------- -------- ----------- ---- -----  ------
    1 Carbon Monox     97.7355    1.936    0.006     176974   BV    2.7
    2 Methane         107.3887    2.324    0.006     191356   VB    3.7
    3 Carbon Dioxi    105.9413    3.507    0.005     188294   BB    8.2
    4 Ethane          106.2411    7.532   -0.009     188114   BB   22.6
    5 NMOC            104.3470   12.247    0.014     179051   BB   16.2
 ---- ------------ ----------- ------- -------- ----------- ---- -----  ------
      Totals:         521.6536             0.022     923789

Total Unidentified Counts :          0 counts

Detected Peaks: 5           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 99 microVolts          LSB:     1 microVolts

Noise (used): 36 microVolts - monitored before this run

Stream: 1      Injection Number: 3    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 11;20;40, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 100ppm mix

Injection Date: 2/22/2016 11:20    Calculation Date: 2/29/2016 13:40

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 26          Zero Offset = 3%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



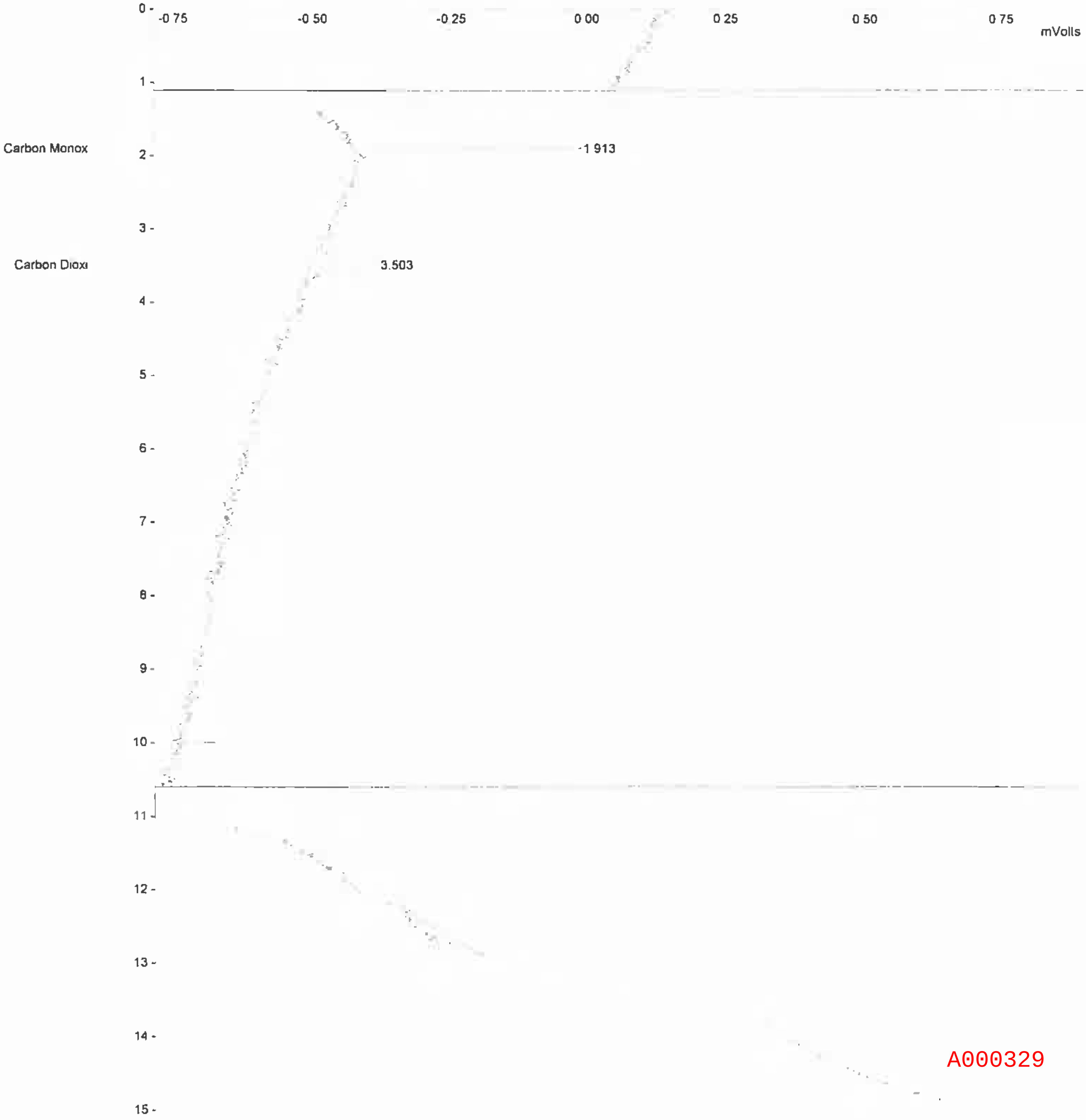
```
Print Date: Mon Feb 29 13:41:10 2016                    Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb 16\2-22-2016, 10;52;58, 100ppm mix.run
Method File   : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID     : 100ppm mix

Injection Date: 2/22/2016 10:52      Calculation Date: 2/29/2016 13:40

Operator     : Douglass                  Detector Type: 0800 (10 Volts)
Workstation:                             Bus Address  : 88
Instrument   : Varian Star #1            Sample Rate  : 1.25 Hz
Channel      : 2 - Foreflush 10          Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299 3588-d6b-21c1 **

Run Mode           : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.     Time                              Width
 Peak       Peak           Result      Time    Offset        Area       Sep.    1/2     Status
  No.       Name           (ppmC)      (min)    (min)       (counts)    Code   (sec)    Codes
 ---- -- ---------- -----------  -------- --------  -----------  ----  -----   ------
    1 Carbon Monox     97.1536    1.907   -0.023       175921     BV     2.7
    2 Methane         106.6070    2.296   -0.022       189963     VB     3.6
    3 Carbon Dioxi    105.5047    3.483   -0.019       187518     BB     8.2
    4 Ethane          106.2638    7.517   -0.024       188155     BB    22.6
    5 NMOC            102.9488   12.207   -0.026       176652     BB    16.0
 ---- ------------- -----------  -------- --------  -----------  ----  -----   ------
      Totals:         518.4779            -0.114       918209

Total Unidentified Counts :          0 counts

Detected Peaks: 6           Rejected Peaks: 1        Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -32 microVolts         LSB:     1 microVolts

Noise (used): 20 microVolts - monitored before this run

Stream: 1        Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-22-2016, 10;52;58, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/22/2016 10:52    Calculation Date: 2/29/2016 13:40

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 26          Zero Offset = 3%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



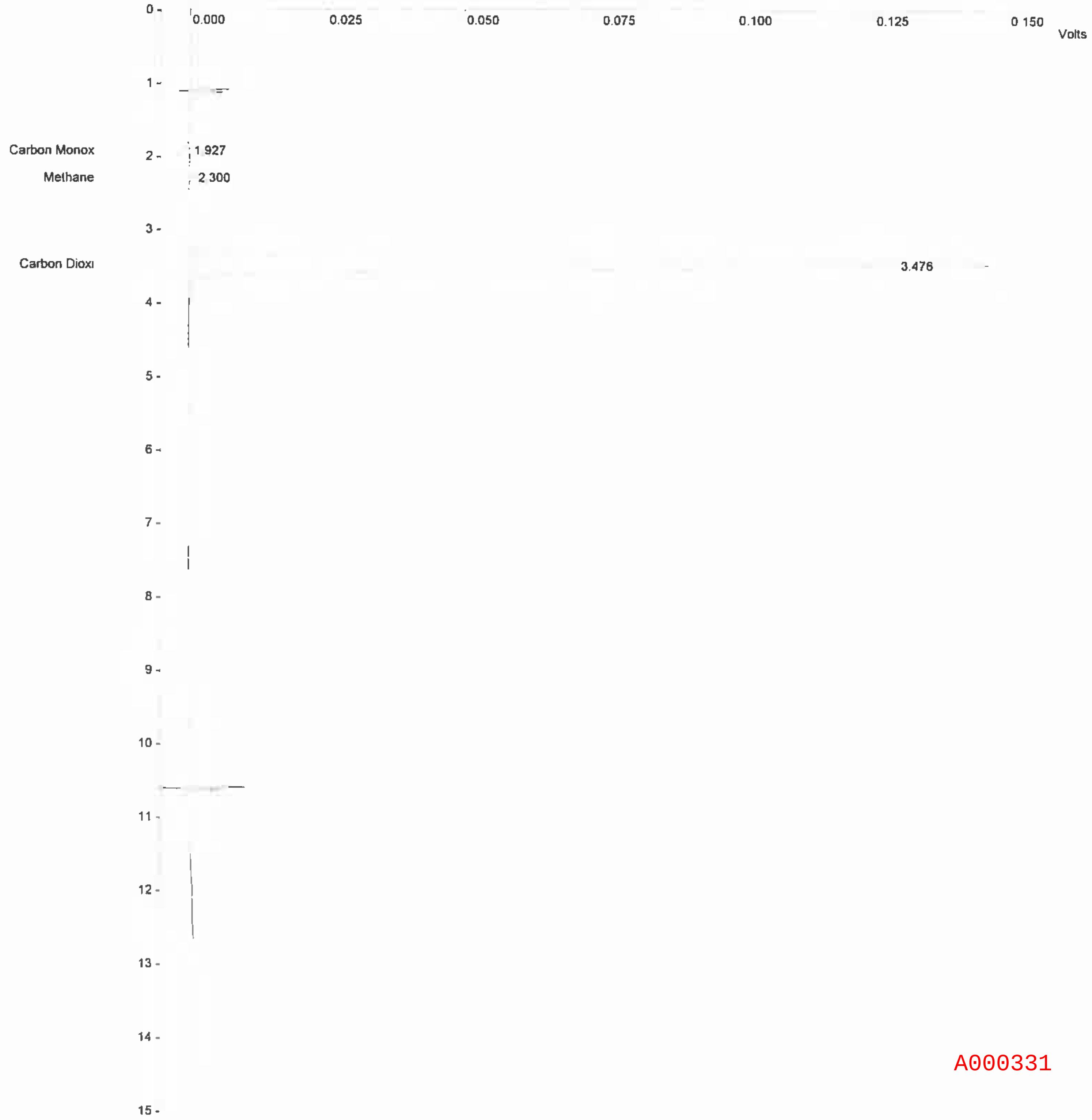
```
Print Date: Mon Feb 29 13:40:33 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-22-2016, 11;43;26, n2 blank 91184.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank 91184

Injection Date: 2/22/2016 11:43    Calculation Date: 2/29/2016 13:40

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                   Ret.    Time                      Width
 Peak      Peak        Result      Time   Offset       Area     Sep.  1/2    Status
  No.      Name        (ppmC)      (min)   (min)     (counts)   Code (sec)   Codes
 ----  ------------  ----------  -------  -------  ----------   ---- -----   ------
    1 Carbon Monox       0.7193    1.913   -0.017        1302     BB   3.0
    2 Methane                      2.318                                      M
    3 Carbon Dioxi       0.7391    3.503    0.001        1314     BB   8.9
    4 Ethane                       7.541                                      M
    5 NMOC                        12.233                                      M
 ----  ------------  ----------  -------  -------  ----------   ---- -----   ------
      Totals:            1.4584            -0.016        2616

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 3           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: 175 microVolts          LSB:     1 microVolts

Noise (used): 14 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-22-2016, 11;43;26, n2 blank 91184.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : n2 blank 91184

Injection Date: 2/22/2016 11:43    Calculation Date: 2/29/2016 13:40

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1           Zero Offset = 30%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



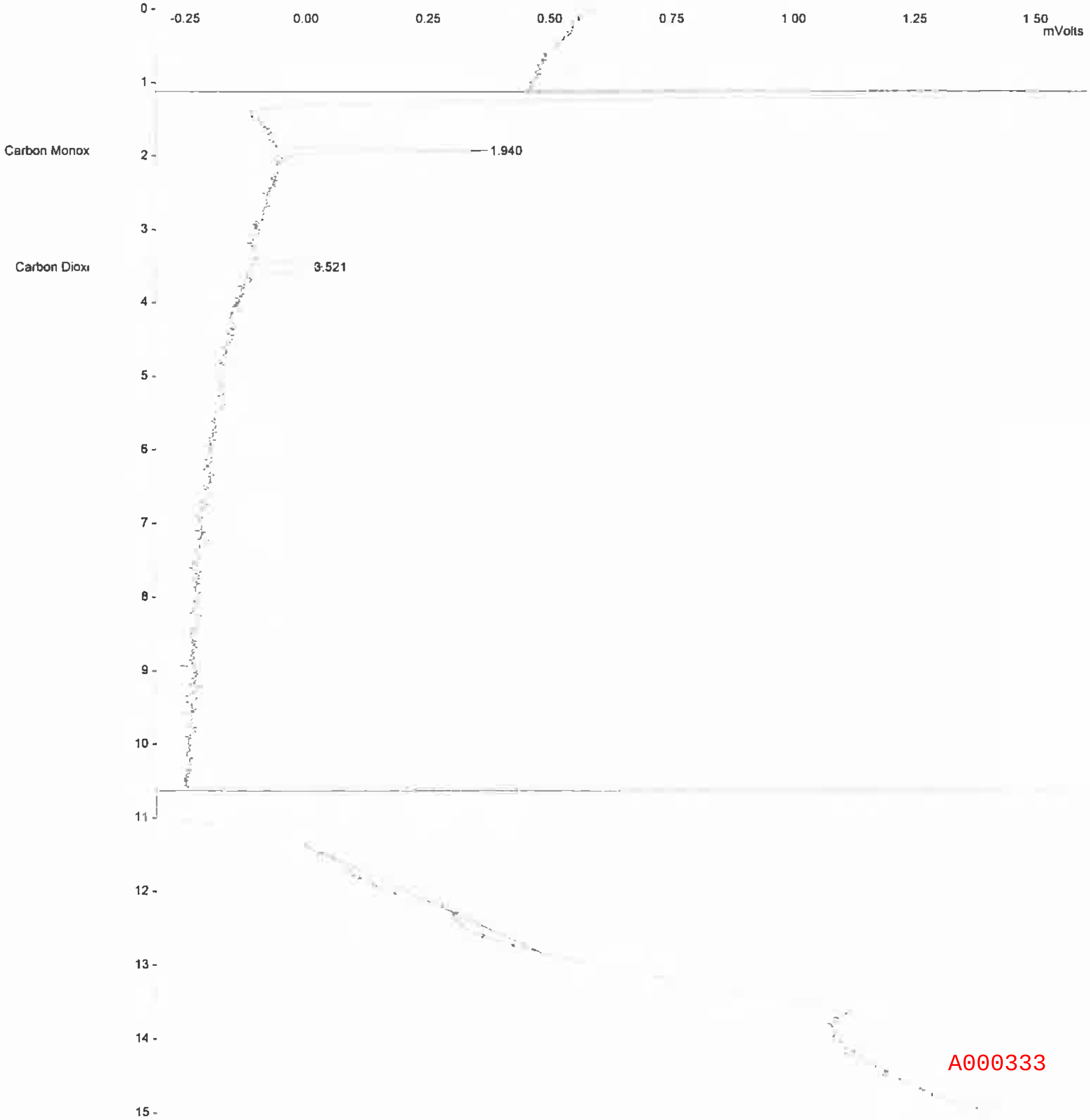
```
Print Date: Tue Feb 23 13:28:48 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-23-2016, 08;54;29, lab air.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/23/2016 08:54    Calculation Date: 2/23/2016 13:28

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                       Ret.    Time                      Width
 Peak      Peak         Result         Time   Offset       Area     Sep.  1/2    Status
  No.      Name         (ppmC)         (min)   (min)     (counts)   Code (sec)   Codes
 ---- ------------ -----------       -------- -------  -----------  ---- -----   ------
    1 Carbon Monox      1.2715         1.927  -0.003         2302    BB   3.4
    2 Methane           2.2354         2.300  -0.018         3983    BB   3.3
    3 Carbon Dioxi    727.2516         3.476  -0.026      1292578    VB   8.2
    4 Ethane                           7.541                                        M
    5 NMOC                            12.170                                        M
 ---- ------------ -----------       -------- -------  -----------  ---- -----   ------
      Totals:         730.7585                -0.047      1298863

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 15          Rejected Peaks: 12      Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -59 microVolts          LSB:     1 microVolts

Noise (used): 15 microVolts - monitored before this run

Stream: 1      Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 08;54;29, lab air.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/23/2016 08:54    Calculation Date: 2/23/2016 13:28

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min    Attenuation = 69          Zero Offset = 3%
Start Time  =   0.000   min      End Time    = 15.013  min   Min / Tick  = 1.00
```



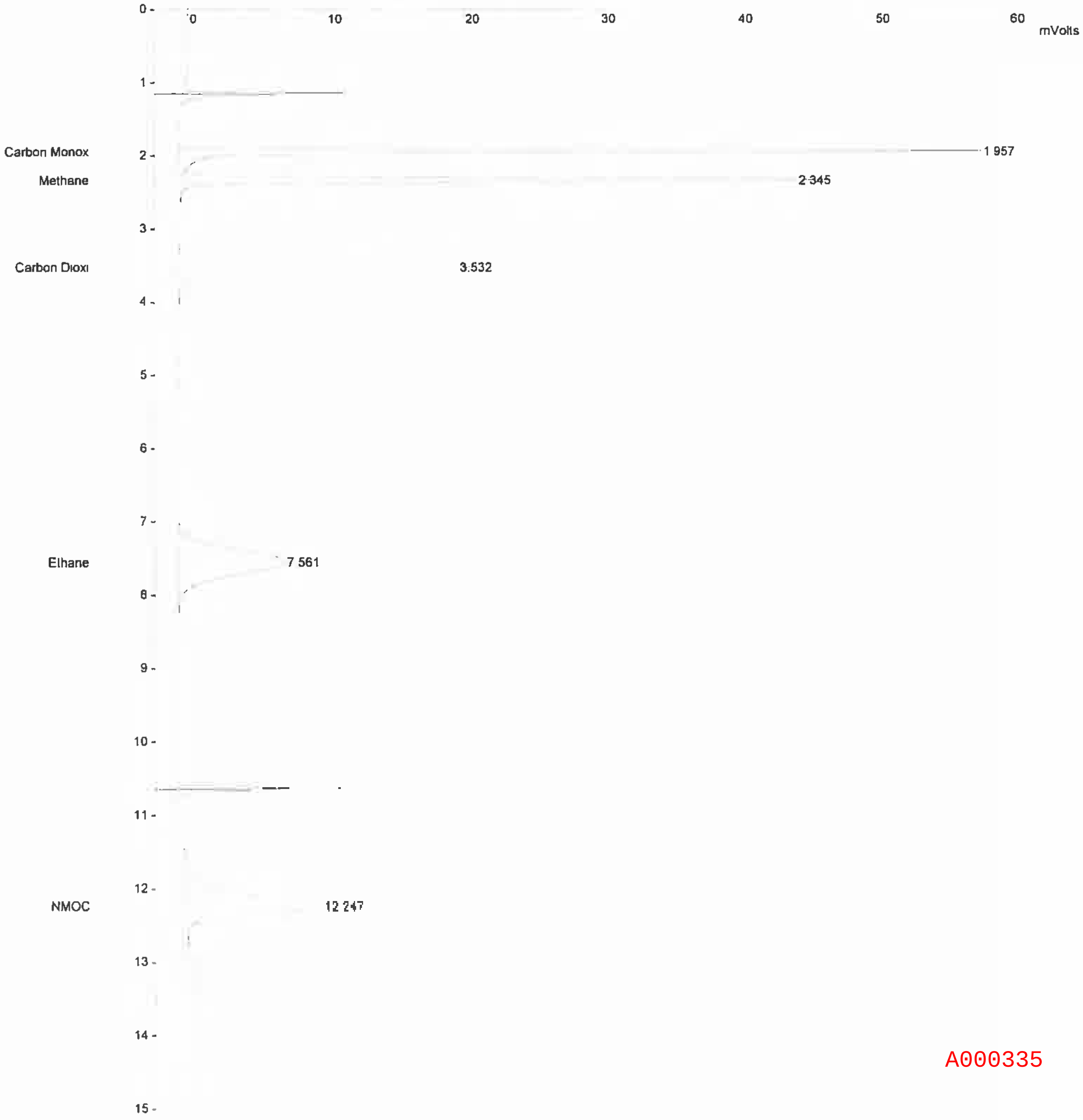
```
Print Date: Tue Feb 23 13:28:58 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb 16\2-23-2016, 09:22:07, n2 blank a102.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : n2 blank A102

Injection Date: 2/23/2016 09:22    Calculation Date: 2/23/2016 13:28

Operator   : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset       Area    Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)     (counts)  Code (sec)  Codes
 ---- ------------ ----------  -------- -------  ---------- ---- -----  ------
    1 Carbon Monox     0.7683     1.940  0.010        1391   BB   2.8
    2 Methane                     2.318                                 M
    3 Carbon Dioxi     0.6722     3.521  0.019        1195   BB   7.8
    4 Ethane                      7.541                                 M
    5 NMOC                       12.170                                 M
 ---- ------------ ----------  -------- -------  ---------- ---- -----  ------
      Totals:          1.4405            0.029        2586

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 2      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 619 microVolts          LSB:     1 microVolts

Noise (used): 53 microVolts - monitored before this run

Stream: 1      Injection Number: 1    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 09;22;07, n2 blank a102.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank A102

Injection Date: 2/23/2016 09:22    Calculation Date: 2/23/2016 13:28

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1            Zero Offset = 11%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



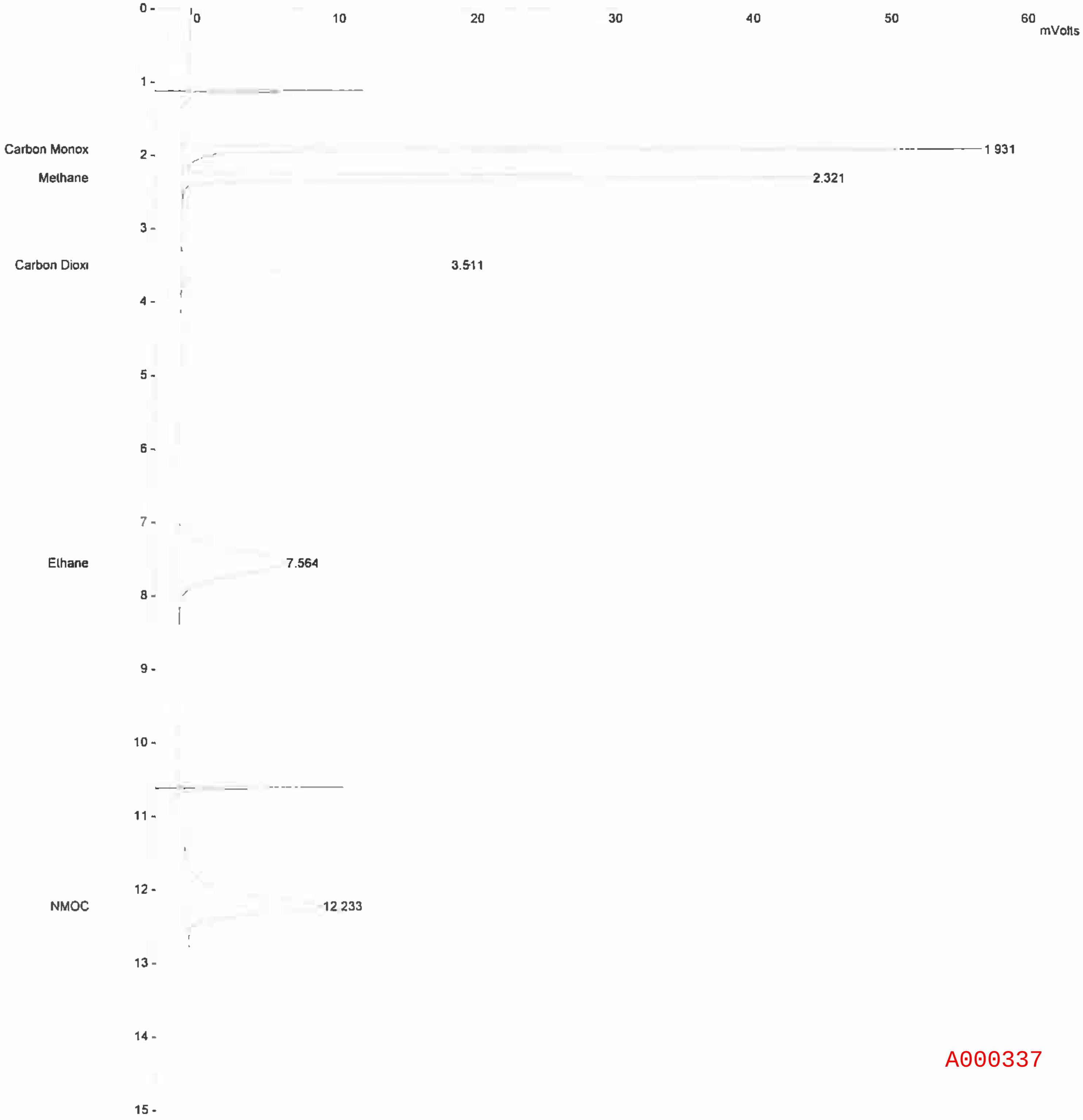
```
Print Date: Tue Feb 23 13:29:51 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb 16\2-23-2016, 10:37:43, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID   : 100ppm mix

Injection Date: 2/23/2016 10:37    Calculation Date: 2/23/2016 13:29

Operator   : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : B8
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 - Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** D0299-3588-d6b-21e1 **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area    Sep.   1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)  Code  (sec)   Codes
 ---- ------------ ----------  ------- ------- ----------  ---- -----   ------
    1 Carbon Monox    97.1092    1.957   0.027     175840    BV   2.6
    2 Methane        105.4247    2.345   0.027     187857    VB   3.7
    3 Carbon Dioxi   105.3613    3.532   0.030     187264    BB   8.2
    4 Ethane         105.4077    7.561   0.020     186639    BB  22.5
    5 NMOC           105.5027   12.247   0.077     181034    BB  15.9
 ---- ------------ ==========  ------- ======= ==========  ---- -----   ------
      Totals:        518.8056            0.181     918634

Total Unidentified Counts :          0 counts

Detected Peaks: 5           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 14 microVolts          LSB:     1 microVolts

Noise (used): 34 microVolts - monitored before this run

Stream: 1      Injection Number: 3    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 10;37;43, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/23/2016 10:37    Calculation Date: 2/23/2016 13:29

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27          Zero Offset = 3%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



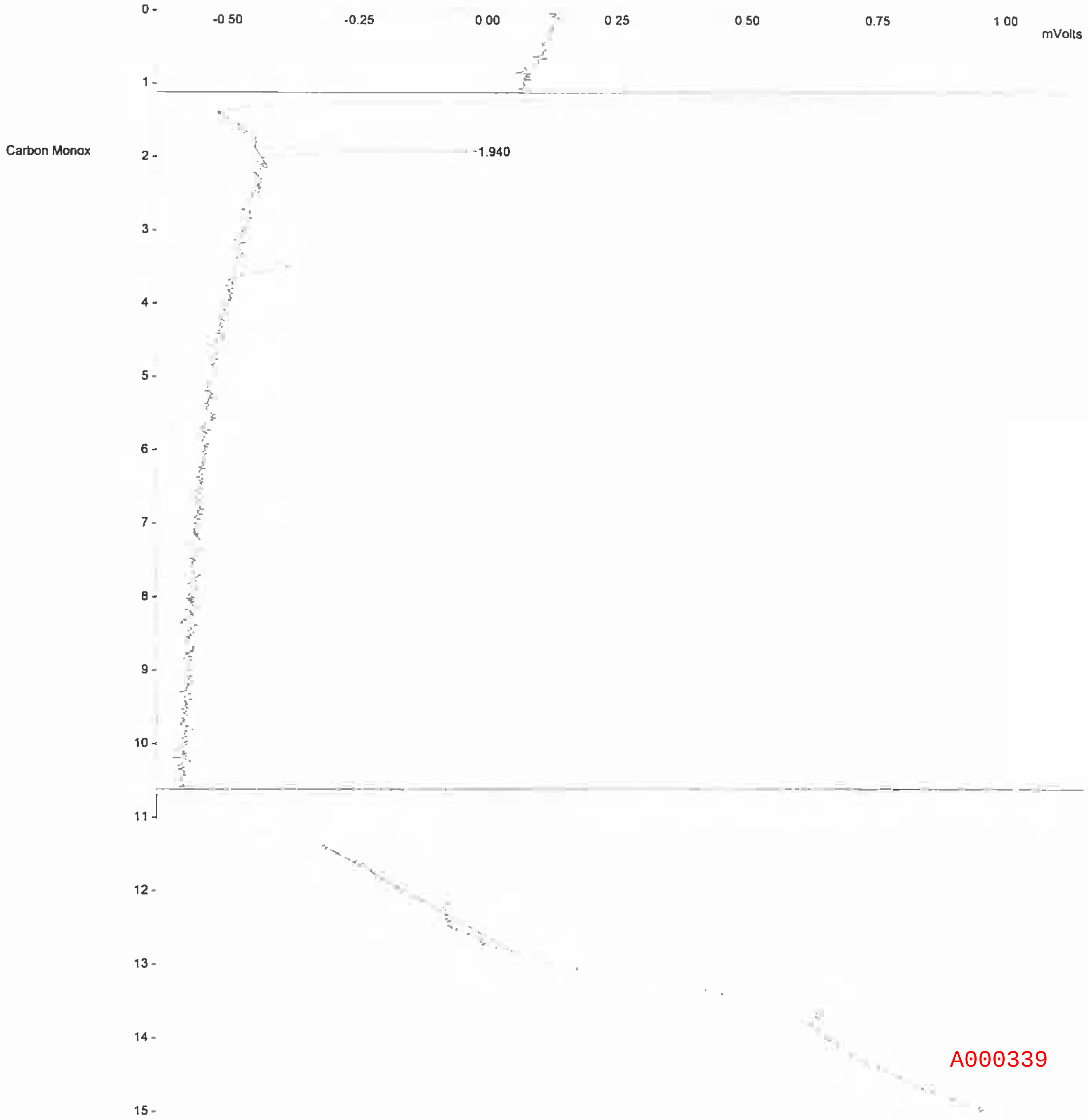
```
Print Date: Tue Feb 23 13:29:59 2016              Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-23-2016, 10:13:41, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 100ppm mix

Injection Date: 2/23/2016 10:13    Calculation Date: 2/23/2016 13:29

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                     Ret.    Time                     Width
 Peak        Peak        Result      Time   Offset      Area    Sep.  1/2   Status
  No.        Name        (ppmC)     (min)   (min)    (counts)   Code (sec)  Codes
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
    1  Carbon Monox    96.4908    1.931    0.001      174720    BV    2.6
    2  Methane        104.8750    2.321    0.003      186877    VB    3.7
    3  Carbon Dioxi   104.6542    3.511    0.009      186007    BB    8.2
    4  Ethane         104.7151    7.564    0.023      185412    BB   22.7
    5  NMOC           104.1153   12.233    0.063      178654    BB   16.1
 ----  ------------  ----------  -------  -------  ----------  ----  -----  ------
       Totals:        514.8504             0.099      911670

Total Unidentified Counts :          0 counts

Detected Peaks: 5          Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -43 microVolts          LSB:     1 microVolts

Noise (used): 30 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 10;13;41, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/23/2016 10:13    Calculation Date: 2/23/2016 13:29

Operator    : Douglass             Detector Type: 0800 (10 Volts)
Workstation:                       Bus Address  : 88
Instrument : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10     Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27          Zero Offset = 3%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



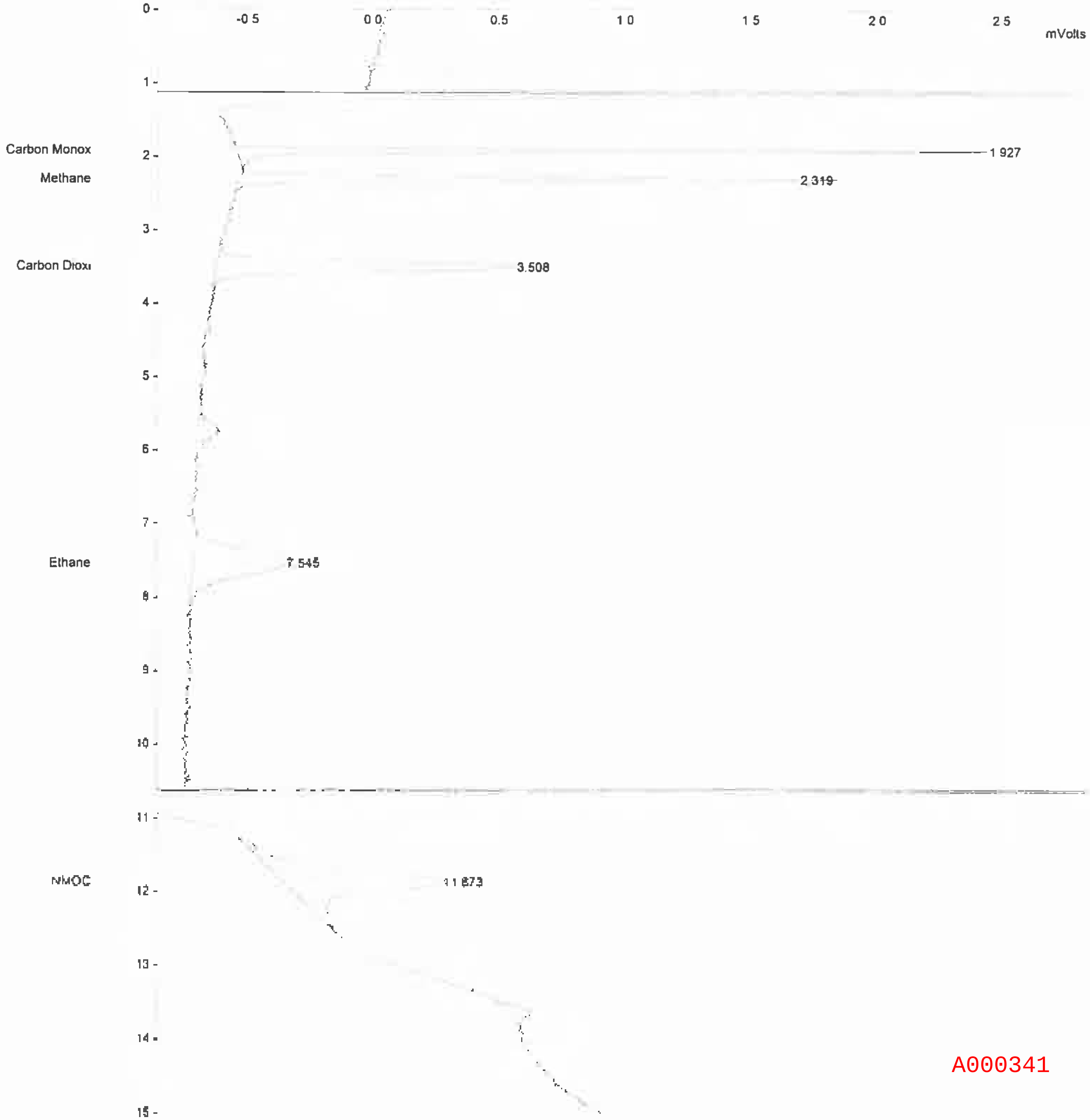
```
Print Date: Tue Feb 23 13:29:09 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 11:01:13, n2 blank w0004.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank w0004

Injection Date: 2/23/2016 11:01     Calculation Date: 2/23/2016 13:28

Operator     : Douglass                  Detector Type: 0800 (10 Volts)
Workstation:                             Bus Address   : 88
Instrument : Varian Star #1              Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10          Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21c1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                        Ret.    Time                     Width
 Peak      Peak           Result        Time   Offset       Area    Sep.  1/2    Status
 No.       Name           (ppmC)        (min)   (min)     (counts)  Code (sec)   Codes
 ----  ------------  -----------  -------  -------  ----------  ----  -----   ------
    1  Carbon Monox       0.7550    1.940    0.010        1367    BB    3.0
    2  Methane                      2.318                                        M
    3  Carbon Dioxi                 3.502                                        M
    4  Ethane                       7.541                                        M
    5  NMOC                        12.170                                        M
 ----  ------------  -----------  -------  -------  ----------  ----  -----   ------
       Totals:            0.7550             0.010        1367

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 4           Rejected Peaks: 3       Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 183 microVolts          LSB:      1 microVolts

Noise (used): 33 microVolts - monitored before this run

Stream: 1      Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 11;01;13, n2 blank w0004.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank w0004

Injection Date: 2/23/2016 11:01    Calculation Date: 2/23/2016 13:28

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1            Zero Offset = 24%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



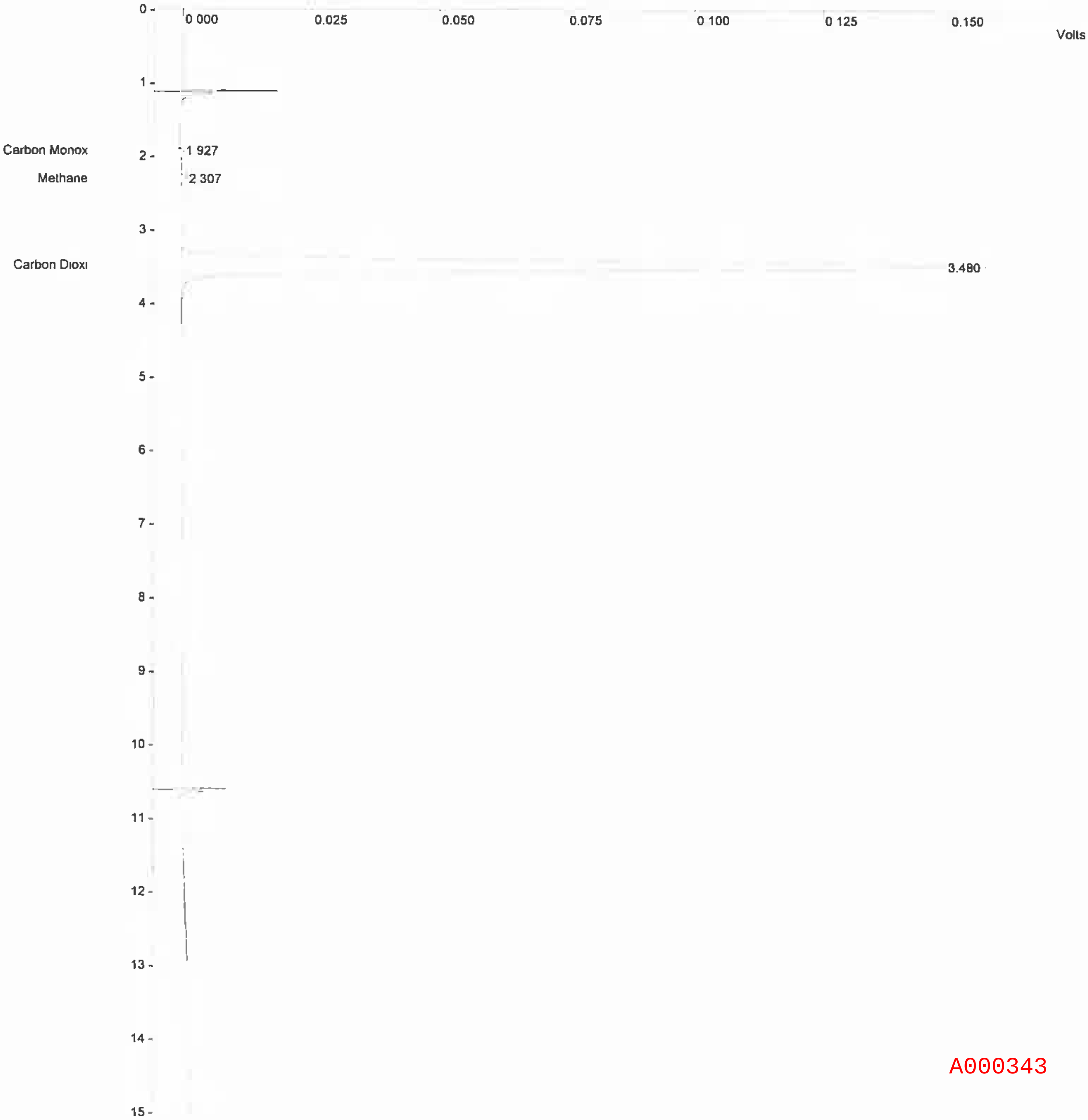
```
Print Date: Wed Feb 24 13:39:23 2016             Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-23-2016, 19;04;36, 5ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/23/2016 19:04    Calculation Date: 2/24/2016 13:39

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak    Peak       Result    Time   Offset      Area    Sep.  1/2   Status
  No.    Name       (ppmC)    (min)   (min)    (counts) Code (sec)   Codes
 ---- ------------ ----------  ------- ------- ----------  ---- -----   ------
    1 Carbon Monox     4.9434    1.927  -0.003       8951    BB   2.7
    2 Methane          5.1841    2.319   0.001       9238    BB   3.7
    3 Carbon Dioxi     6.3765    3.508   0.006      11333    BB   8.3
    4 Ethane           4.9404    7.545   0.004       8748    BB  21.1
    5 NMOC             7.9521   11.873  -0.297      13645    BB  21.4
 ---- ------------ ----------  ------- ------- ----------  ---- -----   ------
      Totals:         29.3965           -0.289      51915

Total Unidentified Counts :          0 counts

Detected Peaks: 5           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 121 microVolts          LSB:     1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 2      Injection Number: 3    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-23-2016, 19;04;36, 5ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/23/2016 19:04    Calculation Date: 2/24/2016 13:39

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument  : Varian Star #1        Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 33%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



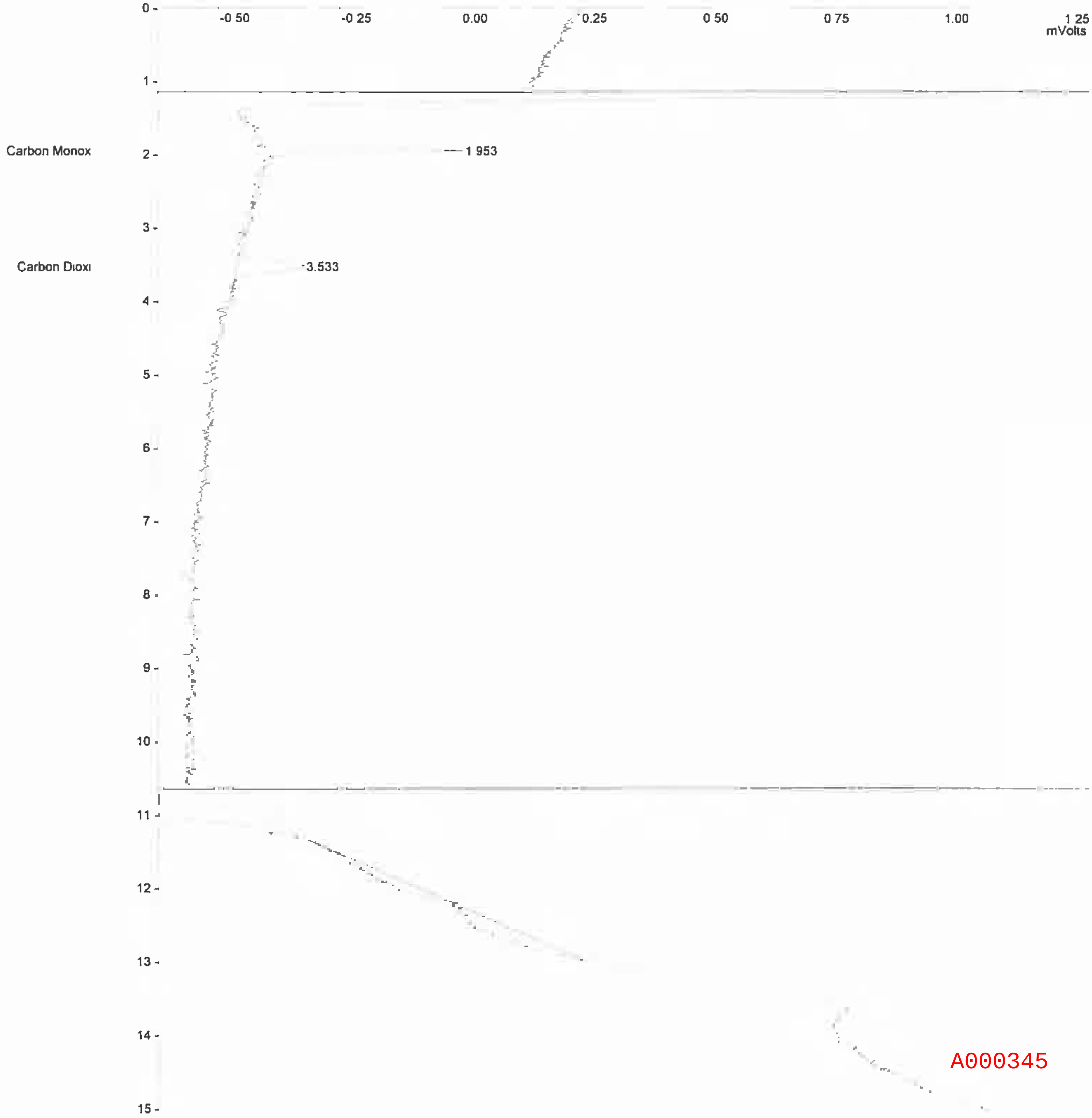
```
Print Date: Wed Feb 24 13:38:10 2016                Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb 16\2-24-2016, 09:08;39, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : lab air

Injection Date: 2/24/2016 09:08     Calculation Date: 2/24/2016 13:38

Operator     : Douglass                  Detector Type: 0800 (10 Volts)
Workstation:                             Bus Address   : 88
Instrument : Varian Star #1              Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10          Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                          Ret.     Time                              Width
 Peak        Peak          Result         Time    Offset        Area        Sep.     1/2       Status
  No.        Name          (ppmC)         (min)    (min)      (counts)     Code    (sec)      Codes
 ----  ------------  -----------  --------  --------  ----------  ----  -----   ------
     1 Carbon Monox       2.9652     1.927   -0.003        5369    BB     4.9
     2 Methane            2.6356     2.307   -0.011        4696    BB     3.6
     3 Carbon Dioxi     785.7171     3.480   -0.022     1396492    BB     8.2
     4 Ethane                        7.541                                           M
     5 NMOC                         12.170                                           M
 ----  ------------  -----------  --------  --------  ----------  ----  -----   ------
       Totals:          791.3179             -0.036     1406557

Status Codes:
M - Missing peak

Total Unidentified Counts :              0 counts

Detected Peaks: 4             Rejected Peaks: 1         Identified Peaks: 5

Multiplier: 1           Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -114 microVolts           LSB:      1 microVolts

Noise (used): 45 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 09;08;39, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/24/2016 09:08    Calculation Date: 2/24/2016 13:38

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address   : 88
Instrument : Varian Star #1         Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 74         Zero Offset = 3%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



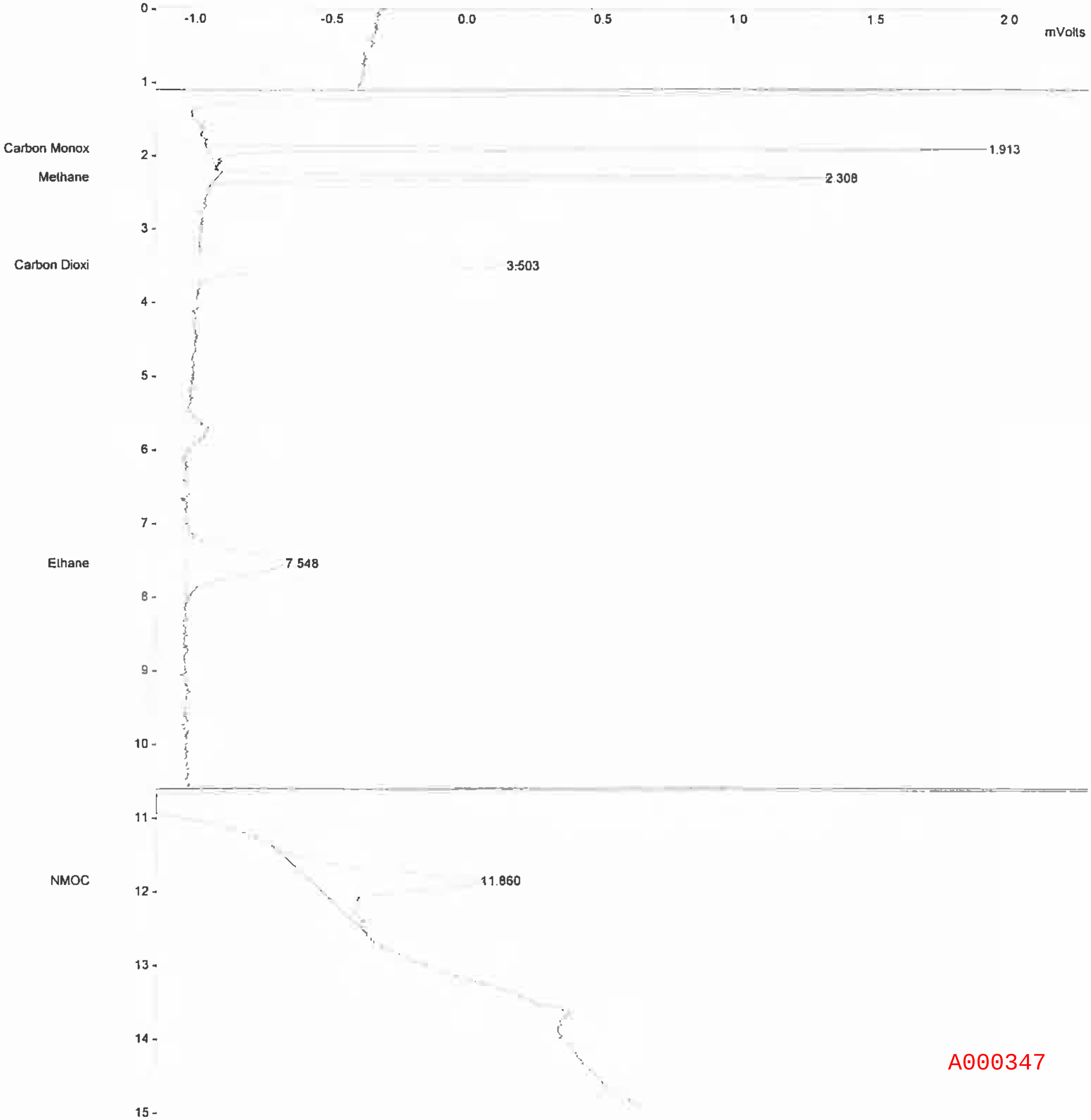
```
Print Date: Wed Feb 24 13:38:19 2016              Page 1 of 1

Title          : SCAQMD Methods 25.x
Run File       : g:\2016\feb_16\2-24-2016, 09;36;19, n2 blank all5.run
Method File    : c:\docume~1\user\locals~1\temp\~nmoc 021716.tmp
Sample ID      : n2 blank all5

Injection Date: 2/24/2016 09:36     Calculation Date: 2/24/2016 13:38

Operator     : Douglass                  Detector Type: 0800 (10 Volts)
Workstation:                             Bus Address  : 88
Instrument  : Varian Star #1             Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10          Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                          Ret.    Time                         Width
 Peak       Peak            Result        Time   Offset        Area      Sep.   1/2    Status
  No.       Name            (ppmC)        (min)   (min)      (counts)    Code  (sec)   Codes
 ----  ------------  ----------   -------  -------  ----------  ----  -----  ------
    1  Carbon Monox      0.7080       1.953    0.023        1282     BB    2.7
    2  Methane                        2.318                                         M
    3  Carbon Dioxi      0.7598       3.533    0.031        1350     BB    9.2
    4  Ethane                         7.541                                         M
    5  NMOC                          12.170                                         M
 ----  ------------  ----------   -------  -------  ----------  ----  -----  ------
       Totals:           1.4678               0.054        2632

Status Codes:
M - Missing peak

Total Unidentified Counts :            0 counts

Detected Peaks: 3          Rejected Peaks: 1        Identified Peaks: 5

Multiplier: 1           Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: 251 microVolts          LSB:     1 microVolts

Noise (used): 26 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 09;36;19, n2 blank a115.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank a115

Injection Date: 2/24/2016 09:36    Calculation Date: 2/24/2016 13:38

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1           Zero Offset = 25%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



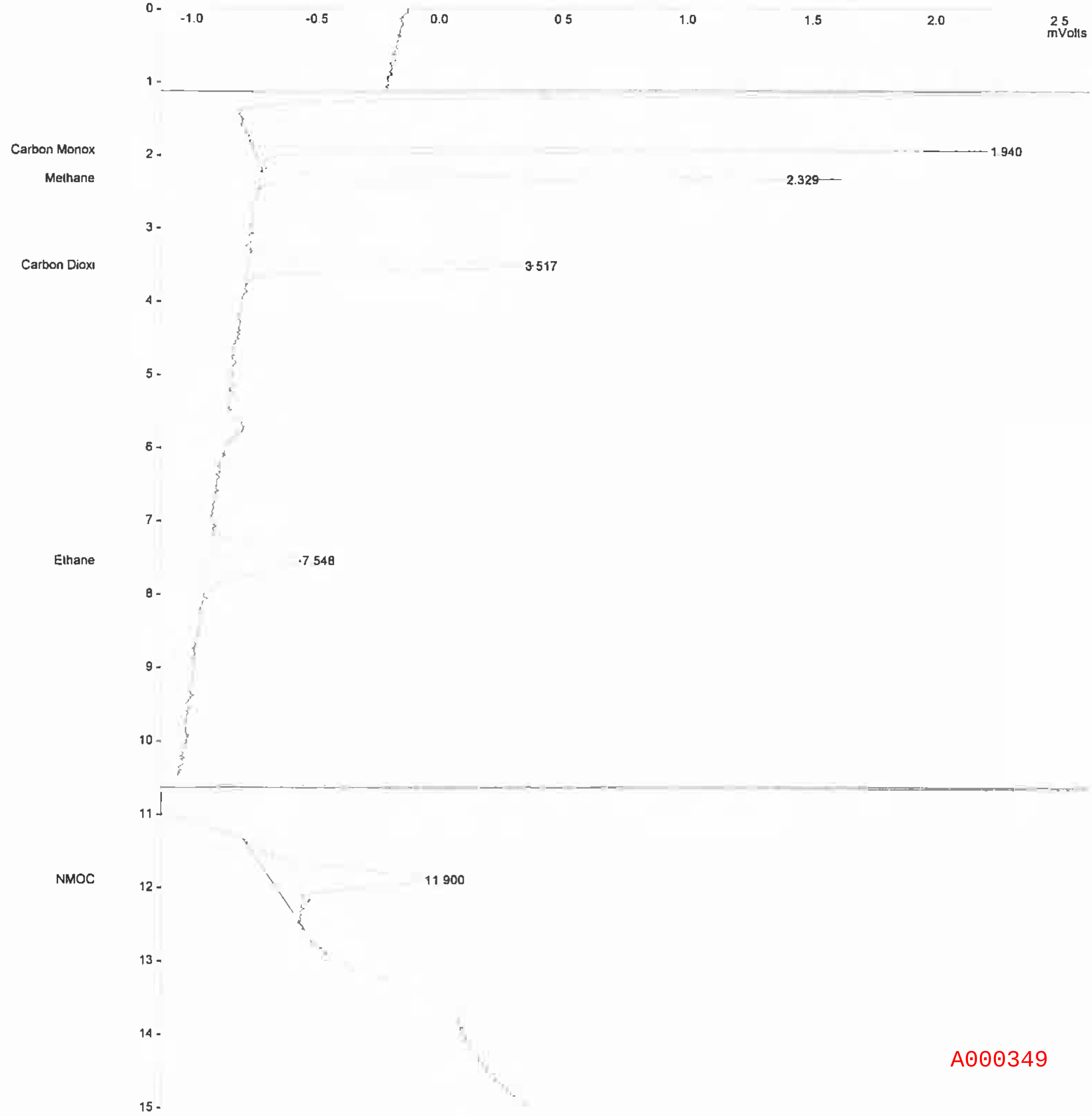
```
Print Date: Wed Feb 24 13:38:53 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-24-2016, 10;30;12, 5ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 5ppm mix

Injection Date: 2/24/2016 10:30    Calculation Date: 2/24/2016 13:38

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 8B
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588 d6b-21el **

Run Mode        : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                    Width
 Peak     Peak       Result     Time   Offset      Area    Sep.  1/2   Status
  No.     Name       (ppmC)     (min)   (min)    (counts)  Code (sec)  Codes
 ---- ------------ ----------  -------- ------- ---------- ---- ------ ------
    1 Carbon Monox     4.8875     1.913  -0.017       8850   BB    2.7
    2 Methane          4.9480     2.308  -0.010       8817   BB    3.7
    3 Carbon Dioxi     5.8667     3.503   0.001      10427   BB    8.2
    4 Ethane           4.8532     7.548   0.007       8593   BB   21.9
    5 NMOC             7.5686    11.860  -0.310      12987   BB   20.9
 ---- ------------ ----------  -------- ------- ---------- ---- ------ ------
      Totals:         28.1240            -0.329      49674

Total Unidentified Counts :          0 counts

Detected Peaks: 5           Rejected Peaks: 0      Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -259 microVolts          LSB:     1 microVolts

Noise (used): 24 microVolts - monitored before this run

Stream: 1      Injection Number: 2    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 10;30;12, 5ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/24/2016 10:30    Calculation Date: 2/24/2016 13:38

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1            Zero Offset = 45%
Start Time  =   0.000   min     End Time     = 15.013  min   Min / Tick  = 1.00
```



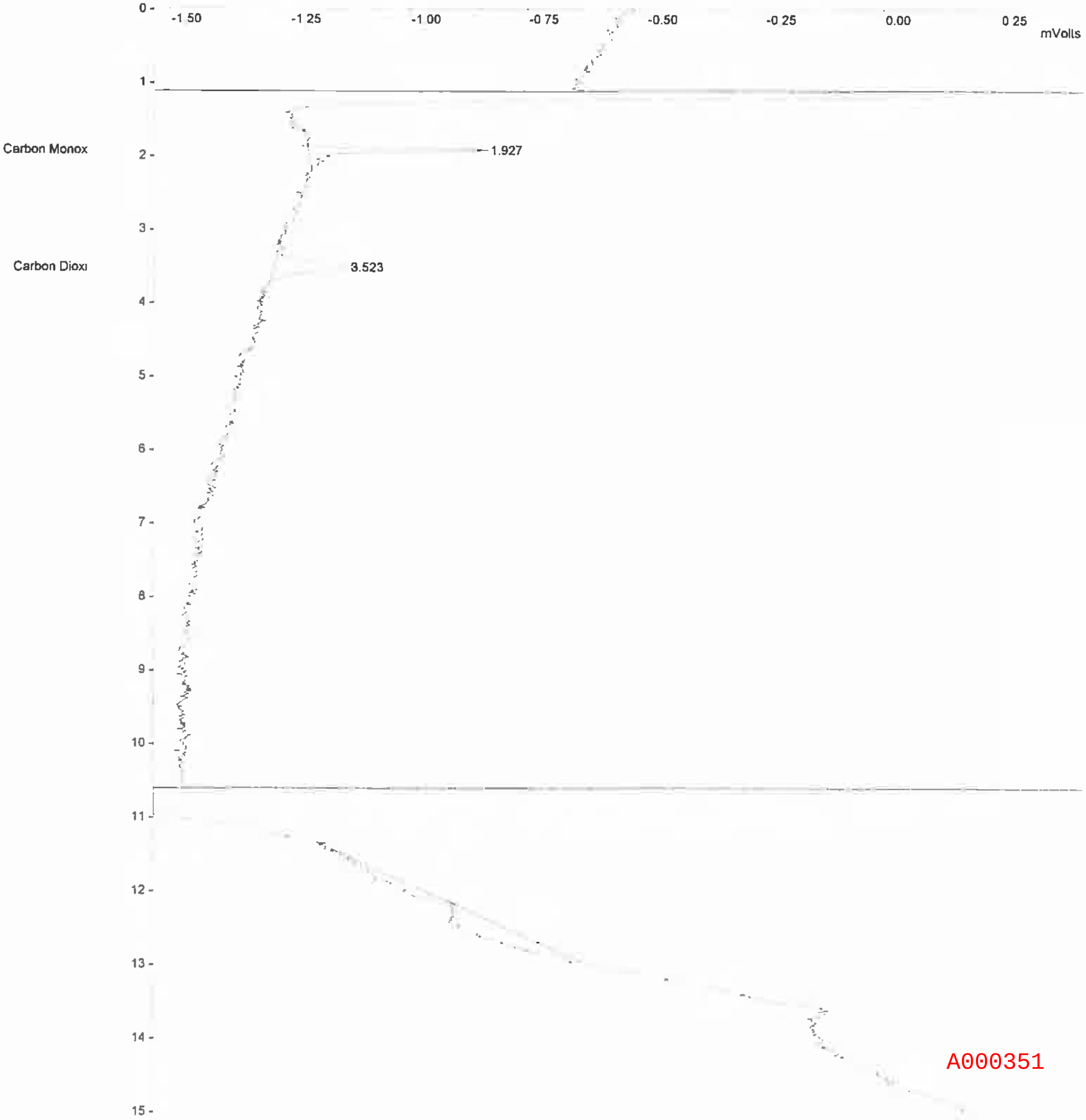
```
Print Date: Wed Feb 24 13:39:03 2016                  Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 10;53;36, 5ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 5ppm mix

Injection Date: 2/24/2016 10:53     Calculation Date: 2/24/2016 13:38

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 - Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.     Time                          Width
 Peak       Peak          Result      Time    Offset       Area      Sep.    1/2    Status
 No.        Name          (ppmC)      (min)    (min)     (counts)    Code   (sec)   Codes
 ----  ------------  -----------  -------  -------  ----------  ----  -----   ------
    1  Carbon Monox       4.9403    1.940    0.010        8946    BB    2.7
    2  Methane            5.0726    2.329    0.011        9039    BB    3.6
    3  Carbon Diox:       5.7128    3.517    0.015       10154    BB    8.2
    4  Ethane             4.8480    7.548    0.007        8584    BB   21.4
    5  NMOC               7.6003   11.900   -0.270       13042    BB   19.6
 ----  ------------  -----------  -------  -------  ----------  ----  -----   ------
       Totals:           28.1740            -0.227       49765

Total Unidentified Counts :             0 counts

Detected Peaks: 5            Rejected Peaks: 0       Identified Peaks: 5

Multiplier: 1            Divisor: 1           Unidentified Peak Factor: 0

Baseline Offset: -80 microVolts           LSB:      1 microVolts

Noise (used): 26 microVolts - monitored before this run

Stream: 1       Injection Number: 3     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-24-2016, 10;53;36, 5ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 5ppm mix

Injection Date: 2/24/2016 10:53    Calculation Date: 2/24/2016 13:38

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 43%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```

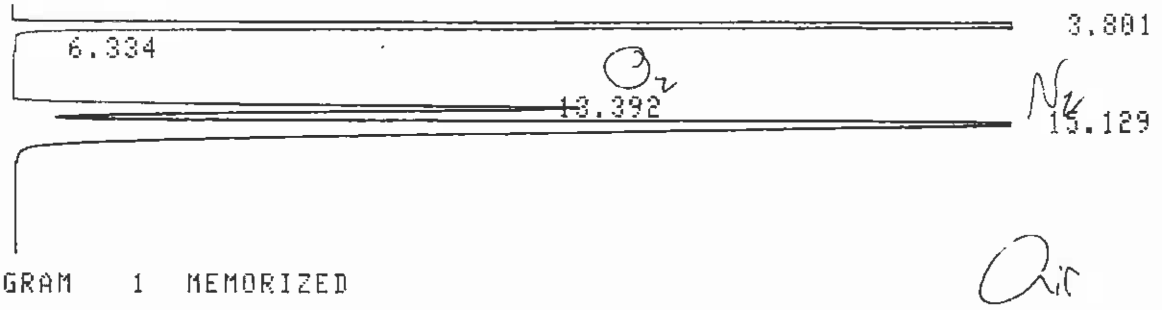


```
Print Date: Wed Feb 24 13:38:29 2016             Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 11;21;22, n2 blank s035.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank s035

Injection Date: 2/24/2016 11:21     Calculation Date: 2/24/2016 13:38

Operator     : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument   : Varian Star #1         Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode         : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                  Ret.    Time                         Width
 Peak     Peak         Result     Time   Offset        Area     Sep.    1/2    Status
 No.      Name         (ppmC)    (min)    (min)      (counts)   Code   (sec)   Codes
 ----  ------------ ----------  -------  -------  ----------   ----   -----   ------
    1  Carbon Monox     0.7754    1.927   -0.003        1404     BB     2.9
    2  Methane                    2.318                                        M
    3  Carbon Dioxi     0.8930    3.523    0.021        1587     BB     7.8
    4  Ethane                     7.541                                        M
    5  NMOC                      12.170                                        M
 ----  ------------ ----------  -------  -------  ----------   ----   -----   ------
       Totals:          1.6684              0.018        2991

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4           Rejected Peaks: 2       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -528 microVolts          LSB:     1 microVolts

Noise (used): 17 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

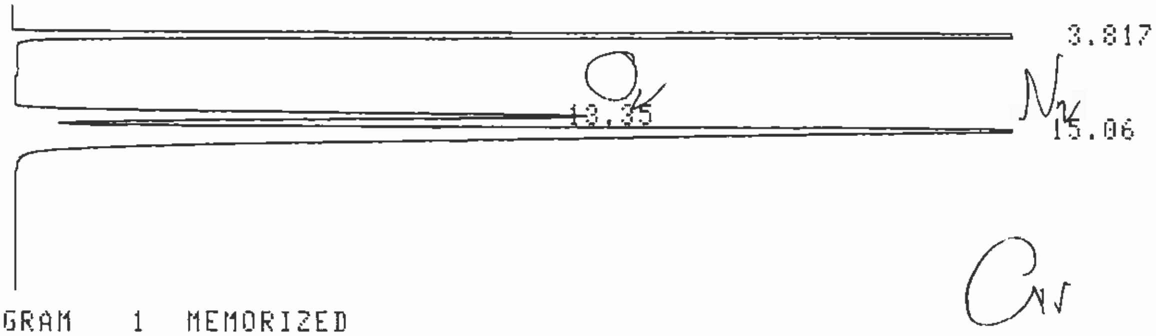
```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-24-2016, 11;21;22, n2 blank s035.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank s035

Injection Date: 2/24/2016 11:21     Calculation Date: 2/24/2016 13:38

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1          Zero Offset = 62%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



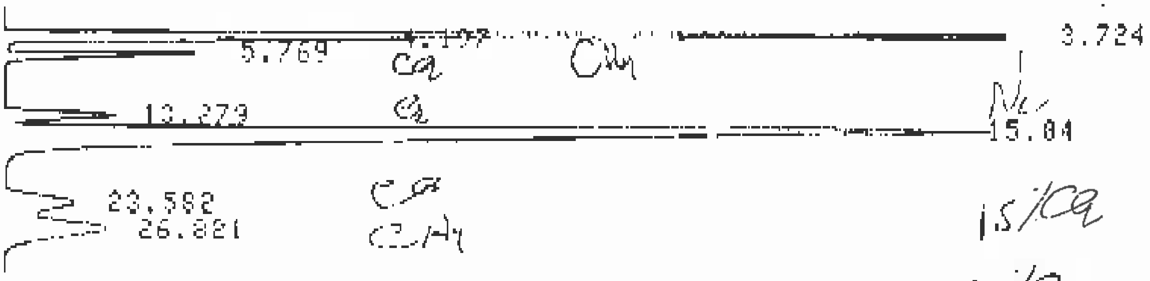
2/9



```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                       FILE         0
SAMPLE NO    0                       METHOD         41
REPORT NO    174

PKNO       TIME        AREA   MK   IDNO      CONC         NAME

   1      3.801    8929050                  35.4332
   2      6.334       7412                   0.0294
   3     13.392    4127181                  16.3779
   4     15.129   12136036    V             48.1595
                 ----------             -------------
        TOTAL     25199678                 100
```

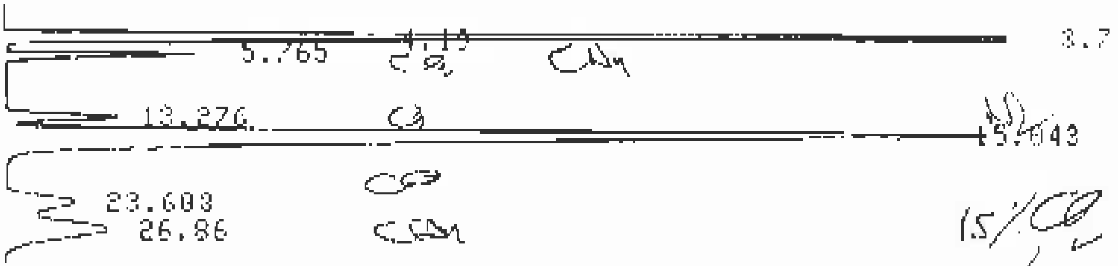


```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                       FILE         0
SAMPLE NO    0                       METHOD         41
REPORT NO    175


PKNO       TIME        AREA   MK   IDNO      CONC         NAME

   1      3.817    8913127                  35.6442
   2     13.35     4103764                  16.4112
   3     15.06    11988923    V             47.9445
                 ----------             -------------
        TOTAL     25005814                 100
```



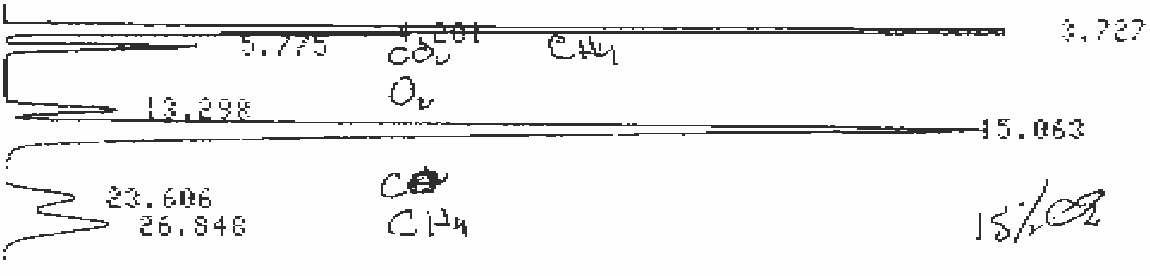
15/C2
4/C2

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                       FILE        0
SAMPLE NO    0                       METHOD         41
REPORT NO    176

PKNO       TIME       AREA   MK   IDNO      CONC        NAME

  1       3.724    6897602                   29.4631
  2       4.197    1068135   V                4.5625
  3       5.769     878551                    3.7527
  4      13.279     796705                    3.4031
  5      15.04    10848033   V               46.3374
  6      23.582    1023389                    4.3714
  7      26.821    1898565   V                8.1097
                 ---------            -------------
        TOTAL    23410980                 100
```



15/C2
4/C2

```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                       FILE        0
SAMPLE NO    0                       METHOD         41
REPORT NO    177

PKNO       TIME       AREA   MK   IDNO      CONC        NAME

  1       3.7      6856302                   29.3629
  2       4.19     1065926   V                4.565
  3       5.765     874005   V                3.743
  4      13.276     799335                    3.4232
  5      15.043   10842092   V               46.4325
  6      23.608    1021561                    4.375
  7      26.86     1890999   V                8.0984
                 ---------            -------------
        TOTAL    23350216                 100
```

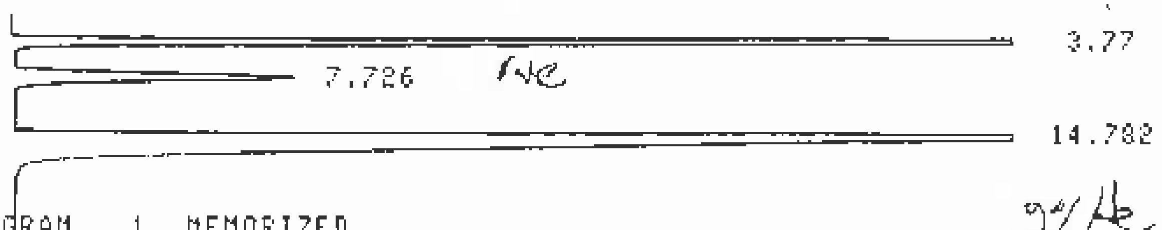


15% CO_2

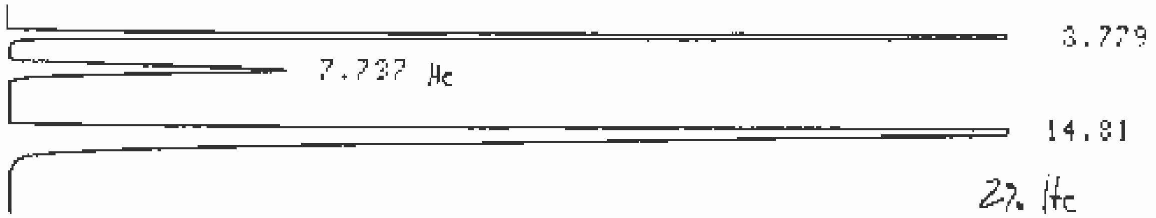
4% O_2

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                    FILE        0
SAMPLE NO   0                    METHOD       41
REPORT NO   197

PKNO      TIME       AREA  MK  IDNO      CONC        NAME

   1     3.727    6976819                29.6736
   2     4.201    1070814  V              4.5544
   3     5.775     888659  V              3.7796
   4    13.298     805435                 3.4257
   5    15.963   10853461  V             46.1617
   6    23.636    1025427                 4.3613
   7    26.848    1891231  V              8.9437
               ----------           -------------
        TOTAL    23511842                100
```

223-02037-02   13'215   Shimadzu

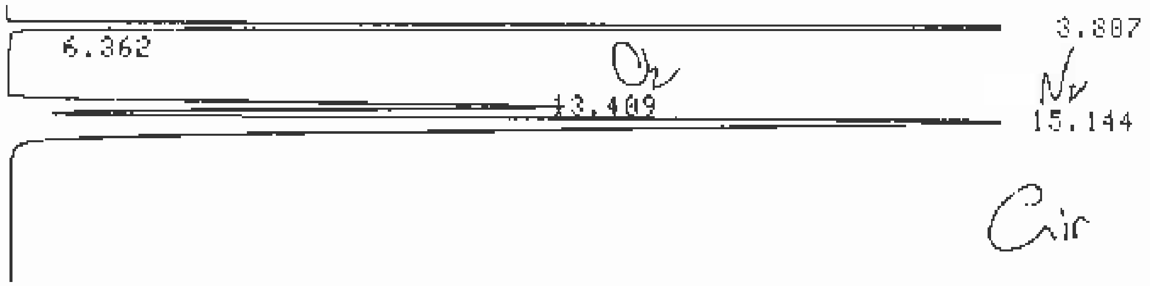


```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                         FILE         0
SAMPLE NO    0                         METHOD         41
REPORT NO    178

PKNO        TIME        AREA   MK   IDNO      CONC        NAME

   1       3.77     9450667                 35.1257
   2       7.726    2340457                  8.6989
   3      14.782   15114126                 56.1754
                 ----------          -------------
          TOTAL    26905248               100
```

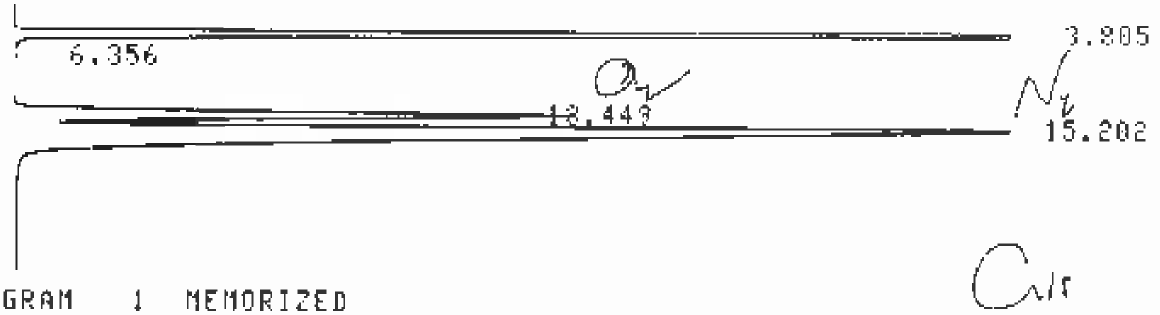


```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                         FILE         0
SAMPLE NO    0                         METHOD         41
REPORT NO    179

PKNO        TIME        AREA   MK   IDNO      CONC        NAME

   1       3.779    9387826                 35.0923
   2       7.737    2326104                  8.6951
   3      14.81    15037862                 56.2125
                 ----------          -------------
          TOTAL    26751792               100
```

8/10



```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD          41
REPORT NO    198

PKNO        TIME        AREA   MK   IDNO       CONC         NAME

   1       3.807    8785070                  35.6732
   2      13.409    4040599                  16.4075
   3      15.144   11800826   V              47.9192
                  ----------            -------------
         TOTAL    24626494                  100
```

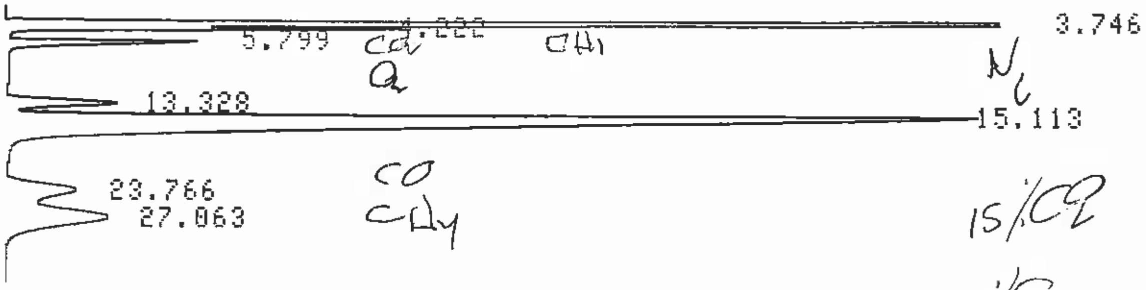


```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                        FILE         0
SAMPLE NO    0                        METHOD          41
REPORT NO    199

PKNO        TIME        AREA   MK   IDNO       CONC         NAME

   1       3.805    8867838                  35.354
   2       6.356       6837                   0.0273
   3      13.449    4109824                  16.3849
   4      15.202   12098510   V              48.2339
                  ----------            -------------
         TOTAL    25083008                  100
```

093

223-02037-02

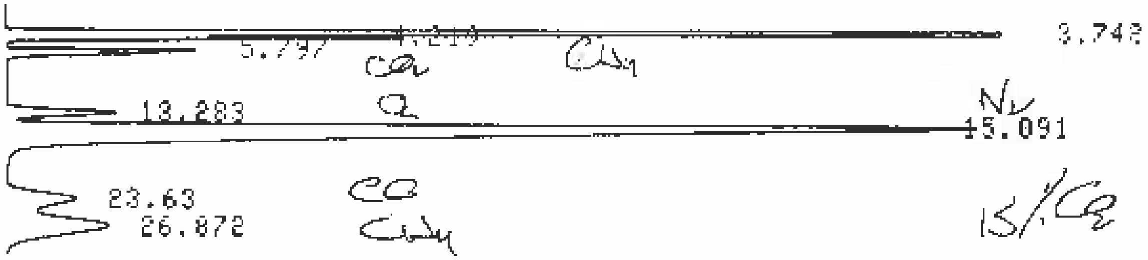
131215



15% CO_2

4% O_2

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                     FILE        0
SAMPLE NO   0                     METHOD        41
REPORT NO   200



PKNO     TIME       AREA  MK  IDNO      CONC        NAME

  1      3.746   6830151                29.2599
  2      4.222   1067640  V              4.5737
  3      5.799    880576  V              3.7723
  4     13.328    791916                 3.3925
  5     15.113  10836560  V             46.423
  6     23.766   1035616                 4.4365
  7     27.063   1900616  V              8.1421
                ----------          -------------
       TOTAL    23343072                100
```



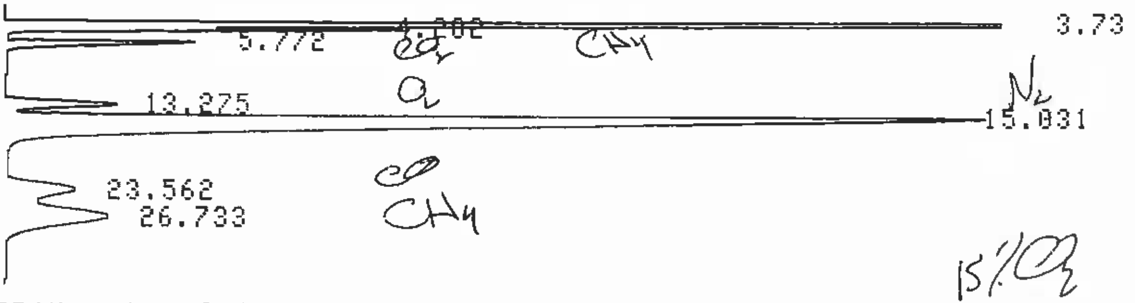
15% CO_2

4% O_2

```
CHROMATOGRAM    1  MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO  1                     FILE        0
SAMPLE NO   0                     METHOD        41
REPORT NO   201

PKNO     TIME       AREA  MK  IDNO      CONC        NAME

  1      3.742   6835817                29.5169
  2      4.219   1052892  V              4.5464
  3      5.797    870275  V              3.7578
  4     13.283    785100                 3.39
  5     15.091  10728611  V             46.326
  6     23.63    1008623                 4.3552
  7     26.872   1877648  V              8.1076
                ----------          -------------
       TOTAL    23158960                100
```

Shimadzu

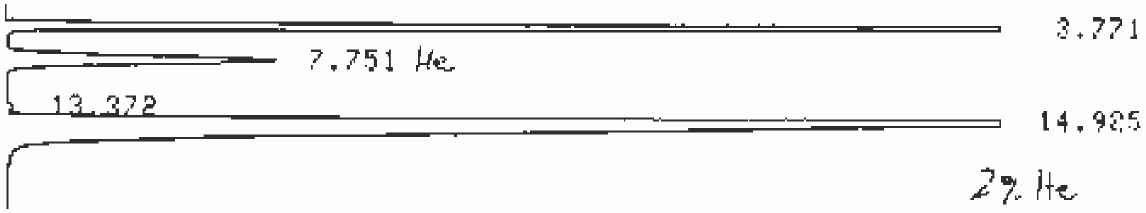
223-02037-02



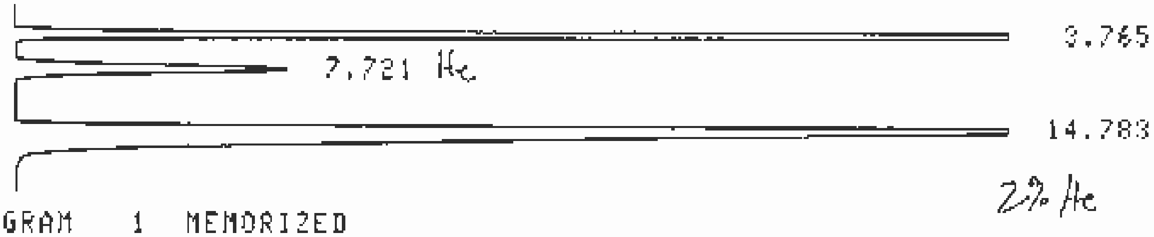
15% O2

4% O2

```
CHROMATOGRAM    1   MEMORIZED

C-R5A   CHROMATOPAC
CHANNEL NO   1                          FILE         0
SAMPLE NO    0                          METHOD        41
REPORT NO    223

PKNO        TIME        AREA   MK   IDNO        CONC          NAME




   1       3.73     6922760                      29.5222
   2       4.202    1066873    V                  4.5497
   3       5.772     881670    V                  3.7599
   4      13.275     802332                       3.4216
   5      15.031   10843737    V                 46.2432
   6      23.562    1027059                       4.3799
   7      26.733    1904913    V                  8.1235
                 ---------             -------------
          TOTAL    23449338                  100
```



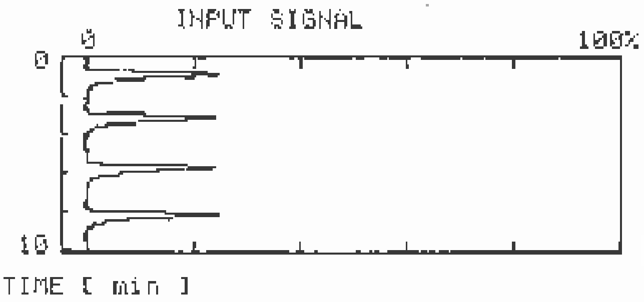
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE        0
SAMPLE NO    0                        METHOD         41
REPORT NO    204

PKNO        TIME        AREA   MK   IDNO      CONC         NAME

  1        3.771    9367774                  34.9831
  2        7.751    2278401                   8.5085
  3       13.372      58205                   0.2174
  4       14.925   15073633   V              56.2911
                  ----------             -------------
          TOTAL    26778012                 100
```



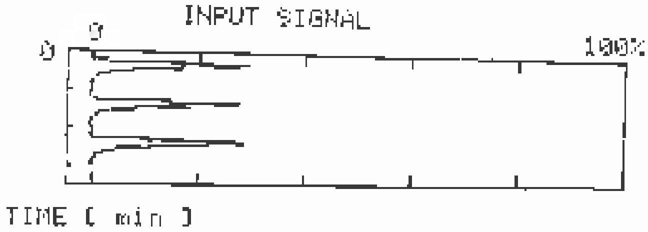
```
CHROMATOGRAM    1   MEMORIZED

C-R5A  CHROMATOPAC
CHANNEL NO   1                        FILE        0
SAMPLE NO    0                        METHOD         41
REPORT NO    205

PKNO        TIME        AREA   MK   IDNO      CONC         NAME

  1        3.765    9380747                  35.3474
  2        7.721    2296379                   8.6529
  3       14.783   14861614                  55.9997
                  ----------             -------------
          TOTAL    26538740                 100
```

TOC ANALYSIS

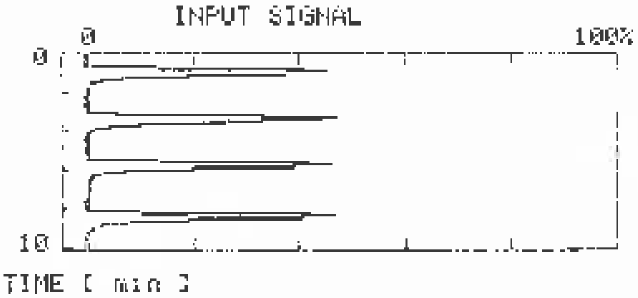
on the TRAPS



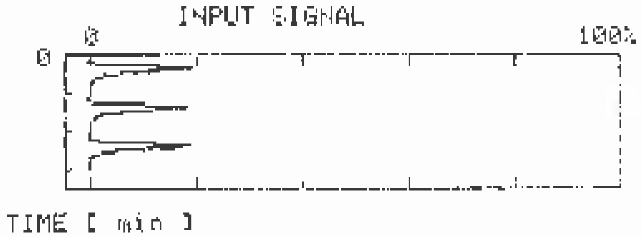
```
SAMPLE#  15   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
   [illegible]
  + 4 10086  4.925
  - - - - - - - - - - - - - - -
   MN 10071  4.917
   SD    76  0.039
   CV  0.75 %
   COR CONC DIL   4.917 [x 1.0]
   COR CONC INJ   4.917 [x 1.0]

      DATE  02(FEB)-09-2016   16:47
```



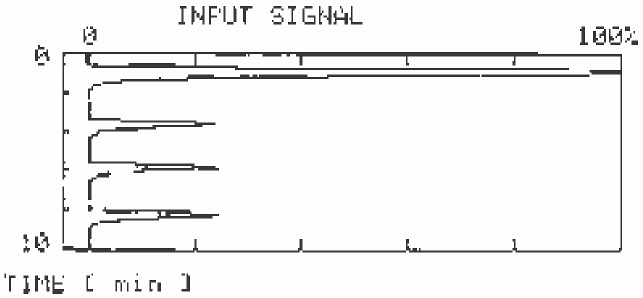
```
SAMPLE#  15   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1 11658  4.418
    2 11295  4.272
    3 11390  4.310
  - - - - - - - - - - - - - - -
   MN 11447  4.333
   SD   188  0.075
   CV  1.64 %
   COR CONC DIL  4.333 [x 1.0]
   COR CONC INJ  4.333 [x 1.0]

SAMPLE#  15   TOC(TC-IC)    0.584 ppm

      DATE  02(FEB)-09-2016   16:55
```



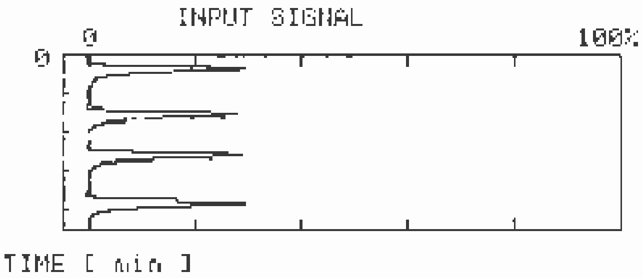
```
SAMPLE#  16   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1-17890  8.913
    2 18423  9.187
    3 17942  8.940
  + 4 18160  9.052
  - - - - - - - - - - - - - -
   MN 18175  9.059
   SD   240  0.123
   CV  1.32 %
   COR CONC DIL  9.059 [x 1.0]
   COR CONC INJ  9.059 [x 1.0]

      DATE  02(FEB)-09-2016   17:07
```



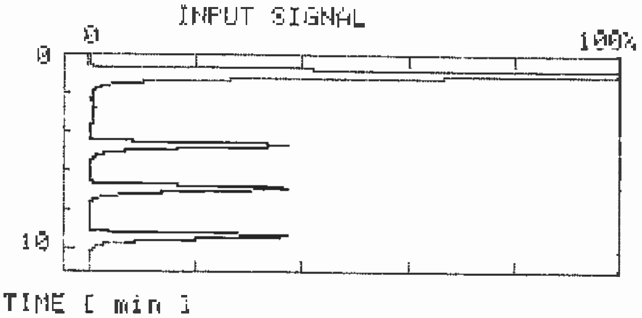
```
SAMPLE#  16   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  7538  2.760
    2  7293  2.661
    3  7224  2.634
  - - - - - - - - - - - - - -
   MN  7351  2.685
   SD   165  0.066
   CV  2.24 %
   COR CONC DIL  2.685 [x 1.0]
   COR CONC INJ  2.685 [x 1.0]

SAMPLE#  16   TOC(TC-IC)    6.374 ppm

      DATE  02(FEB)-09-2016   17:15
```



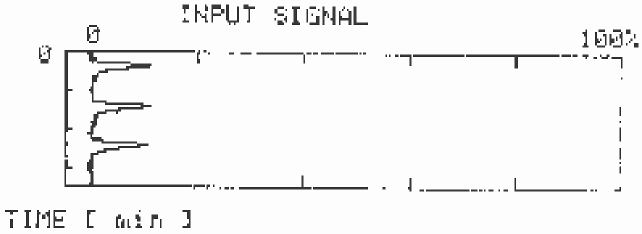
```
SAMPLE#  17    TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1-42961  21.78 H
    2  9588  22.05    16
    3  9654  22.20
    4  9761  22.45
   - - - - - - - - - - - - - -
   MN  9667  22.24
   SD    87  0.203
   CV  0.90 %
   COR CONC DIL  22.24 [x 1.0]
   COR CONC INJ  22.24 [x 1.0]

        DATE  02(FEB)-09-2016  17:26
```



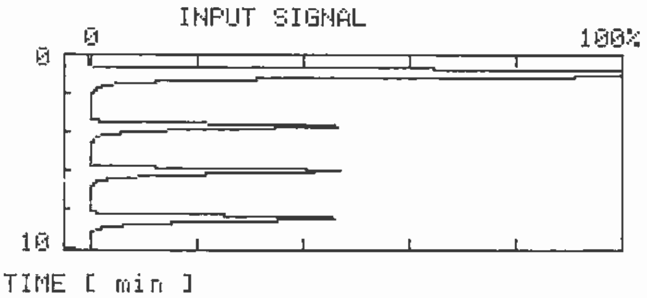
```
SAMPLE#  17    IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1 12020  4.564
    2-11141  4.210
    3 11508  4.358
  + 4 11578  4.386
   - - - - - - - - - - - - - -
   MN 11702  4.436
   SD   277  0.111
   CV  2.37 %
   COR CONC DIL  4.436 [x 1.0]
   COR CONC INJ  4.436 [x 1.0]

SAMPLE#  17   TOC(TC-IC)     17.80 ppm

        DATE  02(FEB)-09-2016  17:37
```



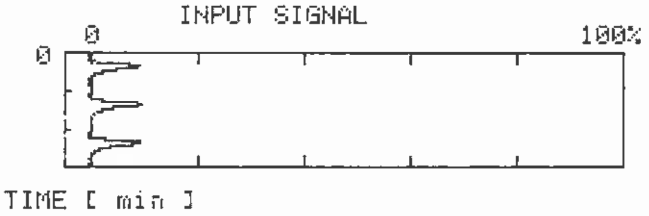
```
SAMPLE#  18    TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1-57220  29.10 H
    2 14784  34.17    16
    3 14763  34.12
    4 14708  33.99
   - - - - - - - - - - - - - -
   MN 14751  34.09
   SD    39  0.091
   CV  0.26 %
   COR CONC DIL  34.09 [x 1.0]
   COR CONC INJ  34.09 [x 1.0]

        DATE  02(FEB)-09-2016  17:50
```



```
SAMPLE#  18    IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  4557  1.613
    2  4394  1.551
    3  4233  1.490
   - - - - - - - - - - - - - -
   MN  4394  1.551
   SD   162  0.061
   CV  3.68 %
   COR CONC DIL  1.551 [x 1.0]
   COR CONC INJ  1.551 [x 1.0]

SAMPLE#  18   TOC(TC-IC)     32.53 ppm

        DATE  02(FEB)-09-2016  17:58
```



```
SAMPLE#  19   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm       C#  µl RG
    1-62457  31.79 H
    2 18415  42.64   16
    3 18427  42.67
    4 18313  42.40
   - - - - - - - - - - - - - -
   MN 18385  42.57
   SD    62  0.146
   CV  0.34 %
   COR CONC DIL  42.57 [x 1.0]
   COR CONC INJ  42.57 [x 1.0]

        DATE  02(FEB)-09-2016  18:11
```



```
SAMPLE#  19   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm       C#  µl RG
    1  3737  1.301
    2  3991  1.397
    3  3818  1.331
   - - - - - - - - - - - - - -
   MN  3848  1.343
   SD   129  0.049
   CV  3.37 %
   COR CONC DIL  1.343 [x 1.0]
   COR CONC INJ  1.343 [x 1.0]

SAMPLE#  19   TOC(TC-IC)    41.22 ppm

        DATE  02(FEB)-09-2016  18:19
```

Almega Environmental Technical Services

SCAQMD Method 25.3
TOC Analysis on the Trap

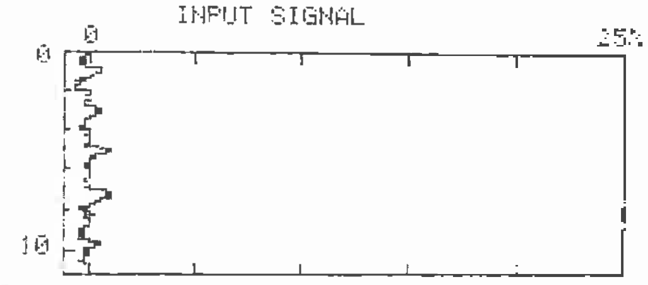
Calibration Curve No.: TC IC

Page: # 7

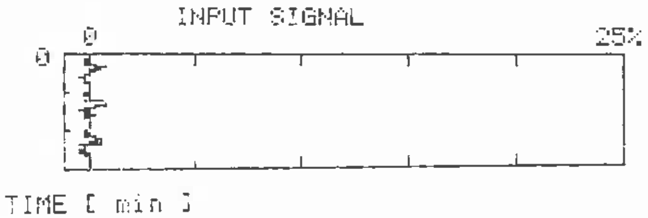
No	Sample ID	Date	Sample Volume, ml		Dilution Factor	Concentration, ppmC		
			Initial	Final		TC	IC	TOC
1	Blank	2/9	—	—	1	-.03	-.02	-.00
2	TCStd		—	—	1	20.76	.013	20.74
3	ICStd		—	—	1	8.916	8.483	.433
4	LCS		—	—	1	11.43	.063	11.36
5	Blank		—	—	1	-.08	-.05	.05
6	MOT -114		7.0	7.0	1	.588	.375	.213
7	-101		6.0	6.0	1	53.40	7.889	45.51
8	-102		7.5	7.5	1	17.53	3.368	14.16
9	-103		8.0	8.0	1	17.01	3.595	13.41
10	-104		7.75	7.75	1	14.81	4.569	10.24
11	-105		8.25	8.25	1	3.186	2.125	1.061
12	-106		9.0	9.0	1	3.953	2.744	1.209
13	-107		8.0	8.0	1	6.726	2.448	4.278
14	-108		7.75	7.75	1	3.159	1.669	1.490
15	-201		8.75	8.75	1	4.917	4.333	.584
16	-202		8.0	8.0	1	9.059	2.685	6.374
17	-203		7.25	7.25	1	22.24	4.436	17.80
18	-204		8.75	8.75	1	34.09	1.551	32.53
19	-205		7.5	7.5	1	42.57	1.343	41.22
20	LCS		—	—	1	11.88	.157	11.72
21								

Comments

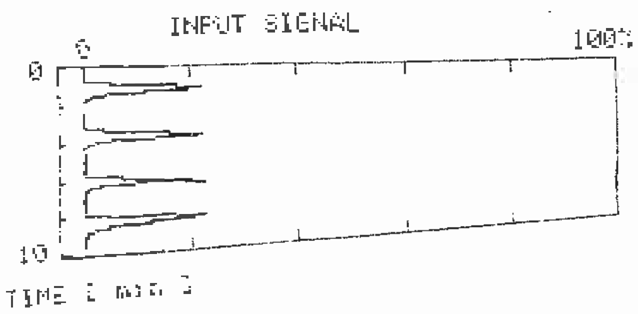
Checked by:



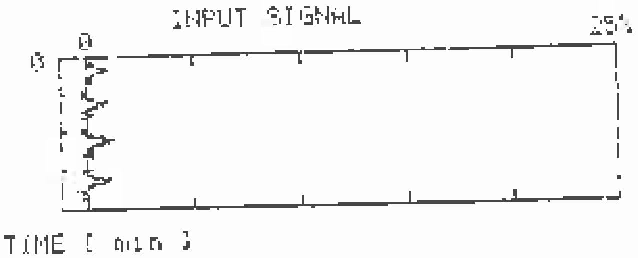
```
SAMPLE#    1    TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1-  483  0.012
    2   368  -0.04
    3   398  -0.03
  + 4-  549  0.046
  + 5   427  -0.01
  - - - - - - - - - - - - - -
   MN   397  -0.03
   SD    29  0.015
   CV  7.41 %
   COR CONC DIL   -0.03 [x 1.0]
   COR CONC INJ   -0.03 [x 1.0]

       DATE  02(FEB)-09-2016  10:52
```



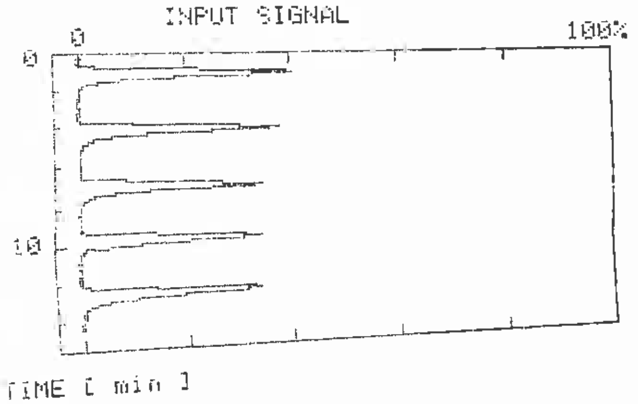
```
SAMPLE#    1    IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1   284  -0.01
    2   236  -0.03
    3   250  -0.02
  - - - - - - - - - - - - - -
   MN   256  -0.02
   SD    24  0.009
   CV  9.61 %
   COR CONC DIL   -0.02 [x 1.0]
   COR CONC INJ   -0.02 [x 1.0]

SAMPLE#    1    TOC(TC-IC)     -0.00 ppm

       DATE  02(FEB)-09-2016  10:59
```



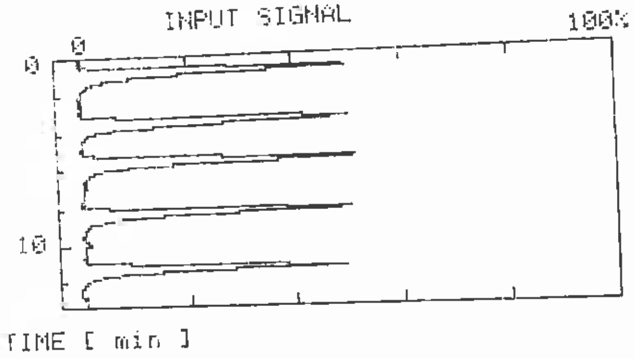
```
SAMPLE#    2    TC
 [x 5,    33µl, C# 16, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1- 8949  20.56
    2  9057  20.81
    3  8970  20.61
  + 4  9075  20.85
  - - - - - - - - - - - - - -
   MN  9034  20.76
   SD    56  0.131
   CV  0.52 %
   COR CONC DIL   20.76 [x 1.0]
   COR CONC INJ   20.76 [x 1.0]

       DATE  02(FEB)-09-2016  11:21
```



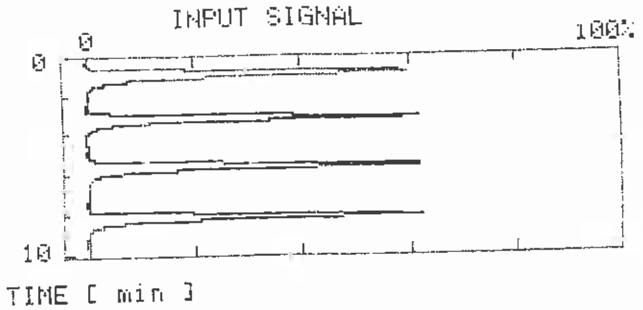
```
SAMPLE#    2    IC
 [x 5,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  [illegible]
    2   344  0.008
    3   387  0.024
  + 4   345  0.008
  - - - - - - - - - - - - - -
   MN   358  0.013
   SD    24  0.009
   CV  6.84 %
   COR CONC DIL    0.013 [x 1.0]
   COR CONC INJ    0.013 [x 1.0]

SAMPLE#    2    TOC(TC-IC)     20.74 ppm

       DATE  02(FEB)-09-2016  11:31
```



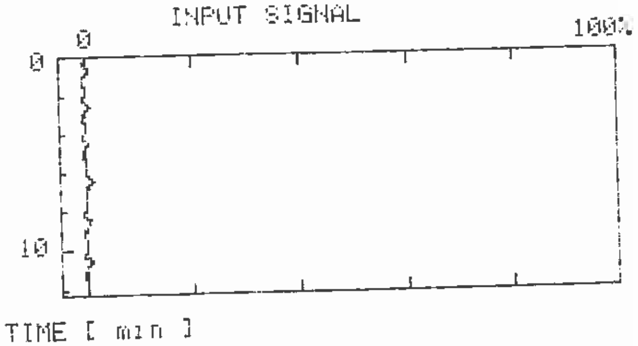
```
SAMPLE#    3    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
   #   AREA PPM           C#   µl RG
   1-19328  9.651
   2 18725  9.342
   3-17096  8.508
 + 4 17255  8.589
 + 5 17703  8.818
  - - - - - - - - - - - - - -
  MN 17894  8.916
  SD   753  0.385
  CV  4.21 %
  COR CONC DIL  8.916 [x 1.0]
  COR CONC INJ  8.916 [x 1.0]

        DATE  02(FEB)-09-2016  11:54
```



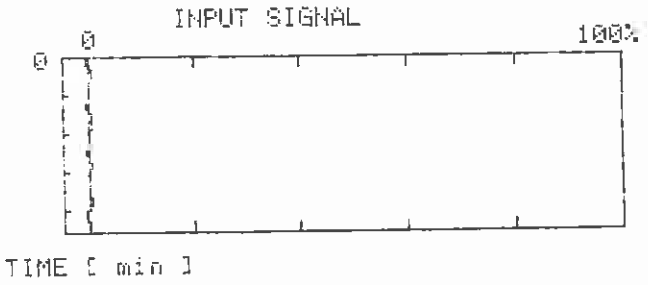
```
SAMPLE#    3    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
   #   AREA PPM           C#   µl RG
   1 21918  8.507
   2-21280  8.290
   3 21824  8.509
 + 4-21309  8.302
 + 5 21639  8.435
  - - - - - - - - - - - - - -
  MN 21760  8.483
  SD   105  0.042
  CV  0.48 %
  COR CONC DIL  8.483 [x 1.0]
  COR CONC INJ  8.483 [x 1.0]

SAMPLE#   3   TOC(TC-IC)     0.433 PPM

        DATE  02(FEB)-09-2016  12:09
```



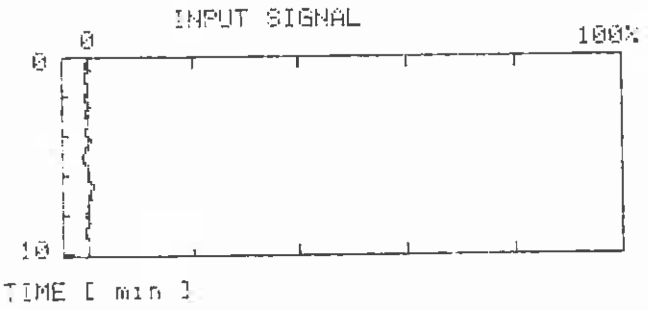
```
SAMPLE#    4    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
   #   AREA PPM           C#   µl RG
   1-22469  11.26
   2 22766  11.41
   3 22898  11.48
 + 4 22726  11.39
  - - - - - - - - - - - - - -
  MN 22796  11.43
  SD    90  0.046
  CV  0.39 %
  COR CONC DIL  11.43 [x 1.0]
  COR CONC INJ  11.43 [x 1.0]

        DATE  02(FEB)-09-2016  12:20
```



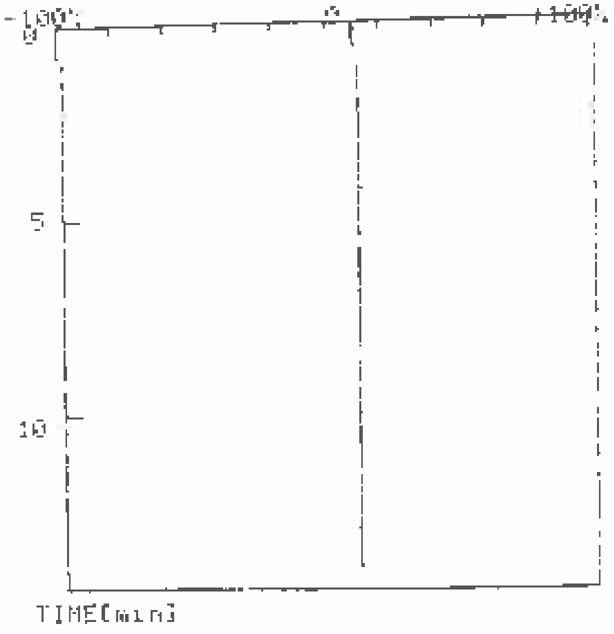
```
SAMPLE#    4    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
   #   AREA PPM           C#   µl RG
   1-   249  -0.02
   2    469  0.055
   3-   304  -0.00
 + 4-   372  0.018
 + 5    510  0.071
 + 6    489  0.063
  - - - - - - - - - - - - - -
  MN    489  0.063
  SD     20  0.007
  CV  4.18 %
  COR CONC DIL  0.063 [x 1.0]
  COR CONC INJ  0.063 [x 1.0]

SAMPLE#   4   TOC(TC-IC)     11.36 PPM

        DATE  02(FEB)-09-2016  12:34
```



```
SAMPLE#    5    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #   AREA PPM          C#   µl RG
    1    402   -0.02
    2    527   0.034
    3-   209   -0.12
  + 4    418   -0.02
   - - - - - - - - - - - - - -
   MN    449   -0.00
   SD     68   0.034
   CV   15.1 %
   COR CONC DIL   -0.00 [x 1.0]
   COR CONC INJ   -0.00 [x 1.0]

         DATE  02(FEB)-09-2016   13:01
```

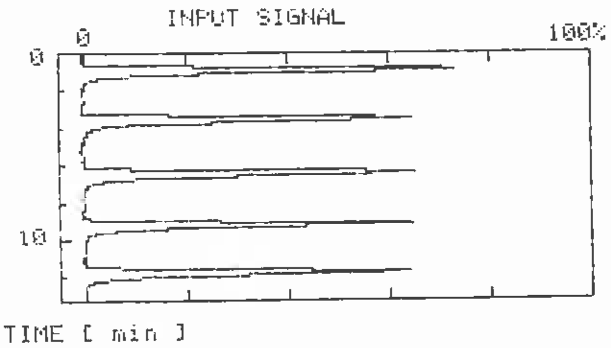


```
SAMPLE#    5    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #   AREA PPM          C#   µl RG
    1    151   -0.06
    2    207   -0.04
    3-   538   0.082
  + 4-   423   0.038
  + 5    184   -0.05
   - - - - - - - - - - - - - -
   MN    180   -0.05
   SD     28   0.010
   CV   15.5 %
   COR CONC DIL   -0.05 [x 1.0]
   COR CONC INJ   -0.05 [x 1.0]

SAMPLE#    5    TOC(TC-IC)     0.050 PPM

         DATE  02(FEB)-09-2016   13:13
```

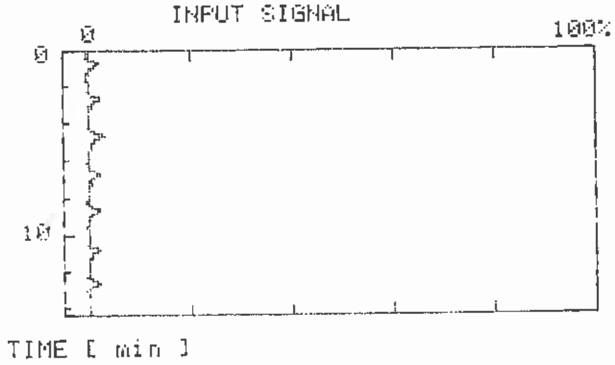


```
  RANGE                   : x1
[READY]
  TC FURNACE TEMP         :  OK       679°C
  DEHUMIDIFIER TEMP       :  OK       1.0°C
  BASELINE POSITION       :  OK
  BASELINE FLUCTUATION:      OK
  BASELINE NOISE          :  OK

        DATE   02(FEB)-09-2016   10:08
```

```
TOC-5000 DATA REPORT
        DATE  02(FEB)-09-2016 18:55

SPL# TC,PPM    RMK     IC,PPM   RMK     TOC,PPM
  1   -0.03  14*****  -0.02  13*****   -0.00
  2   20.76  16*****  0.013  13*****   20.74
  3   8.916  14*****  8.483  13*****   0.433
  4   11.43  14*****  0.063  13*****   11.36
  5   -0.00  14*****  -0.05  13*****   0.050
  6   0.388  14*****  0.175  13*****   0.213
  7   53.40  16*H***  7.889  13*****   45.51
  8   17.53  14*****  3.368  13*****   14.16
  9   17.01  14*****  3.595  13*****   13.41
 10   14.81  14*****  4.569  13*****   10.24
 11   3.186  14*****  2.125  13*****   1.061
 12   3.953  14*****  2.744  13*****   1.209
 13   6.726  14*****  2.448  13*****   4.278
 14   3.159  14*****  1.669  13*****   1.490
 15   4.917  14*****  4.333  13*****   0.584
 16   9.059  14*****  2.685  13*****   6.374
 17   22.24  16*H***  4.436  13*****   17.80
 18   34.09  16*H***  1.551  13*****   32.53
 19   42.57  16*H***  1.343  13*****   41.22
 20   11.88  14*****  0.157  13*****   11.72


ANALYST :
SAMPLE  :
```



```
SAMPLE#  20   TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm       C#  µl RG
     1-27380  13.78
     2-24909  12.51
     3 23748  11.92
   + 4 23567  11.82
   + 5 23719  11.90
    - - - - - - - - - - - - - -
    MN 23678  11.88
    SD    97  0.050
    CV  0.41 %
    COR CONC DIL  11.88 [x 1.0]
    COR CONC INJ  11.88 [x 1.0]

          DATE  02(FEB)-09-2016  18:36
```

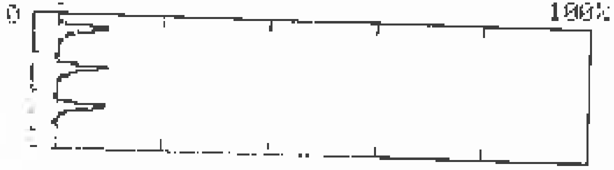


```
SAMPLE#  20   IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm       C#  µl RG
     1-  892  0.217
     2-  898  0.219
     3- 1064  0.282
   + 4   752  0.163
   + 5   732  0.156
   + 6-  606  0.108
   + 7   726  0.153
    - - - - - - - - - - - - - -
    MN   736  0.157
    SD    13  0.005
    CV  1.84 %
    COR CONC DIL  0.157 [x 1.0]
    COR CONC INJ  0.157 [x 1.0]

 SAMPLE#  20   TOC(TC-IC)    11.72 ppm

          DATE  02(FEB)-09-2016  18:54
```

INPUT SIGNAL

```
SAMPLE#    6    TC
[x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #  AREA ppm        C#  µl RG
    1  4410   2.023
    2  4413   2.025
    3  4581   2.111
 - - - - - - - - - - - - - - - - - -
   MN   4468   2.053
   SD     97   0.050
   CV   2.19 %
   COR CONC DIL   2.053 [x 1.0]
   COR CONC INJ   2.053 [x 1.0]

        DATE   02(FEB)-10-2016   11:36
```

INPUT SIGNAL



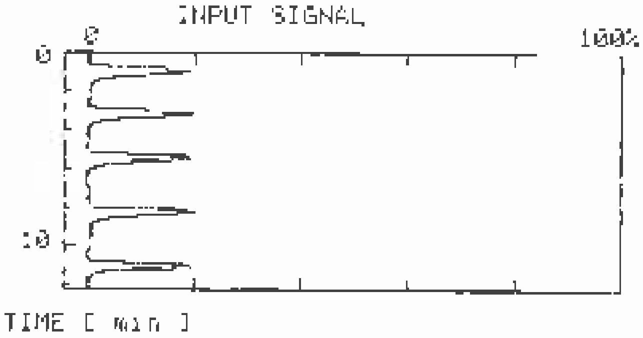
```
SAMPLE#    6    IC
[x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #  AREA ppm        C#  µl RG
    1  3982   1.394
    2  3935   1.376
    3  3815   1.330
 - - - - - - - - - - - - - - - - - -
   MN   3910   1.367
   SD     86   0.032
   CV   2.20 %
   COR CONC DIL   1.367 [x 1.0]
   COR CONC INJ   1.367 [x 1.0]

SAMPLE#    6    TOC(TC-IC)     0.686 ppm

        DATE   02(FEB)-10-2016   11:43
```

INPUT SIGNAL

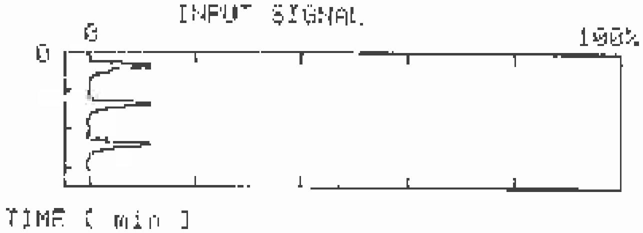
```
SAMPLE#    7    TC
[x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #  AREA ppm        C#  µl RG
    1  5244   2.450
    2  5376   2.517
    3  5364   2.511
 - - - - - - - - - - - - - - - - - -
   MN   5328   2.493
   SD     72   0.037
   CV   1.36 %
   COR CONC DIL   2.493 [x 1.0]
   COR CONC INJ   2.493 [x 1.0]

        DATE   02(FEB)-10-2016   11:52
```

INPUT SIGNAL

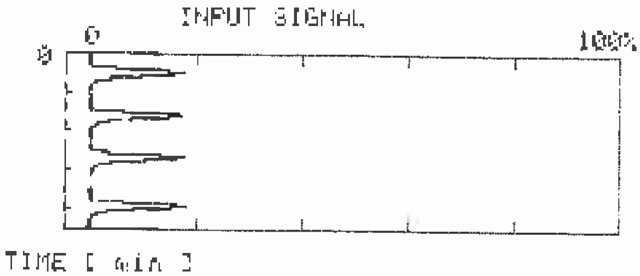
```
SAMPLE#    7    IC
[x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #  AREA ppm        C#  µl RG
    1  4302   1.516
    2  4288   1.510
    3  4323   1.524
 - - - - - - - - - - - - - - - - - -
   MN   4304   1.517
   SD     17   0.006
   CV   0.40 %
   COR CONC DIL   1.517 [x 1.0]
   COR CONC INJ   1.517 [x 1.0]

SAMPLE#    7    TOC(TC-IC)     0.976 ppm

        DATE   02(FEB)-10-2016   12:00
```



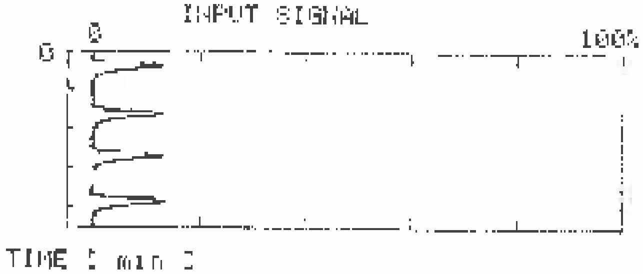
```
SAMPLE#    8    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #   AREA ppm          C#   µl RG
    1- 7893   3.804
    2  7995   3.851
    3  8162   3.941
  + 4  8650   4.191
  + 5  7974   3.845
   - - - - - - - - - - - - - -
   MN   8040   3.879
   SD    105   0.054
   CV   1.31 %
   COR CONC DIL   3.879 [x 1.0]
   COR CONC INJ   3.879 [x 1.0]

        DATE  02(FEB)-10-2016   12:14
```



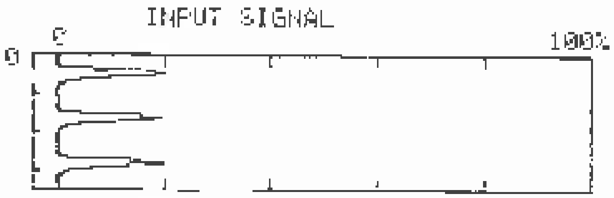
```
SAMPLE#    8    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #   AREA ppm          C#   µl RG
    1  4810   1.709
    2  4835   1.719
    3  5051   1.801
   - - - - - - - - - - - - - -
   MN   4898   1.743
   SD    132   0.050
   CV   2.70 %
   COR CONC DIL   1.743 [x 1.0]
   COR CONC INJ   1.743 [x 1.0]

SAMPLE#    8    TOC(TC-IC)     2.136 ppm

        DATE  02(FEB)-10-2016   12:22
```



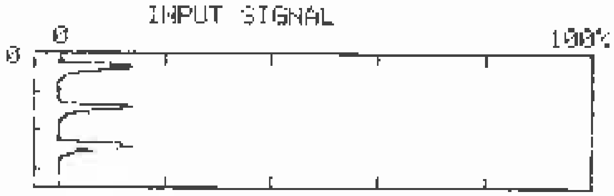
```
SAMPLE#    9    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
    #   AREA ppm          C#   µl RG
    1- 7498   3.602
    2  7176   3.437
    3  7188   3.443
  + 4  7270   3.485
   - - - - - - - - - - - - - -
   MN   7211   3.455
   SD     51   0.026
   CV   0.70 %
   COR CONC DIL   3.455 [x 1.0]
   COR CONC INJ   3.455 [x 1.0]

        DATE  02(FEB)-10-2016   12:33
```



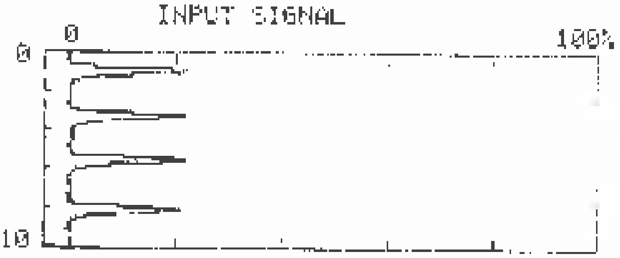
```
SAMPLE#    9    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
    #   AREA ppm          C#   µl RG
    1- 5751   2.068
    2  5537   1.986
    3  5494   1.970
  + 4  5642   2.026
   - - - - - - - - - - - - - -
   MN   5557   1.994
   SD     76   0.029
   CV   1.36 %
   COR CONC DIL   1.994 [x 1.0]
   COR CONC INJ   1.994 [x 1.0]

SAMPLE#    9    TOC(TC-IC)     1.461 ppm

        DATE  02(FEB)-10-2016   12:44
```



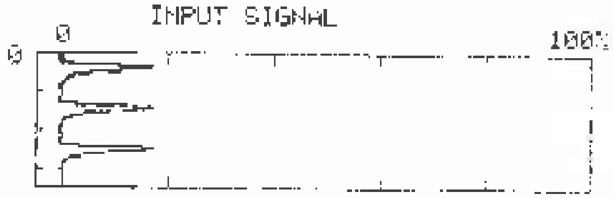
```
SAMPLE#  10   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  8389  4.057
    2  8305  4.014
    3  8461  4.094
  - - - - - - - - - - - - - -
   MN  8384  4.055
   SD    78  0.039
   CV  0.93 %
   COR CONC DIL  4.055 [x 1.0]
   COR CONC INJ  4.055 [x 1.0]

      DATE  02(FEB)-10-2016  12:53
```



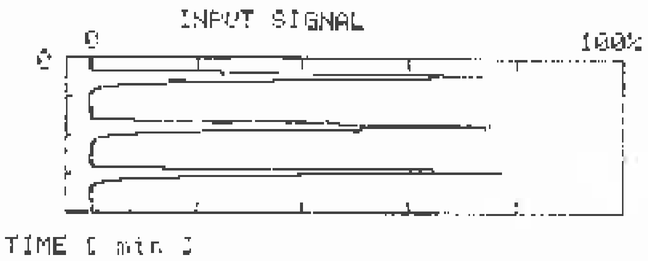
```
SAMPLE#  10   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  5493  1.970
    2  5615  2.016
    3  5622  2.019
  - - - - - - - - - - - - - -
   MN  5576  2.001
   SD    72  0.027
   CV  1.30 %
   COR CONC DIL  2.001 [x 1.0]
   COR CONC INJ  2.001 [x 1.0]

SAMPLE#  10   TOC(TC-IC)     2.054 ppm

      DATE  02(FEB)-10-2016  13:01
```



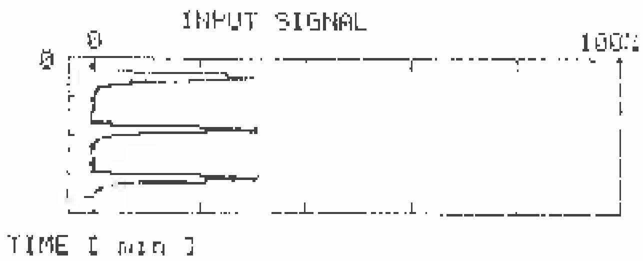
```
SAMPLE#  11   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  9218  4.481
    2  8968  4.353
    3  9179  4.461
  + 4- 8750  4.242
  - - - - - - - - - - - - - -
   MN  9121  4.432
   SD   134  0.068
   CV  1.47 %
   COR CONC DIL  4.432 [x 1.0]
   COR CONC INJ  4.432 [x 1.0]

      DATE  02(FEB)-10-2016  13:23
```



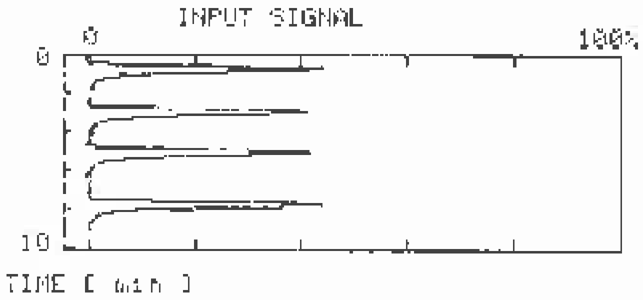
```
SAMPLE#  11   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1  7341  2.681
    2  7210  2.628
    3  7225  2.634
  - - - - - - - - - - - - - -
   MN  7258  2.648
   SD    71  0.028
   CV  0.98 %
   COR CONC DIL  2.648 [x 1.0]
   COR CONC INJ  2.648 [x 1.0]

SAMPLE#  11   TOC(TC-IC)     1.784 ppm

      DATE  02(FEB)-10-2016  13:31
```



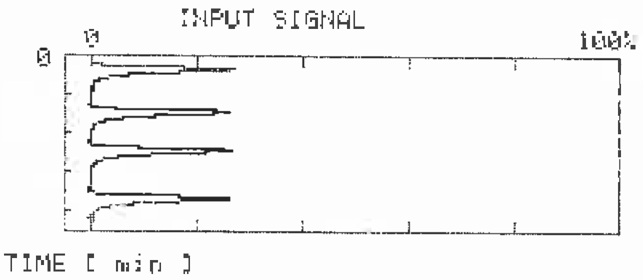
```
SAMPLE#  12   TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1 30839  15.56
    2 31160  15.72
    3 31659  15.98
  - - - - - - - - - - - - - -
   MN 31219  15.75
   SD   413  0.212
   CV  1.32 %
   COR CONC DIL  15.75 [x 1.0]
   COR CONC INJ  15.75 [x 1.0]

       DATE  02(FEB)-10-2016  13:45
```



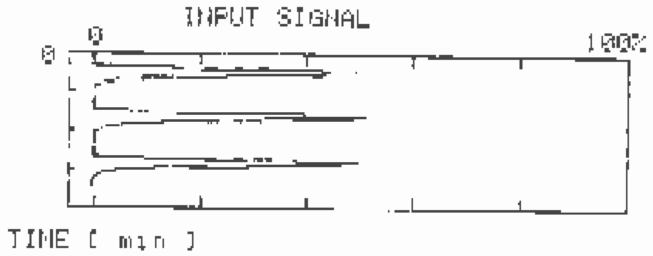
```
SAMPLE#  13   TC
 [x 1,    27µl, C# 14, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl PG
    1 13343  6.589
    2 13412  6.625
    3 12970  6.399
  - - - - - - - - - - - - - -
   MN 13241  6.538
   SD   237  0.121
   CV  1.79 %
   COR CONC DIL  6.538 [x 1.0]
   COR CONC INJ  6.538 [x 1.0]

       DATE  02(FEB)-10-2016  14:14
```



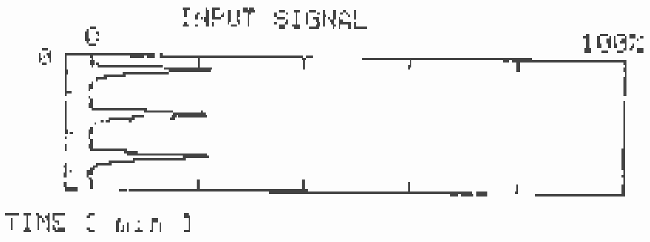
```
SAMPLE#  12   IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl RG
    1 17996  6.969
    2-17004  6.569
    3 17420  6.737
  + 4 17646  6.828
  - - - - - - - - - - - - - -
   MN 17687  6.844
   SD   290  0.116
   CV  1.64 %
   COR CONC DIL  6.844 [x 1.0]
   COR CONC INJ  6.844 [x 1.0]

SAMPLE#  12   TOC(TC-IC)    8.906 ppm

       DATE  02(FEB)-10-2016  13:57
```



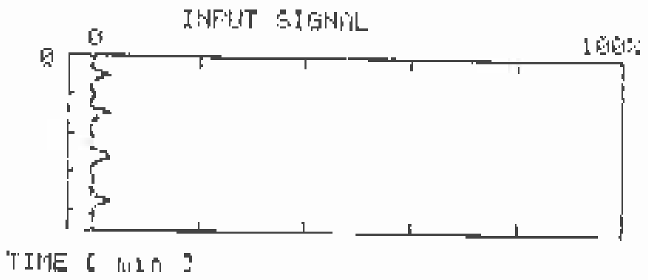
```
SAMPLE#  13   IC
 [x 1,    33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm        C#  µl PG
    1 11097  4.192
    2-10493  3.949
    3 10986  4.148
  + 4 10826  4.083
  - - - - - - - - - - - - - -
   MN 10969  4.141
   SD   136  0.054
   CV  1.24 %
   COR CONC DIL  4.141 [x 1.0]
   COR CONC INJ  4.141 [x 1.0]

SAMPLE#  13   TOC(TC-IC)    2.397 ppm

       DATE  02(FEB)-10-2016  14:26
```



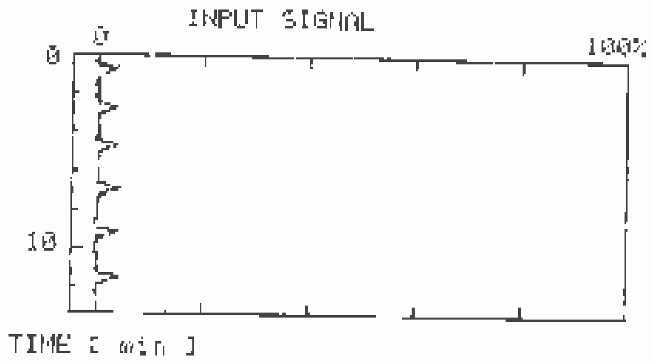
```
SAMPLE#   14    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1 20474   10.23
     2 20799   10.40
     3 20853   10.43
   - - - - - - - - - - - - - -
   MN 20708   10.36
   SD    205  0.105
   CV   0.98 %
   COR CONC DIL   10.36 [x 1.0]
   COR CONC INJ   10.36 [x 1.0]

        DATE  02(FEB)-10-2016   14:35
```



```
SAMPLE#   14    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1   9060   3.372
     2   8904   3.310
     3   9064   3.374
   - - - - - - - - - - - - - -
   MN   9009   3.352
   SD     91   0.036
   CV   1.01 %
   COR CONC DIL   3.352 [x 1.0]
   COR CONC INJ   3.352 [x 1.0]

SAMPLE#   14    TOC(TC-IC)      7.008 ppm

        DATE  02(FEB)-10-2016   14:43
```



```
SAMPLE#   15    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1-  1260   0.410
     2   1401   0.482
     3   1459   0.501
   + 4   1401   0.482
   - - - - - - - - - - - - - - -
   MN   1413   0.489
   SD     21   0.011
   CV   1.55 %
   COR CONC DIL   0.489 [x 1.0]
   COR CONC INJ   0.489 [x 1.0]

        DATE  02(FEB)-10-2016   15:21
```



```
SAMPLE#   15    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #   AREA ppm         C#   µl RG
     1-  1310   0.376
     2   1437   0.424
     3-  1407   0.413
   + 4   1621   0.494
   + 5-  1800   0.562
   + 6   1580   0.479
   - - - - - - - - -   - - - -
   MN   1546   0.466
   SD     96   0.036
   CV   6.24 %
   COR CONC DIL   0.466 [x 1.0]
   COR CONC INJ   0.466 [x 1.0]

SAMPLE#   15    TOC(TC-IC)      0.023 ppm

        DATE  02(FEB)-10-2016   15:30
```

Almega Environmental Technical Services

SCAQMD Method 25.3
TOC Analysis on the Trap

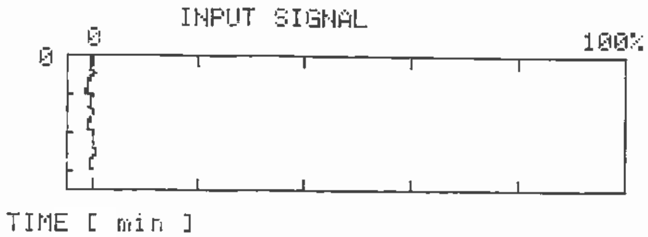
Calibration Curve No.: TC IC

Page: # 8

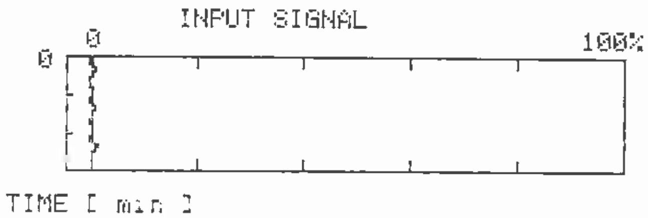
No	Sample ID	Date	Sample Volume, ml		Dilution Factor	Concentration, ppmC		
			Initial	Final		TC	IC	TOC
1	Blank	2/10	—	—	1	-.05	.031	-.08
2	TC Std		—	—	1	21.25	.193	21.05
3	TC Std		—	—	1	9.085	8.972	.113
4	LCS		-	—	1	11.62	.306	11.31
5	Blank		—	—	1	-0.11	-0.07	-0.04
6	A018 -206		7.75	7.75	1	2.053	1.367	.686
7	-207		8.5	8.5	1	2.493	1.517	.976
8	-208		8.0	8.0	1	3.879	1.743	2.136
9	-209		8.5	8.5	1	3.455	1.994	1.461
10	-210		8.5	8.5	1	4.055	2.001	2.054
11	-211		8.0	8.0	1	4.432	2.648	1.784
12	-212		7.75	7.75	1	15.75	6.844	8.906
13	-213		8.75	8.75	1	6.538	4.141	2.397
14	-214		8.25	8.25	1	10.36	3352	7.008
15	-215		7.0	7.0	1	.489	.466	.023
16	LCS		—	—	1	21.54	.325	21.21
17								
18								
19								
20								
21								

Comments____________________

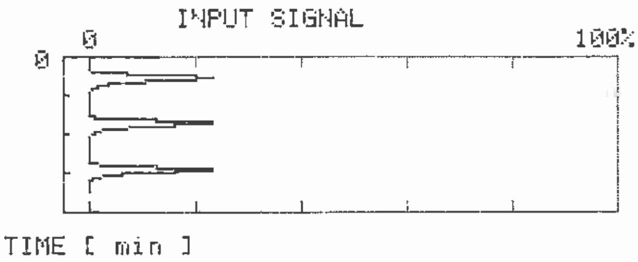
Checked by:__________



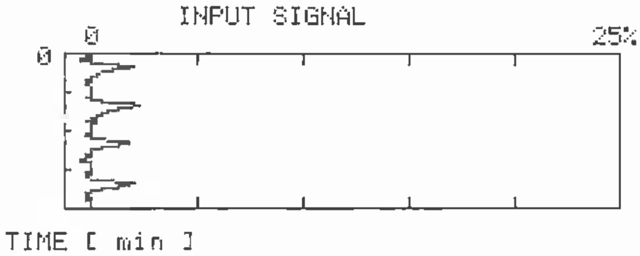
```
SAMPLE#    1    TC
 [x 1,    27μl, C# 14, #WASH 2, SP  0min]
     #  AREA ppm        C#   μl RG
     1   330  -0.06
     2   382  -0.03
     3   334  -0.06
   - - - - - - - - - - - - - -
   MN    348  -0.05
   SD     28  0.014
   CV  8.29 %
   COR CONC DIL   -0.05 [x 1.0]
   COR CONC INJ   -0.05 [x 1.0]

       DATE  02(FEB)-10-2016  09:13
```



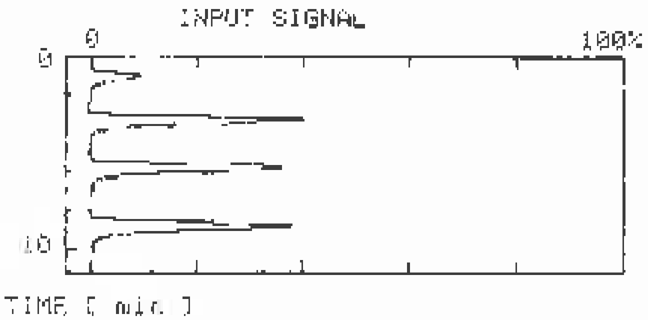
```
SAMPLE#    1    IC
 [x 1,    33μl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#   μl RG
     1   410  0.033
     2   386  0.024
     3   422  0.037
   - - - - - - - - - - - - - -
   MN    406  0.031
   SD     18  0.007
   CV  4.51 %
   COR CONC DIL   0.031 [x 1.0]
   COR CONC INJ   0.031 [x 1.0]

SAMPLE#    1   TOC(TC-IC)    -0.08 ppm

       DATE  02(FEB)-10-2016  09:21
```



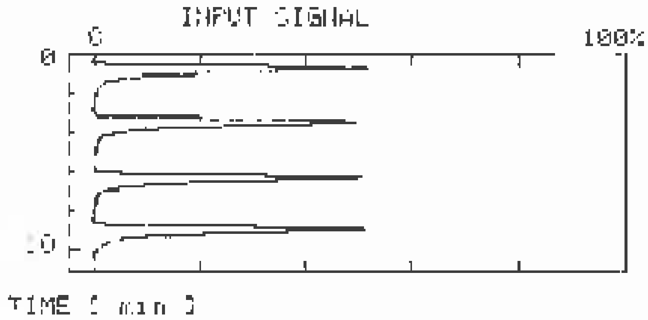
```
SAMPLE#    2    TC
 [x 5,    30μl, C# 16, #WASH 2, SP  0min]
     #  AREA ppm        C#   μl RG
     1  9261   21.29
     2  9285   21.34
     3  9193   21.13
   - - - - - - - - - - - - - -
   MN   9246   21.25
   SD     47   0.111
   CV   0.51 %
   COR CONC DIL   21.25 [x 1.0]
   COR CONC INJ   21.25 [x 1.0]

       DATE  02(FEB)-10-2016  10:06
```



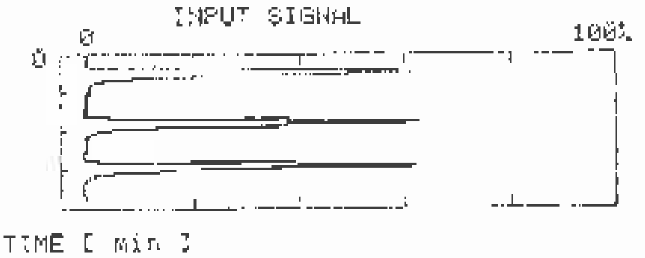
```
SAMPLE#    2    IC
 [x 1,    33μl, C# 13, #WASH 2, SP  0min]
     #  AREA ppm        C#   μl RG
     1   887   0.215
     2-  1075  0.286
     3   762   0.167
   + 4   840   0.197
   - - - - - - - - - - - - - -
   MN    829   0.193
   SD     63   0.024
   CV    7.6 %
   COR CONC DIL   0.193 [x 1.0]
   COR CONC INJ   0.193 [x 1.0]

SAMPLE#    2   TOC(TC-IC)    21.05 ppm

       DATE  02(FEB)-10-2016  10:16
```



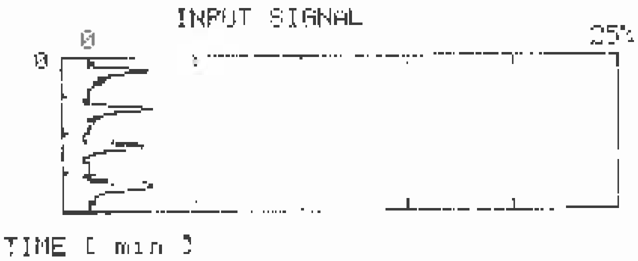
```
SAMPLE#   3   TC
 [x 5,   33µl, C# 16, #WASH 2, SP  0min]
   #  AREA ppm        C#  µl RG
   1- 4319  9.763
   2 18296  9.121    14
   3 18040  8.990
   4 18337  9.142
  - - - - - - - - - - - - - -
  MN 18224  9.085
  SD   160  0.082
  CV  0.88 %
  COR CONC DIL  9.085 [x 1.0]
  COR CONC INJ  9.085 [x 1.0]

       DATE  02(FEB)-10-2016  10:28
```



```
SAMPLE#   3   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
   #  AREA ppm        C#  µl RG
   1 23202  9.064
   2 23033  8.995
   3 22690  8.857
 + 4-23319  9.111
  - - - - - - - - - - - - - -
  MN 22975  8.972
  SD   260  0.105
  CV  1.13 %
  COR CONC DIL  8.972 [x 1.0]
  COR CONC INJ  8.972 [x 1.0]

SAMPLE#   3   TOC(TC-IC)     0.113 ppm

       DATE  02(FEB)-10-2016  10:41
```

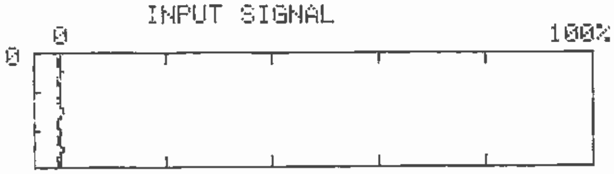


```
SAMPLE#   4   TC
 [x 1,   27µl, C# 14, #WASH 2, SP  0min]
   #  AREA ppm        C#  µl RG
   1 23020  11.54
   2 23351  11.71
   3 23162  11.61
  - - - - - - - - - - - - - -
  MN 23177  11.62
  SD   166  0.085
  CV  0.71 %
  COR CONC DIL  11.62 [x 1.0]
  COR CONC INJ  11.62 [x 1.0]

       DATE  02(FEB)-10-2016  10:51
```



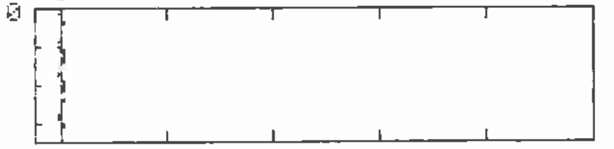
```
SAMPLE#   4   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
   #  AREA ppm        C#  µl RG
   1-  915  0.225
   2  1109  0.299
   3  1091  0.292
 + 4  1179  0.326
  - - - - - - - - - - - - - -
  MN  1126  0.306
  SD    46  0.017
  CV  4.12 %
  COR CONC DIL  0.306 [x 1.0]
  COR CONC INJ  0.306 [x 1.0]

SAMPLE#   4   TOC(TC-IC)     11.31 ppm

       DATE  02(FEB)-10-2016  11:01
```

INPUT SIGNAL

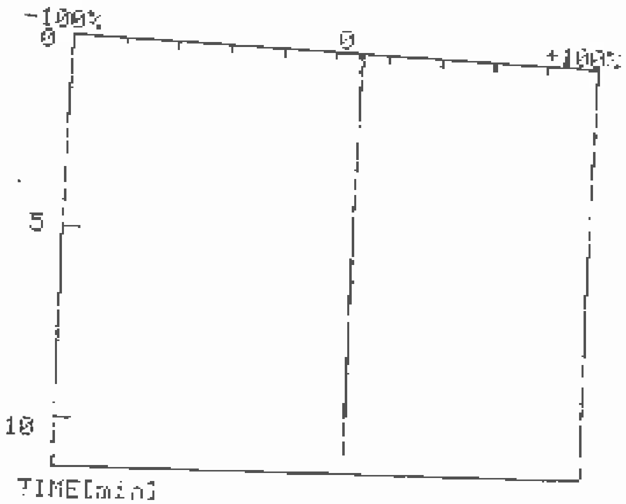


```
SAMPLE#    5    TC
 [x 1,    27µl, C# 14, #WASH 2, SP   0min]
     #  AREA ppm        C#   µl RG
     1   206   -0.12
     2   250   -0.10
     3   255   -0.10
 - - - - - - - - - - - - - - -
    MN   237   -0.11
    SD    26   0.013
    CV  11.3 %
    COR CONC DIL   -0.11 [x 1.0]
    COR CONC INJ   -0.11 [x 1.0]

        DATE  02(FEB)-10-2016   11:17
```

INPUT SIGNAL

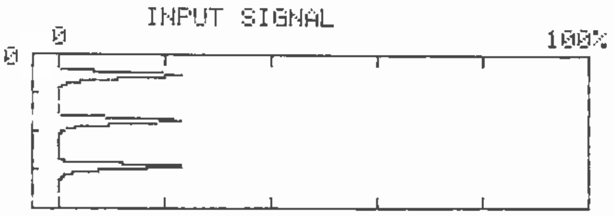


```
SAMPLE#    5    IC
 [x 1,    33µl, C# 13, #WASH 2, SP   0min]
     #  AREA ppm        C#   µl RG
     1   122   -0.07
     2   136   -0.07
     3-  200   -0.04
   + 4   128   -0.07
 - - - - - - - - - - - - - - -
    MN   128   -0.07
    SD     7   0.002
    CV   5.45 %
    COR CONC DIL   -0.07 [x 1.0]
    COR CONC INJ   -0.07 [x 1.0]

SAMPLE#    5   TOC(TC-IC)     -0.04 ppm

        DATE  02(FEB)-10-2016   11:25
```

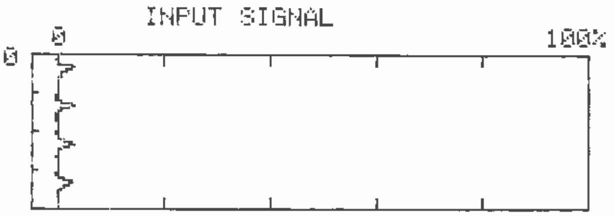


```
 RANGE                   : x1
[READY]
 TC FURNACE TEMP         :  OK      680°C
 DEHUMIDIFIER TEMP       :  OK      1.0°C
 BASELINE POSITION       :  OK
 BASELINE FLUCTUATION:      OK
 BASELINE NOISE          :  OK

        DATE  02(FEB)-10-2016   08:58
```

```
TOC-5000 DATA REPORT
         DATE  02(FEB)-10-2016 16:10

SPL# TC,ppm   RMK    IC,ppm   RMK    TOC,ppm
  1   -0.05 14****  0.031 13****   -0.08
  2   21.25 16****  0.193 13****   21.05
  3   7.085 14****  6.972 13****   0.117
  4   11.12 14****  0.306 13****   11.7
  5   -0.11 14**** -0.07  13****   -0.04
  6   2.053 14****  1.367 13****   0.686
  7   2.493 14****  1.517 13****   0.976
  8   3.879 14****  1.743 13****   2.136
  9   3.455 14****  1.994 13****   1.461
 10   4.055 14****  2.001 13****   2.054
 11   4.432 14****  2.648 13****   1.784
 12   15.75 14****  6.844 13****   8.906
 13   6.538 14****  4.141 13****   2.397
 14   10.36 14****  3.352 13****   7.008
 15   0.489 14****  0.466 13****   0.023
 16   21.54 16****  0.325 13****   21.21

ANALYST :
SAMPLE  :
```



```
SAMPLE#  16   TC
 [x 5,   30µl, C# 16, #WASH 2, SP  0min]
    #  AREA ppm       C#  µl RG
    1  9398  21.61
    2  9329  21.45
    3  9383  21.57
   - - - - - - - - - - - - - -
   MN  9370  21.54
   SD    36  0.084
   CV  0.38 %
   COR CONC DIL  21.54 [x 1.0]
   COR CONC INJ  21.54 [x 1.0]

        DATE  02(FEB)-10-2016  15:58
```



```
SAMPLE#  16   IC
 [x 1,   33µl, C# 13, #WASH 2, SP  0min]
    #  AREA ppm       C#  µl RG
    1  1253  0.354
    2  1123  0.305
    3- 1000  0.258
  + 4  1154  0.316
   - - - - - - - - - - - - - -
   MN  1176  0.325
   SD    67  0.025
   CV  5.77 %
   COR CONC DIL  0.325 [x 1.0]
   COR CONC INJ  0.325 [x 1.0]

SAMPLE#  16   TOC(TC-IC)    21.21 ppm

        DATE  02(FEB)-10-2016  16:07
```

TANK PREPARATION

TANK PREPARATIONS

Client: CES
Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date pressurized: 8-Feb-16

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg		Final Pressure	Comments
		1	2				
298	201	-758	-758	-156	*	168	Run # 1
A116	202	-758	-758	-158	*	162	Run # 2
91180	203	-758	-758	-166	*	166	Run # 3
S017	204	-758	-758	-202		164	Run # 4
S37	205	-758	-758	-146	*	166	Run # 5
91187	206	-758	-758	-204		164	Run # 6

* - Post -test Pressure is less then 200 mm Hg.

TANK PREPARATIONS

Client: CES
Lab No.: A 018
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date pressurized: 8-Feb-16

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg	Final Pressure	Comments
		1	2			
A124	207	-758	-758	-190 *	162	Run # 7
E0021	208	-758	-758	-182 *	166	Run # 8
A126	209	-758	-758	-304	170	Run # 9
A107	210	-758	-758	-158 *	162	Run # 10
E0002	211	-758	-758	-82 *	170	Run # 11
91185	212	-758	-758	-154 *	160	Run # 12

* - Post -test Pressure is less then 200 mm Hg.

TANK PREPARATIONS

Client: CES
Project No.: c9922
Unit Tested: Burrtec / Gore
Sampling Date: 5-Feb-16
Date pressurized: 8-Feb-16

Lab No.: A 018

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg	Final Pressure	Comments
		1	2			
A124	207	-758	-758	-190 *	162	Run # 7
E0021	208	-758	-758	-182 *	166	Run # 8
A126	209	-758	-758	-304	170	Run # 9
A107	210	-758	-758	-158 *	162	Run # 10
E0002	211	-758	-758	-82 *	170	Run # 11
91185	212	-758	-758	-154 *	160	Run # 12

* - Post -test Pressure is less then 200 mm Hg.

TANK PREPARATIONS

Client:	CES	Lab No.:	A 018
Project No.:	c9922		
Unit Tested:	Burrtec / Gore		
Sampling Date:	5-Feb-16		
Date pressurized:	8-Feb-16		

Tank ID	Sample ID	Pre-test pressure mm Hg		Post-test pressure mm Hg	Final Pressure	Comments
		1	2			
S036	213	-758	-758	-160 *	168	Run # 13
22083	214	-758	-758	-148 *	174	Run # 14
S011	215	-758	-758	260 *	260	Run # 15

* - Post -test Pressure is less then 200 mm Hg.

CALIBRATIONS

17-Feb-16
Current

	100 ppm mix					1000 ppm mix					2000 ppm mix						
	conc	area 1	area 2	RF 1	RF 2	conc	area 1	area 2	RF 1	RF 2	conc	area 1	area 2	RF 1	RF 2	Ave	RSD
Carbon Monoxide	101.08	174659	173097	5.79E-04	5.84E-04	1000.4	1715054	1721231	5.83E-04	5.81E-04	2006.8	3649011	3643625	5.50E-04	5.51E-04	5.71E-04	1.9
Methane	101.92	186705	187767	5.46E-04	5.43E-04	1001.8	1834200	1840846	5.46E-04	5.44E-04	2010	3593083	3587084	5.59E-04	5.60E-04	5.50E-04	-1.9
Carbon Dioxide	104.3	184321	184699	5.66E-04	5.65E-04	1002	1810513	1819945	5.53E-04	5.51E-04	1999	3549147	3550089	5.63E-04	5.63E-04	5.60E-04	0.1
Ethane	97.06	185227	183571	5.24E-04	5.29E-04	1004	1789843	1797879	5.61E-04	5.58E-04	2015	3584223	3579270	5.62E-04	5.63E-04	5.50E-04	2.0
TGNMO	101.9	176590	176723	5.77E-04	5.77E-04	1002	1741911	1749412	5.75E-04	5.73E-04	2002	3444635	3436779	5.81E-04	5.83E-04	5.78E-04	3.0
	Average	183211	183190	5.53E-04	5.53E-04	Average	1778304	1785862.6	5.64E-04	5.61E-04	Average	3564020	3559369	5.63E-04	5.64E-04		
			Average	5.53E-04				Average	5.63E-04				Average	5.64E-04			
	RSD%			1.3					-0.4					0.5			

Average **5.61E-04**

RSD, %

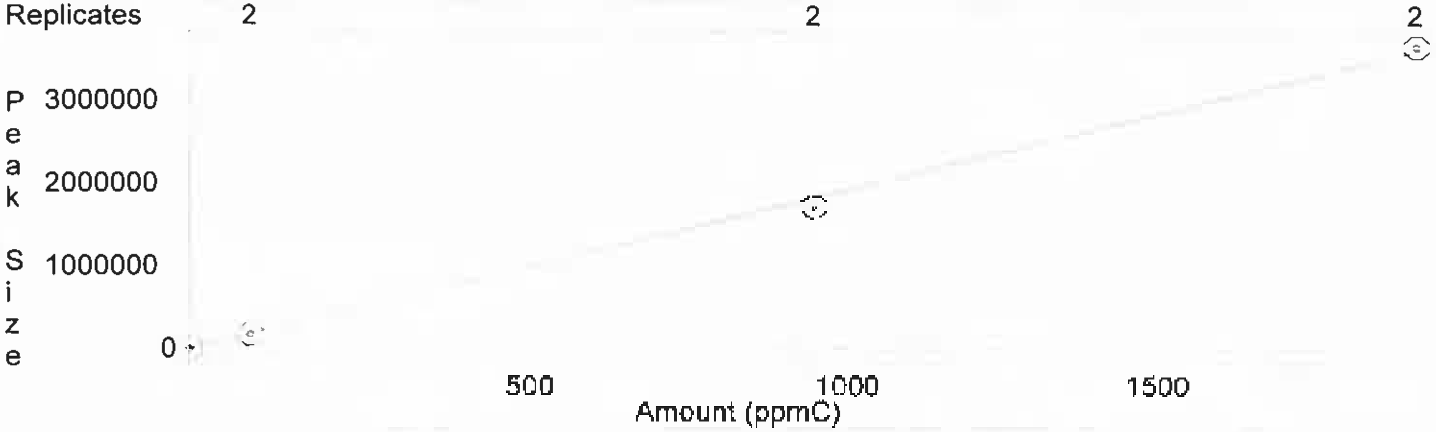
RSD_{CO} =	3.894	r_{CO} =	0.99921
RSD_{CH4} =	1.220	r_{CH4} =	0.99995
RSD_{CO2} =	2.091	r_{CO2} =	0.99993
RSD_{C2H6} =	1.570	r_{C2H6} =	1.00000
RSD_{NMOC} =	1.609	r_{NMOC} =	0.99999

Print Date: 18 Feb 2016 14:50:25
Calibration Curves Report - Page 1
File: g:\2016\jan_16\nmoc_120815.mth
Detector: 800 Interface Box, Address: 88, Channel ID: 2

Carbon Monoxide

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.810746e+003x

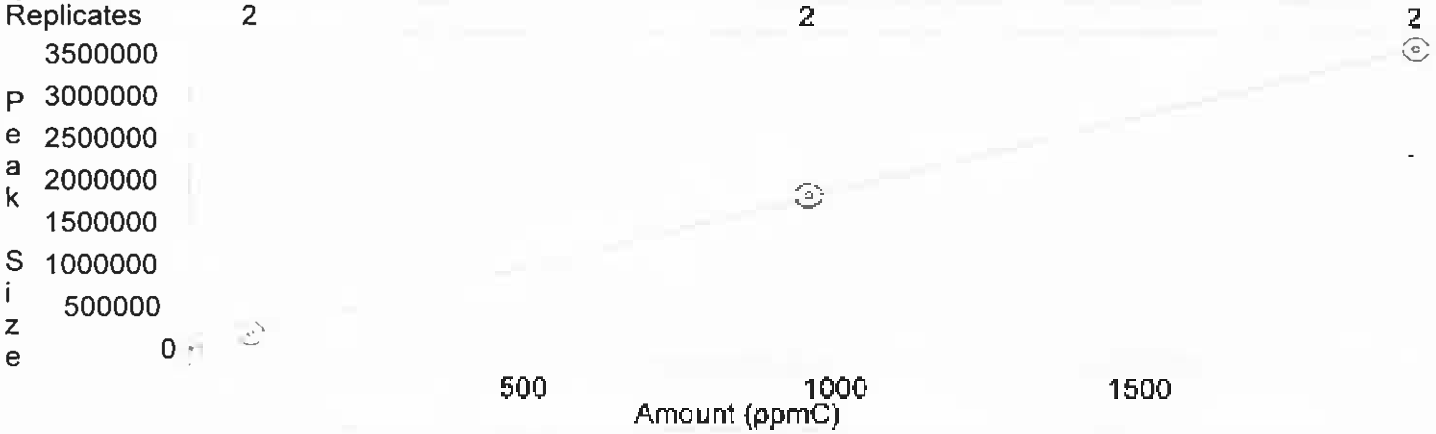
Resp. Fact. RSD: 3.894%
Coeff. Det.(r²): 0.998422



Methane

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.781904e+003x

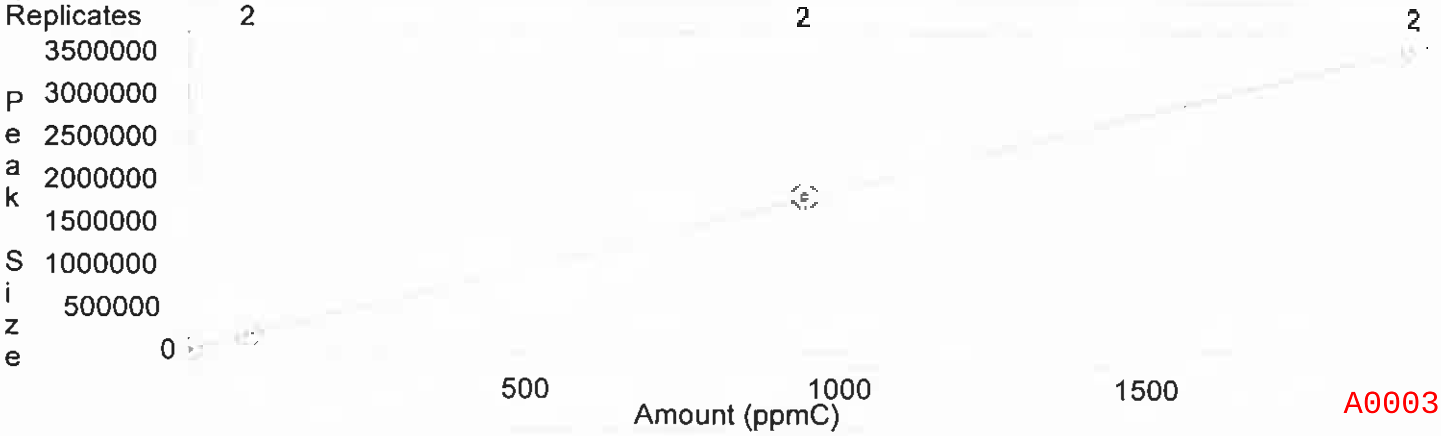
Resp. Fact. RSD: 1.220%
Coeff. Det.(r²): 0.999907



Carbon Dioxide

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.777347e+003x

Resp. Fact. RSD: 2.091%
Coeff. Det.(r²): 0.999865

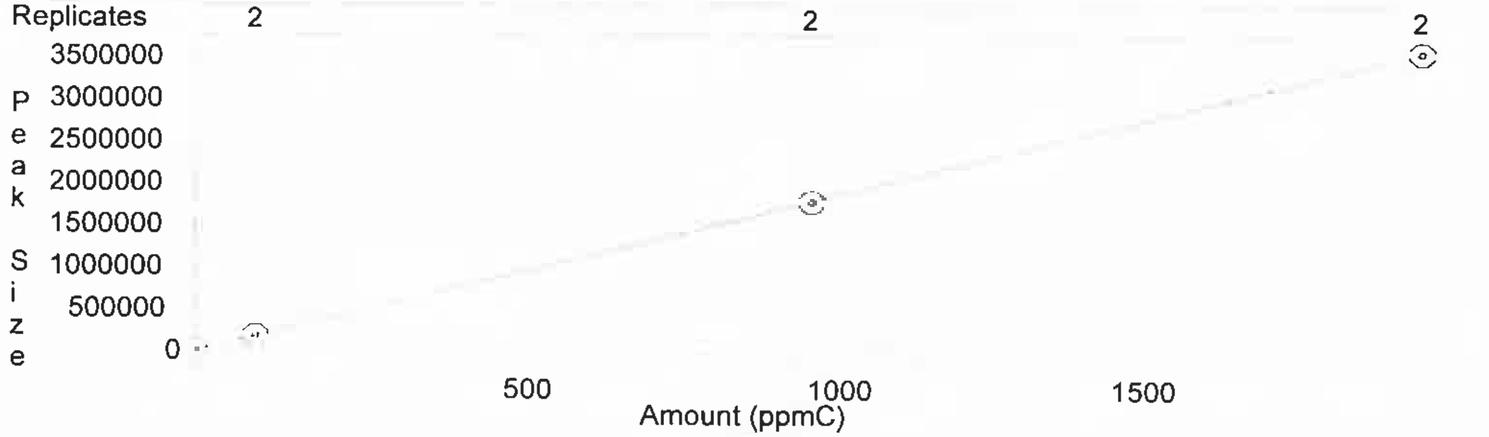


Print Date: 18 Feb 2016 14:50:26
Calibration Curves Report - Page 2
File: g:\2016\jan_16\nmoc_120815.mth
Detector: 800 Interface Box, Address: 88, Channel ID: 2

Ethane

External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.770637e+003x

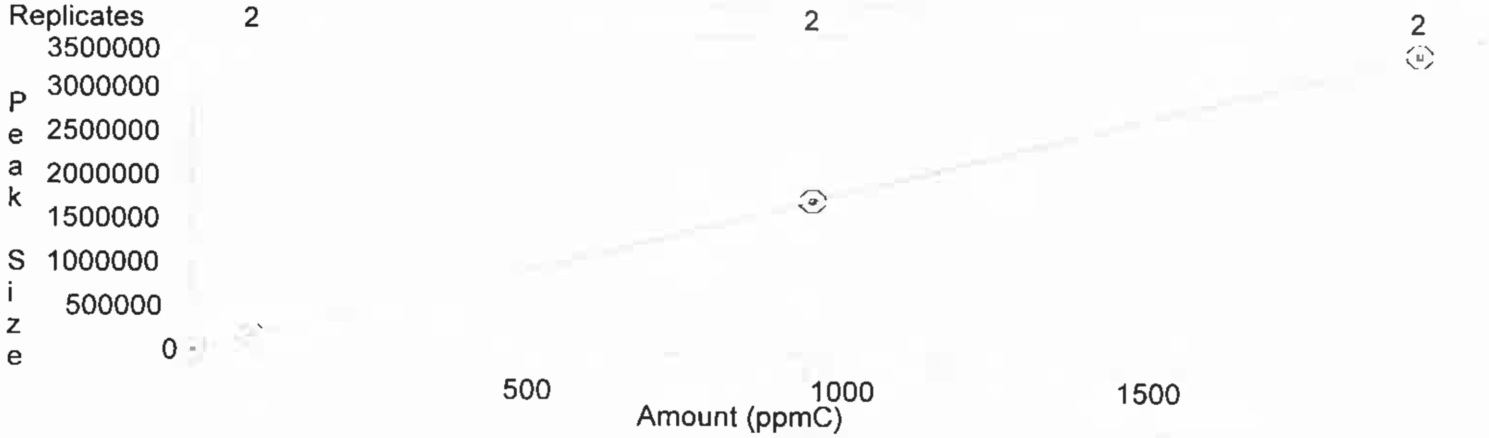
Resp. Fact. RSD: 1.570%
Coeff. Det.(r^2): 0.999994



NMOC

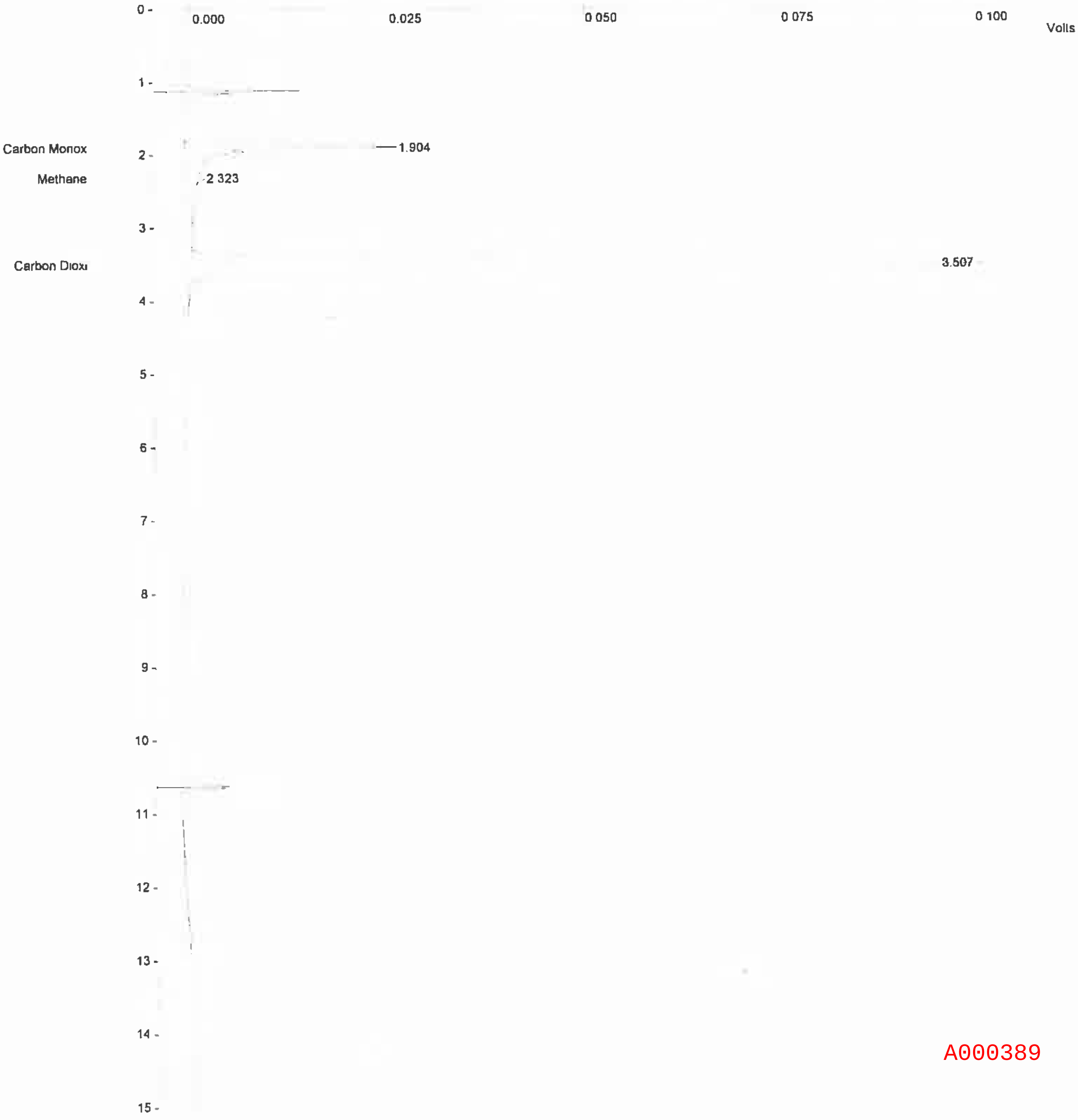
External Standard Analysis
Curve Type: Linear
Origin: Force
y = +1.715921e+003x

Resp. Fact. RSD: 1.609%
Coeff. Det.(r^2): 0.999984



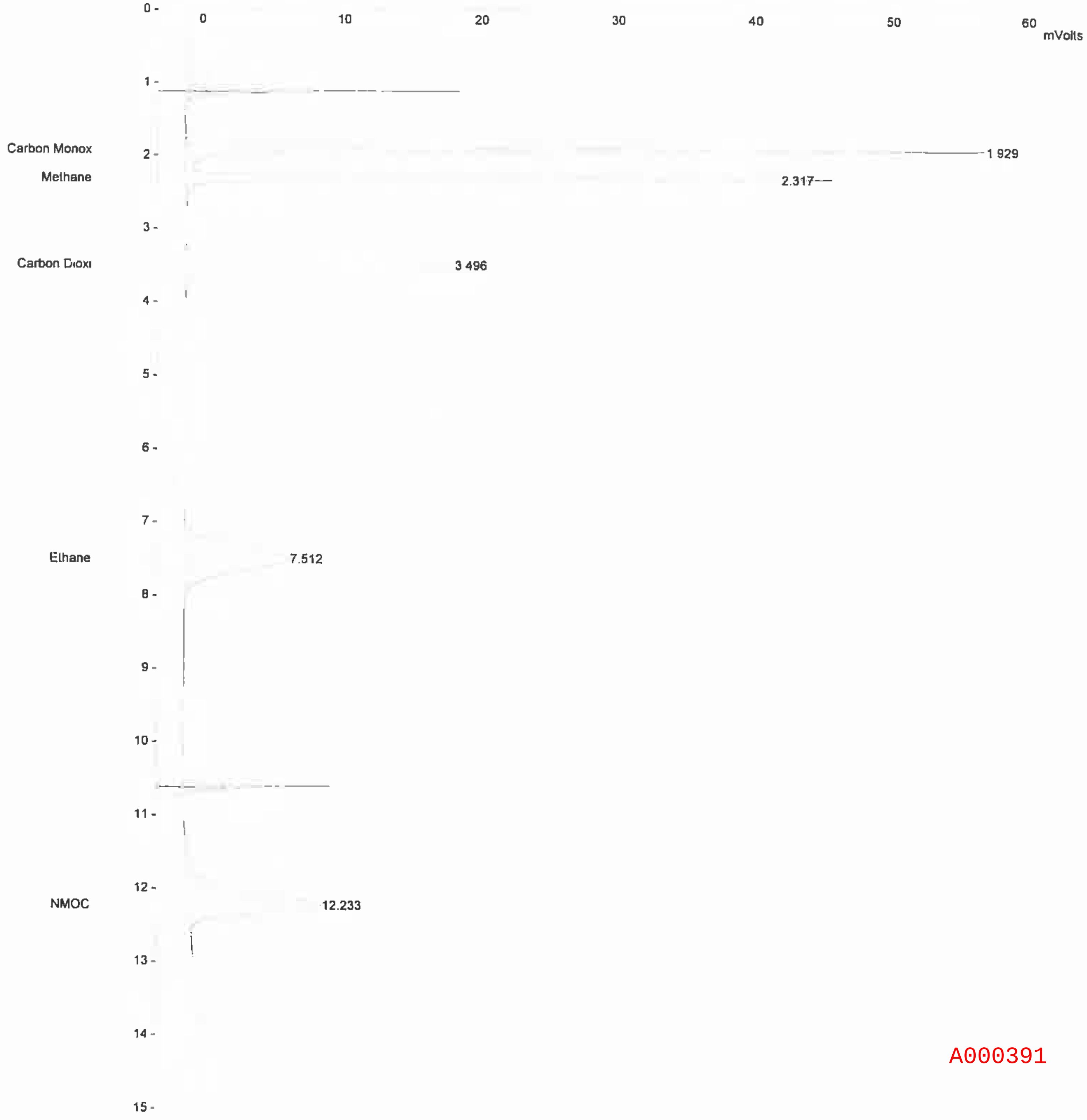
```
Print Date: Thu Feb 18 14:57:37 2016            Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-17-2016, 14;34;08, lab air.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/17/2016 14:34    Calculation Date: 2/18/2016 14:57

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                Ret.    Time                        Width
 Peak     Peak       Result     Time   Offset        Area     Sep.   1/2    Status
 No.      Name       (ppmC)     (min)   (min)      (counts)   Code  (sec)   Codes
 ---- ------------ ----------- ------- -------- ---------- ---- ------   ------
    1 Carbon Monox     83.3950   1.904  -0.026     151650   BB    2.5
    2 Methane           1.8956   2.323   0.005       3374   TS    0.0
    3 Carbon Dioxi    504.6068   3.507   0.005     895732   BB    8.2
    4 Ethane                     7.541                                    M
    5 NMOC                      12.233                                    M
 ---- ------------ ----------- ------- -------- ---------- ---- ------   ------
      Totals:     589.8974          -0.016    1050756

Status Codes:
M - Missing peak

Total Unidentified Counts :          0 counts

Detected Peaks: 4          Rejected Peaks: 1       Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -419 microVolts         LSB:      1 microVolts

Noise (used): 72 microVolts - monitored before this run

Stream: 1       Injection Number: 1     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*******************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 14;34;08, lab air.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : lab air

Injection Date: 2/17/2016 14:34    Calculation Date: 2/18/2016 14:57

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 48          Zero Offset = 4%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



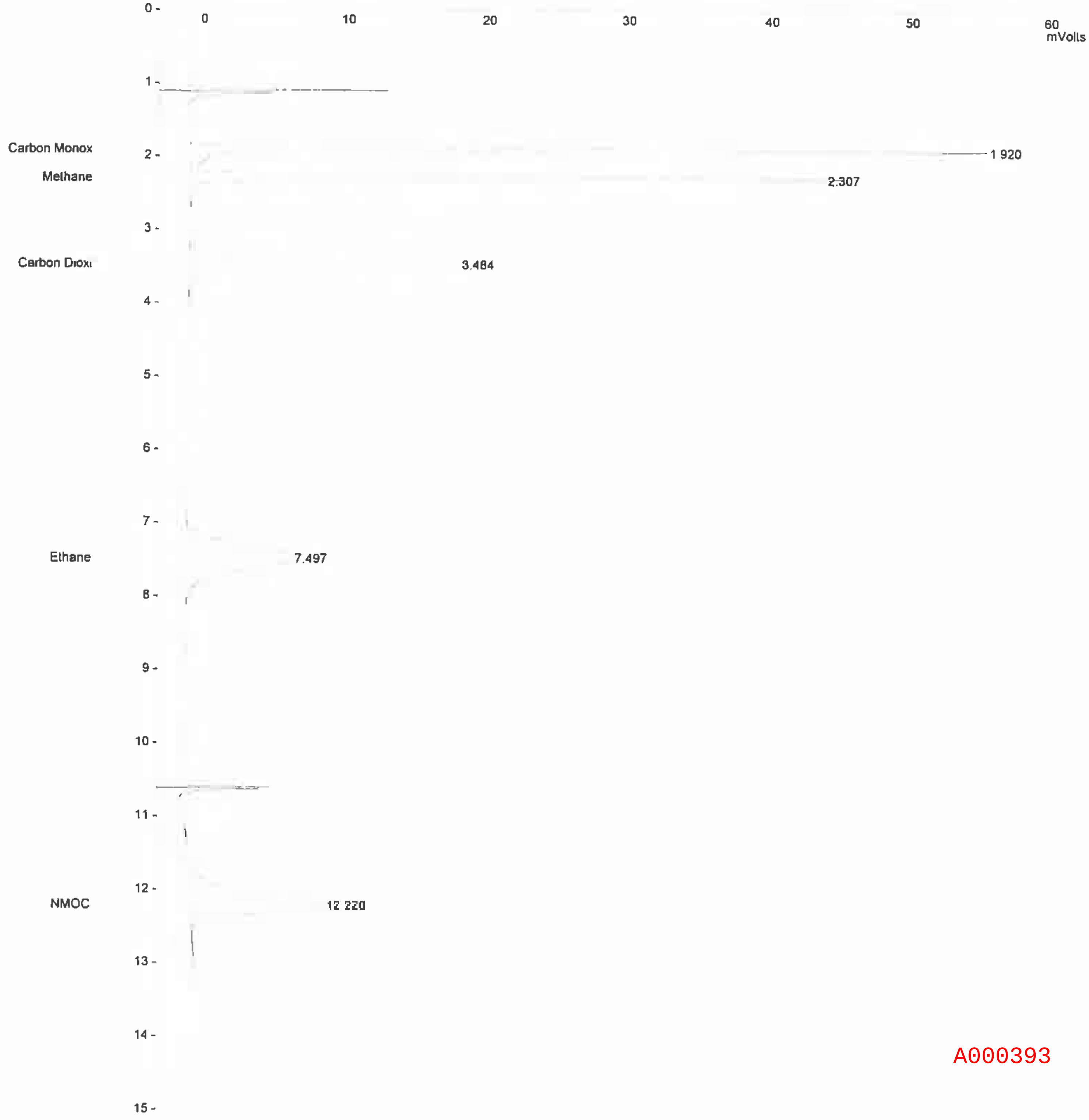
```
Print Date: Thu Feb 18 14:56:26 2016               Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 11;47;16, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/17/2016 11:47     Calculation Date: 2/18/2016 14:56

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 3

                        Ret.    Time                     Width
 Peak      Peak         Time   Offset      Area     Sep.  1/2    Status
  No.      Name         (min)   (min)    (counts)   Code (sec)   Codes
 ---- ------------    ------- ------- ----------   ---- -----   ------
    1 Carbon Monox     1.929  -0.001     174659     BV   2.6
    2 Methane          2.317  -0.001     186705     VB   3.6
    3 Carbon Dioxi     3.496  -0.006     184321     BB   8.2
    4 Ethane           7.512  -0.029     185227     BB  22.6
    5 NMOC            12.233   0.000     176590     BB  16.4
 ---- ------------    ------- ======= ==========   ---- -----   ------
      Totals:                 -0.037     907502

Total Unidentified Counts :            0 counts

Detected Peaks: 6           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -411 microVolts          LSB:     1 microVolts

Noise (used): 32 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 11;47;16, 100ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 100ppm mix

Injection Date: 2/17/2016 11:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27          Zero Offset = 4%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



```
Print Date: Thu Feb 18 14:56:34 2016            Page 1 of 1

Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb 16\2-17-2016, 12:10:50, 100ppm mix.run
Method File   : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : 100ppm mix

Injection Date: 2/17/2016 12:10    Calculation Date: 2/18/2016 14:56

Operator    : Douglass                Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10        Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 3

                       Ret.    Time                    Width
 Peak      Peak        Time   Offset      Area    Sep.  1/2    Status
  No.      Name        (min)   (min)    (counts)  Code (sec)   Codes
 ---- ------------  ------- ------- ----------- ---- -----   ------
    1 Carbon Monox    1.920  -0.009      173097   BV   2.6
    2 Methane         2.307  -0.010      187767   VB   3.6
    3 Carbon Dioxi    3.484  -0.012      184699   BB   8.2
    4 Ethane          7.497  -0.015      183571   BB  22.5
    5 NMOC           12.220  -0.013      176723   BB  16.4
 ---- ------------  ------- ------- =========== ---- -----   ------
      Totals:                -0.059      905857

Total Unidentified Counts :           0 counts

Detected Peaks: 5         Rejected Peaks: 0      Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -203 microVolts         LSB:     1 microVolts

Noise (used): 64 microVolts - monitored before this run

Stream: 1       Injection Number: 3     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title         : SCAQMD Methods 25.x
Run File      : g:\2016\feb_16\2-17-2016, 12;10;50, 100ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID     : 100ppm mix

Injection Date: 2/17/2016 12:10     Calculation Date: 2/18/2016 14:56

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address   : 88
Instrument : Varian Star #1          Sample Rate   : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time      : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 27          Zero Offset = 4%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



```
Print Date: Thu Feb 18 14:56:41 2016             Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 15;23;50, 1000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 1000ppm mix

Injection Date: 2/17/2016 15:23    Calculation Date: 2/18/2016 14:56

Operator     : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 88
Instrument : Varian Star #1           Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 2

                        Ret.    Time                      Width
 Peak       Peak        Time   Offset      Area      Sep.  1/2    Status
 No.        Name        (min)   (min)    (counts)    Code (sec)   Codes
 ---- ------------   -------- -------- -----------   ---- -----   ------
    1 Carbon Monox      1.943    0.023     1715054     BV   2.7
    2 Methane           2.332    0.026     1834200     VV   3.6
    3 Carbon Dioxi      3.519    0.035     1810513     VB   8.2
    4 Ethane            7.561    0.064     1789843     BB  22.6
    5 NMOC             12.247    0.027     1741911     BB  16.0
 ---- ------------   -------- ======== ===========   ---- -----   ------
      Totals:                    0.175     8891521

Total Unidentified Counts :           0 counts

Detected Peaks: 6           Rejected Peaks: 1       Identified Peaks: 5

Multiplier: N/A         Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -414 microVolts          LSB:      1 microVolts

Noise (used): 28 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

*********************************************************************************
```

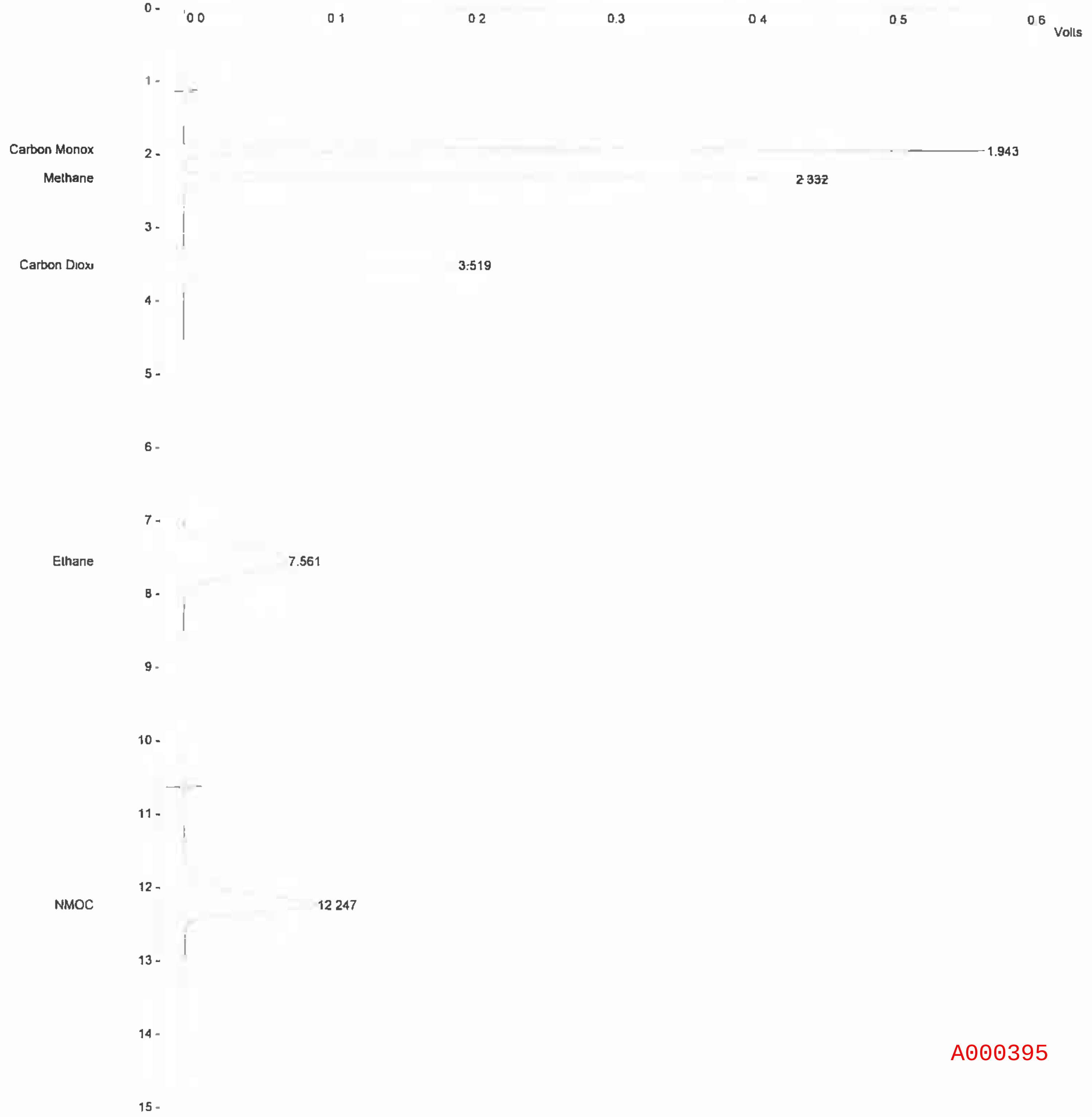
Title   : SCAQMD Methods 25.x
Run File   : g:\2016\feb_16\2-17-2016, 15;23;50, 1000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 1000ppm mix

Injection Date: 2/17/2016 15:23   Calculation Date: 2/18/2016 14:56

Operator   : Douglass   Detector Type: 0800 (10 Volts)
Workstation: Bus Address : 88
Instrument : Varian Star #1   Sample Rate : 1.25 Hz
Channel   : 2 = Foreflush 10   Run Time   : 15.013 min

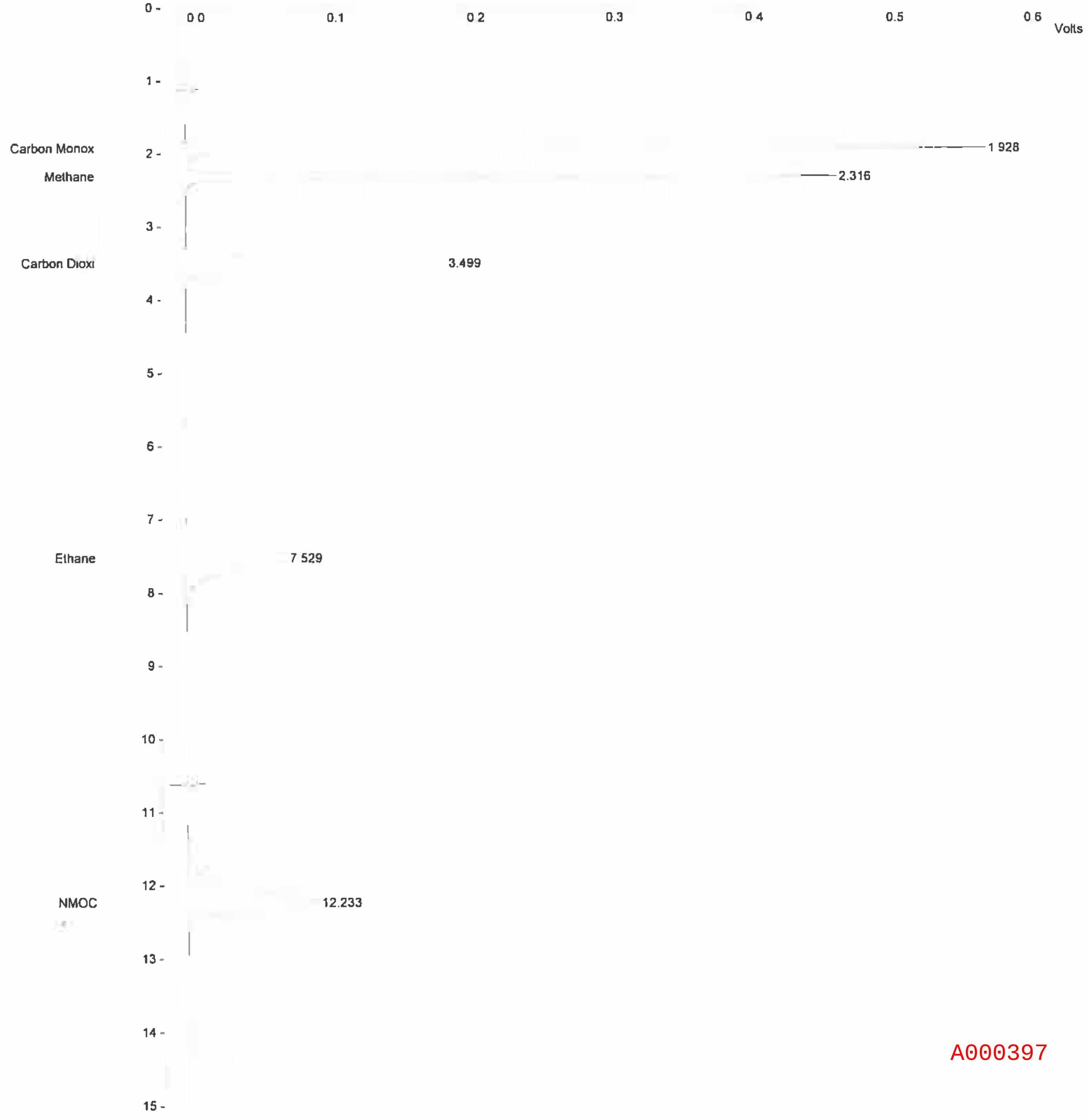
** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =   1.32 cm/min   Attenuation = 270   Zero Offset = 2%
Start Time =   0.000   min   End Time   = 15.013 min   Min / Tick = 1.00



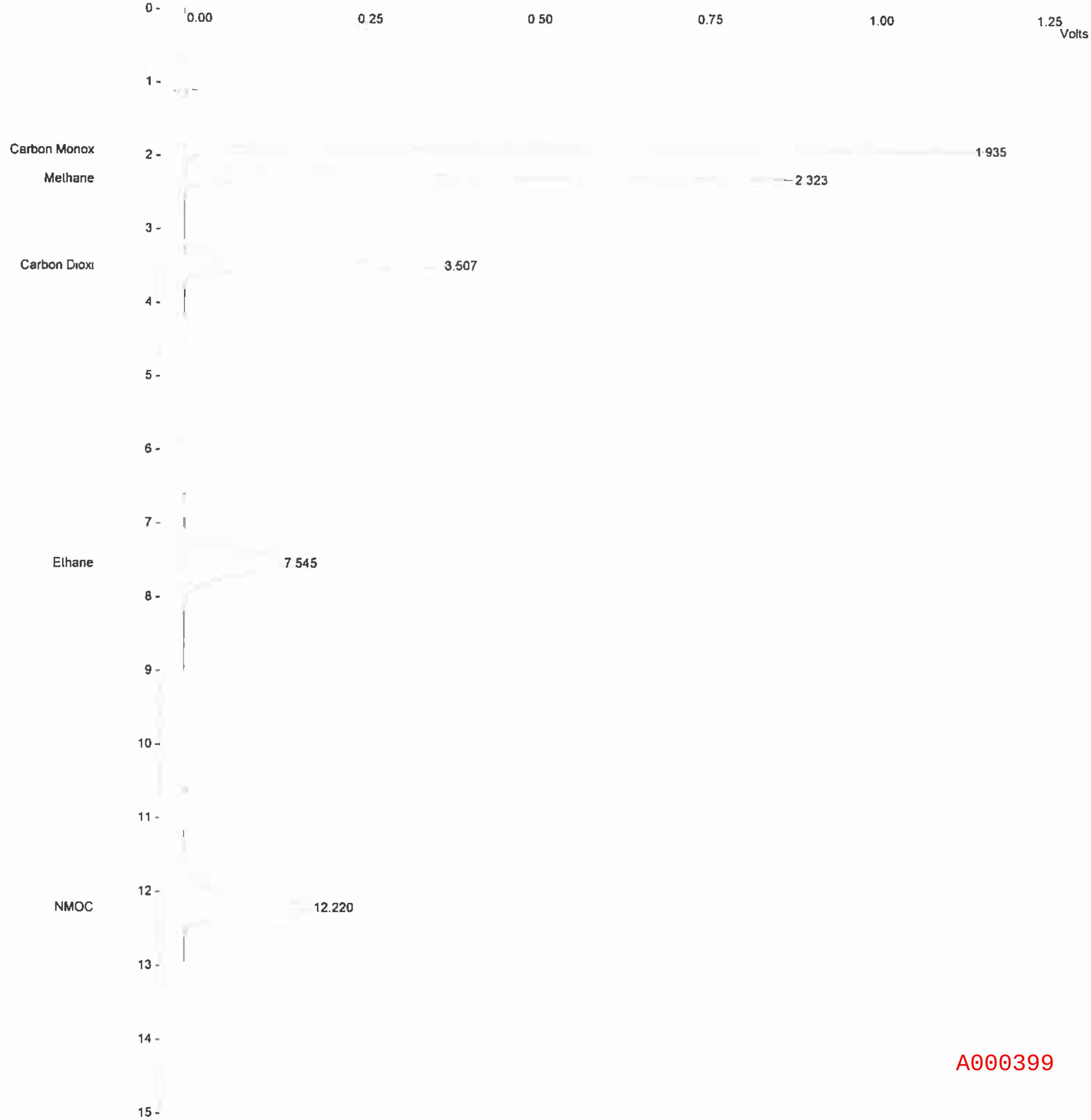
```
Print Date: Thu Feb 18 14:56:48 2016              Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-17-2016, 15;47;14, 1000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 1000ppm mix

Injection Date: 2/17/2016 15:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 08
Instrument  : Varian Star #1         Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3508-d6b-21ol **

Run Mode          : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level             : 2

                           Ret.     Time                      Width
 Peak       Peak           Time    Offset       Area     Sep.  1/2    Status
  No.       Name           (min)    (min)     (counts)   Code (sec)   Codes
 ---- ------------       ------- -------  ----------   ---- -----   ------
    1 Carbon Monox        1.928   -0.014     1721231     BV   2.7
    2 Methane             2.316   -0.016     1840846     VV   3.7
    3 Carbon Dioxi        3.499   -0.019     1819945     VB   8.7
    4 Ethane              7.529   -0.032     1797879     BB  22.6
    5 NMOC               12.233   -0.013     1749412     BB  15.8
 ---- ------------       ------- =======  ==========   ---- -----   ------
      Totals:                     -0.094     8929313

Total Unidentified Counts :              0 counts

Detected Peaks: 8          Rejected Peaks: 3      Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -102 microVolts          LSB:      1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1       Injection Number: 3     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

**********************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 15;47;14, 1000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 1000ppm mix

Injection Date: 2/17/2016 15:47    Calculation Date: 2/18/2016 14:56

Operator    : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument  : Varian Star #1        Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 271          Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



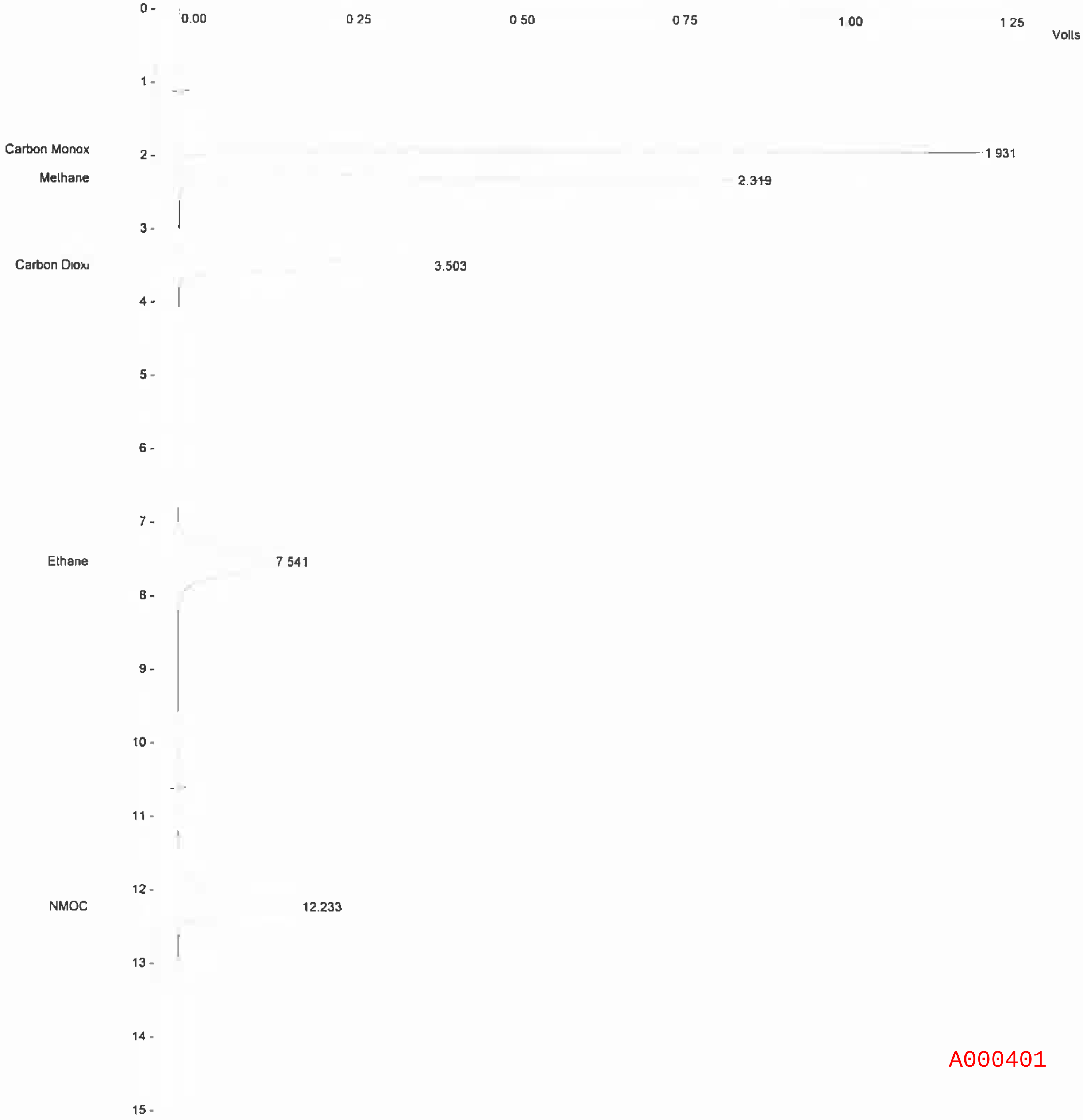
```
Print Date: Thu Feb 18 14:57:04 2016                Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 16;40;15, 2000ppm mix.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 2000ppm mix

Injection Date: 2/17/2016 16:40    Calculation Date: 2/18/2016 14:56

Operator    : Douglass                 Detector Type: 0800 (10 Volts)
Workstation:                           Bus Address  : 88
Instrument  : Varian Star #1           Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10         Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode           : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level              : 1

                         Ret.     Time                              Width
 Peak       Peak         Time    Offset        Area       Sep.  1/2      Status
  No.       Name         (min)    (min)      (counts)     Code  (sec)    Codes
 ---- ------------     -------- ------- ----------     ---- -----    ------
    1 Carbon Monox       1.935    0.005    3649011       BV    2.8
    2 Methane            2.323    0.005    3593083       VV    3.6
    3 Carbon Dioxi       3.507    0.005    3549147       VB    8.2
    4 Ethane             7.545    0.004    3584223       VB   22.7
    5 NMOC              12.220   -0.013    3444635       BB   15.7
 ---- ------------     -------- ======= ==========     ---- -----    ------
      Totals:                     0.006   17820099

Total Unidentified Counts :            0 counts

Detected Peaks: 7           Rejected Peaks: 2       Identified Peaks: 5

Multiplier: N/A         Divisor: N/A         Unidentified Peak Factor: 0

Baseline Offset: -347 microVolts          LSB:      1 microVolts

Noise (used): 30 microVolts - monitored before this run

Stream: 1       Injection Number: 2     Sampling Time:   0.00 min

Original Notes:


Appended Notes:

*****************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-17-2016, 16;40;15, 2000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 2000ppm mix

Injection Date: 2/17/2016 16:40    Calculation Date: 2/18/2016 14:56

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 561         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



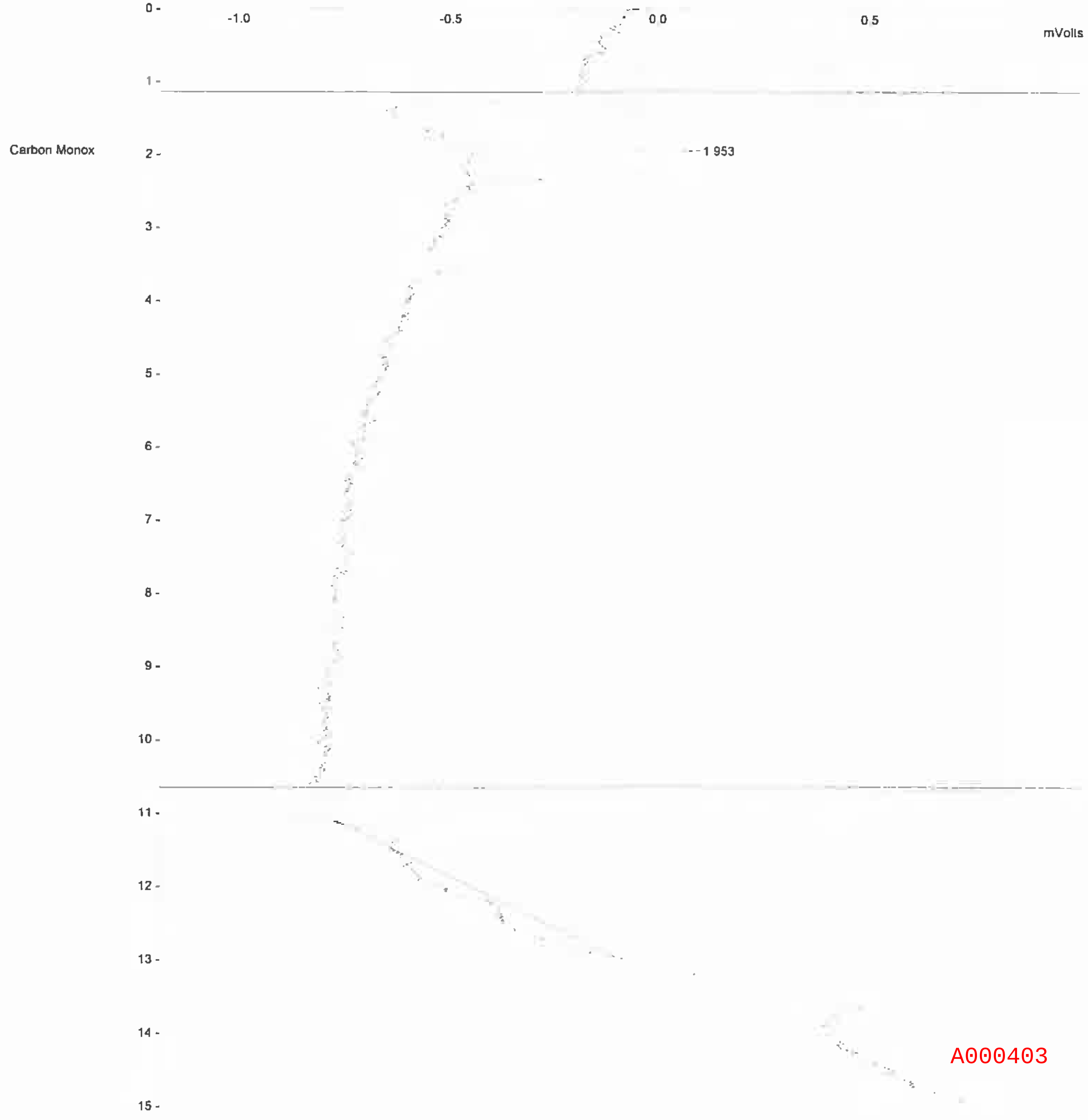
```
Print Date: Thu Feb 18 14:57:11 2016            Page 1 of 1

Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-17-2016, 17:07:56, 2000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : 2000ppm mix

Injection Date: 2/17/2016 17:07    Calculation Date: 2/18/2016 14:56

Operator   : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                        Bus Address  : 88
Instrument : Varian Star #1         Sample Rate  : 1.25 Hz
Channel    : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode        : Calibration
Peak Measurement: Peak Area
Calculation Type: External Standard
Level           : 1

                      Ret.    Time                    Width
 Peak     Peak        Time   Offset       Area    Sep.  1/2    Status
  No.     Name        (min)   (min)    (counts)  Code (sec)   Codes
 ---- ------------   ------- -------  ----------  ---- -----  ------
    1 Carbon Monox     1.931  -0.003    3643625    BV    2.7
    2 Methane          2.319  -0.003    3587084    VV    3.6
    3 Carbon Dioxi     3.503  -0.003    3550089    VB    8.2
    4 Ethane           7.541  -0.004    3579270    BB   22.7
    5 NMOC            12.233   0.013    3436779    BB   15.9
 ---- ------------   ------- =======  ----------  ---- -----  ------
      Totals:                 -0.000   17796847

Total Unidentified Counts :          0 counts

Detected Peaks: 6           Rejected Peaks: 1      Identified Peaks: 5

Multiplier: N/A        Divisor: N/A        Unidentified Peak Factor: 0

Baseline Offset: -276 microVolts          LSB:      1 microVolts

Noise (used): 21 microVolts - monitored before this run

Stream: 1      Injection Number: 3    Sampling Time:   0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb_16\2-17-2016, 17;07;56, 2000ppm mix.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : 2000ppm mix

Injection Date: 2/17/2016 17:07    Calculation Date: 2/18/2016 14:56

Operator     : Douglass              Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10      Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 581         Zero Offset = 2%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



```
Print Date: Thu Feb 18 14:58:15 2016               Page 1 of 1

Title        : SCAQMD Methods 25.x
Run File     : g:\2016\feb 16\2-17-2016, 17:35:35, n2 blank s077.run
Method File  : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID    : n2 blank s077

Injection Date: 2/17/2016 17:35     Calculation Date: 2/18/2016 14:58

Operator     : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                          Bus Address  : 08
Instrument  : Varian Star #1          Sample Rate  : 1.25 Hz
Channel      : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Run Mode          : Analysis
Peak Measurement: Peak Area
Calculation Type: External Standard

                                      Ret.    Time                      Width
 Peak      Peak          Result       Time   Offset      Area     Sep.   1/2    Status
 No.       Name          (ppmC)       (min)   (min)    (counts)   Code  (sec)   Codes
 ----  ------------  ----------    -------  -------  ----------   ----  -----   ------
    1  Carbon Monox      0.8770      1.953    0.023        1595     BB    2.7
    2  Methane                       2.318                                      M
    3  Carbon Dioxi                  3.502                                      M
    4  Ethane                        7.541                                      M
    5  NMOC                         12.233                                      M
 ----  ------------  ----------    -------  -------  ----------   ----  -----   ------
       Totals:           0.8770               0.023        1595

Status Codes:
M - Missing peak

Total Unidentified Counts :           0 counts

Detected Peaks: 3           Rejected Peaks: 2        Identified Peaks: 5

Multiplier: 1          Divisor: 1          Unidentified Peak Factor: 0

Baseline Offset: -17 microVolts          LSB:     1 microVolts

Noise (used): 109 microVolts - monitored before this run

Stream: 2      Injection Number: 1     Sampling Time:    0.00 min

Original Notes:


Appended Notes:

********************************************************************************
```

```
Title       : SCAQMD Methods 25.x
Run File    : g:\2016\feb_16\2-17-2016, 17;35;35, n2 blank s077.run
Method File : c:\docume~1\user\locals~1\temp\~nmoc_021716.tmp
Sample ID   : n2 blank s077

Injection Date: 2/17/2016 17:35    Calculation Date: 2/18/2016 14:58

Operator    : Douglass               Detector Type: 0800 (10 Volts)
Workstation:                         Bus Address  : 88
Instrument : Varian Star #1          Sample Rate  : 1.25 Hz
Channel     : 2 = Foreflush 10       Run Time     : 15.013 min

** Star Chromatography Workstation Version 6.00 ** 00299-3588-d6b-21e1 **

Chart Speed =    1.32 cm/min   Attenuation = 1           Zero Offset = 47%
Start Time  =   0.000   min     End Time    = 15.013  min   Min / Tick  = 1.00
```



AIR ANALYSIS REPORT

DETERMINATION OF AMMONIA EMISSIONS FROM STATIONARY SOURCES BY SCAQMD METHOD 207.1

Prepared for:

Mr. C.E. Schmidt
C. E. Schmidt
19200 Live Oak Road
Red Bluff, CA 96080

Sampling Date: 02/04/16
Report Date: 02/12/16

Prepared by:

Almega Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630

Report Number: c9922
100 Series

Prepared by: ______________________
Douglass Williams, Laboratory Manager

Reviewed by: ______________________
John Phillips, President

Almega
ENVIRONMENTAL

LABORATORY REPORT

Determinaton of Ammonia emissions by SCAQMD Method 207.1

Date Analyzed:	12-Feb-16	Client:	CES
Sampling Date:	4-Feb-16	Unit:	n/a
Project No.:	c9922	Lab No.:	A 018

Sample ID	Lab ID	Sample (V) volume, ml	mV (P)	mg of NH_3-N/L (C)	**mg NH_3 (N) per sample**	Detection limit, mg
A - 114	A 018 - A 114	41	160.3	0.100	**0.005**	0.004
A - 101	A 018 - A 101	41	153.7	0.132	**0.007**	0.004
A - 102	A 018 - A 102	41	153.5	0.133	**0.007**	0.004
A - 103	A 018 - A 103	41	152.1	0.142	**0.007**	0.004
A - 104	A 018 - A 104	41	153.7	0.132	**0.007**	0.004
A - 104 spike*	A 018 - A 104	41	12.3	49.516		0.004
A - 105	A 018 - A 105	41	152.5	0.139	**0.007**	0.004
A - 106	A 018 - A 106	41	159.6	0.103	**0.005**	0.004
A - 107	A 018 - A 107	41	159.1	0.106	**0.005**	0.004
A - 108	A 018 - A 108	41	156.7	0.117	**0.006**	0.004

Lab ID	C1	C2	Cavg	RPD (< 5%) %	Cspike1	Cspike2	% R average
A - 104	0.13	0.13	0.13	0.00	49.52	49.52	109

N = C * 17.03/14.01 * V/1000

Where:

N - Net sample collection (mg)

Cavg - concentrtion of NH3-N/L from analysis

17.03 - MW of Ammonia

14.01 - MW of Nitrogen

V - Sample volume, ml

$C = 10^{(P-B)/M}$

Where:

C - Measured concentrtion of Ammonia

P - mV

B - Intercept

M - Slope

RPD=(C1-C2)/Cavg*100

Where:

RPD-Relative Percent Difference

%R=(Cspike*0.044-Csample*0.042)/2.0*100

Where:

%R-Matrix Spike Percent Recovery

Checked by: ____________

Regression Calculations

Date Analyzed:	02/12/16		Client:	CES
Sampling Date:	02/04/16		Unit:	n/a
Project No.:	c9922		Lab No.:	A 018
Analyst	DW			

Calib.Std mg NH_3-N/L	Log_{10} Calib Std (X)	Elect. Pot mV (Y)	(X^2)	(Y^2)	(XY)
0.5	-0.30	120.4	0.09	14496	-36.2
1	0.00	105.6	0.00	11151	0.0
5	0.70	69.1	0.49	4774.81	48.3
20	1.30	34.8	1.69	1211.04	45.3
100	2.00	-6.0	4.00	36	-12.0
Sum	3.70	324	6.27	31669	45.3
	(Sx)	(Sy)	(Sx^2)	(Sy^2)	(Sxy)
Average	0.74	65	1.25	6334	
	(Ax = Sx / 5)	(Ay = Sy / 5)	($Ax^2 = Sx^2 / 5$)	($Ay^2 = Sy^2 / 5$)	

$SDx = \{ [Ax^2 - (Ax)^2]*5/4\}^{1/2}$

SD_x = 0.940

$SDy = \{ [Ay^2 - (Ay)^2]*5/4\}^{1/2}$

SD_y = 51.69

Slope = M = $Sxy-5(Ax)(Ay)/Sx^2-5(Ax)^2$

M = -54.96

Intercept = B = Ay - M(Ax)

B = 105.4

Coeff. of Determination = $r^2 = (M*SDx/Sdy)^2$

r^2 = 0.999073

Relative Percent Accuracy (RPA) for Calibration Verification Standard

Date Analyzed:	02/12/16	Client:	CES
Sampling Date:	02/04/16	Unit:	n/a
Project No.:	c9922	Lab No.:	A 018
Analyst	DW		

Calibration Verification Standard

	mV (P)	mg of NH_3-N/L (C)	RPA (< 10%) %
CVS 1	25.3	28.72	**3.01**
CVS 2	25.1	28.96	
CVS avg		28.84	

RPA=(Cavg-28)/28*100
Where:
28 = theoretical value of check standard

e9922

Cert# A018

CE Schmidt, PhD, Environmental Consultant

Chain of Custody Record

Ammonia Day 1

Form Serial Number CES F1-07105 Client Name Buntec WV Gore Compliance Test Project Manager Gary Keewitz Requested Completion Date	For Information Regarding These Samples Please Contact: Dr. Charles E. Schmidt 19200 Live Oak Road, Red Bluff, CA 96080 530-529-4256 Fax:530-529-4878 E-Mail: SCHMIDTCE@aol.com	Client Address and Phone Number 1890 Cherry Ave Fontana, CA 92335 909-428-4700 Analysis Requested	Laboratory Name Almega Environmental Laboratory Address 10692 Walker Street Cypress, CA 90630 Laboratory Phone 714-889-4000 Laboratory Contact Mr. John Phillips

Station Number/ID	Date	Time	COMP	GRAB	Sample ID Number	Media ID Number	# OF CONTAINERS	Sample Container Trap	Vial	Can	Sample Vol (liters)	SCAQMD Method 207.1	Field NH3 (ppmv)	Remarks
	2/4/2016	946		x	A- 101		1		X		35.3	X		
	2/4/2016	947		x	A- 102		1		X		31.0	X		
	2/4/2016	948		x	A- 103		1		X		30.7	X		
	2/4/2016	948		x	A- 104		1		X		30.3	X		
	2/4/2016	1205		x	A- 105		1		X		31.3	X		
	2/4/2016	1203		x	A- 106		1		X		32.2	X		
	2/4/2016	1204		x	A- 107		1		X		31.9	X		
	2/4/2016	1203		x	A- 108		1		X		30.6	X		
	~~2/4/2016~~	~~1444~~		~~x~~	~~A- 109~~		~~1~~		~~X~~		~~36.2~~	~~X~~		Do not analyze
	2/4/2016	1443		x	A- 110		1		X		34.2	X		
	2/4/2016	1442		x	A- 111		1		X		31.0	X		
	2/4/2016	1441		x	A- 112		1		X		30.3	X		
	~~2/4/2016~~	~~1441~~		~~x~~	~~A- 113~~		~~1~~		~~X~~		~~32.9~~	~~X~~		
	2/4/2016	1635		x	A- 114		1		X		35.0	X		

Sampler CESchmidt	Date/Time 2/5/16 1430	Relinquished by CESchmidt	Date/Time 1430 2/5/16	HAZWRAP/NEESA Y N	
Received by	Date/Time 02/05/16 1643	Relinquished by	Date/Time 02/05/16 1640	QC Level 1 2 3	
Received by	Date/Time	Relinquished by	Date/Time	COC	Ice
				Ana Req	Temp
				Cust Seal	pH
Received by Laboratory	Date/Time	Sample Shipped Via UPS FEDEX BUS [✓ Other]	Air Bill No	Sample Condition	

Remarks 2/5/16 16:30

File: Buntec WV Forms NH3 P2.xlsb Form: NH3 COC Flux D1

Almega
ENVIRONMENTAL

Standard Receipt
Sample LOG in Checklist

Project No: 29922

Lab ID: A018

Method: M25.3/He M207.1

Sampling Date: 2/4 - 2/5/16

Location: C&S

Int:

Date & Time Rc'd: 2/5/16

Location: [illegible] LAB

Int: [illegible]

Arrived By: (circle) FedEx UPS Drop Off (Int) [illegible] Other

Condition of Package(s): (comment): ok

Package Type: Box [✓ Cooler] Other:

Number of Sample Container(s):

Correct Containers (per Method): [✓ Y] N

Preservation: (circle) [✓ ICE] DryICE ICEPacks None

Sample Conditions:

Sample Temp (C): 6.1

Ambient Temp (C): 21

Sample Temp (C): 6.1

Filter Condition: —

PH: <2.0

Components Sealed: [✓ Y] N

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other

Silica Gel Condition:

Tedlar Bags -
Condensation: Y N

Comments:

Container(s) Requested: Glass Plastic

Additional Comments:

Determination of Ammonia by Specific Electrode

Probe 101 N-1

Cal Date: 12/21/15

Page: # 7

No	Sample ID	Date	Sample Volume ml, (V)	pH < 2.0	Temp. °C, (t)	Color Blue	Electrode Reading, mV, (P)	
1	[illegible] Blank x2	2/2/16	—	[✓ Y] N	21.4	[✓ Y] N	195.3 / 194.8	
2	+1mL 0.1M NH4+		—	[✓ Y] N	"	[✓ Y] N	36.8	57.1
3	+10mL "		—	[✓ Y] N	"	[✓ Y] N	-20.3	✓
4	Std-1		—	[✓ Y] N	"	[✓ Y] N	120.4	
5	-2		—	[✓ Y] N	21.5	[✓ Y] N	105.6	54.96
6	-3		—	[✓ Y] N	"	[✓ Y] N	69.1	99.75
7	-4		—	[✓ Y] N	"	[✓ Y] N	34.8	
8	-5		—	[✓ Y] N	21.2	[✓ Y] N	-6.0	✓
9	CVS x2		—	[✓ Y] N	"	[✓ Y] N	25.3 / 25.1	✓
10	A018-114		41	[✓ Y] N		[✓ Y] N	166.3	
11	-101		"	[✓ Y] N		[✓ Y] N	153.7	
12	-102		"	[✓ Y] N		[✓ Y] N	153.5	
13	-103		"	[✓ Y] N		[✓ Y] N	152.1	
14	-104		"	[✓ Y] N		[✓ Y] N	153.7	
15	-104sp,x		"	[✓ Y] N		[✓ Y] N	12.3	
16	-105		"	[✓ Y] N		[✓ Y] N	158.5	
17	-106		"	[✓ Y] N		[✓ Y] N	159.6	
18	-107		"	[✓ Y] N		[✓ Y] N	159.1	
19	-108		"	[✓ Y] N		[✓ Y] N	156.7	
20	-201		"	[✓ Y] N		[✓ Y] N	151.7	
21	Std		"	[✓ Y] N		[✓ Y] N	118/18.1	

Comments LAB TEMP 21°

Determination of Ammonia by Specific Electrode

Page: # 8

No	Sample ID	Date	Sample Volume ml, (V)	pH < 2.0	Temp. °C, (t)	Color Blue	Electrode Reading, mV, (P)
1	CVS	8/12	—	[✓ Y] N	21.9	[✓ Y] N	24.7
2	AO,C 202		41	[✓ Y] N	↓	[✓ Y] N	158.0
3	203		''	[✓ Y] N	↓	[✓ Y] N	159.0
4	204		''	[✓ Y] N	↓	[✓ Y] N	158.4
5	205		''	[✓ Y] N	↓	[✓ Y] N	159.1
6	206		''	[✓ Y] N	↓	[✓ Y] N	159.3
7	Spk		''	[✓ Y] N	↓	[✓ Y] N	1[illegible].1
8	CVS x2		—	[✓ Y] N	↓	[✓ Y] N	24.7/24.7
9	Method Blk x2		—	[✓ Y] N	↓	[✓ Y] N	187.1/186.3
10	Water Blank x2		—	[✓ Y] N	↓	[✓ Y] N	191.3/191.0
11				Y N		Y N	
12				Y N		Y N	
13				Y N		Y N	
14				Y N		Y N	
15				Y N		Y N	
16				Y N		Y N	
17				Y N		Y N	
18				Y N		Y N	
19				Y N		Y N	
20				Y N		Y N	
21				Y N		Y N	

Comments AR Temp 21

Sample
REFRIGERATOR
(Big)

2015 -

Date	T⁰C	Initial	Date	T⁰C	Initial	Date	T⁰C	Initial
4/6/15	3.8	DW	10/26	3.8	DW			
4/13/15	3.9	DW	11/2	3.7	DW			
4/20/15	3.9	DW	11/9	4.0	DW			
4/27/15	4.0	DW	11/16	3.9	DW			
5/4	4.0	DW	11/23	3.8	DW			
5/11	4.0	DW	11/30	3.7	DW			
5/18	4.1	DW	12/6	3.7	DW			
5/26	4.0	DW	12/13	3.8	DW			
6/1	4.1	DW	12/21	3.7	DW			
6/8	4.2	DW	12/28	3.6	DW			
6/15	4.0	DW	1/4/2016	4.5	DW			
6/24	3.8	DW	1/11/16	4.3	DW			
6/29	4.2	DW	1/18	4.5	DW			
7/6	4.2	DW	1/25	4.5	DW			
7/13	4.0	DW	2/1	4.3	DW			
7/20	4.0	DW	2/8	4.0	DW			
7/27	4.1	DW						
8/2	4.0	DW						
8/10	4.1	DW						
8/17	4.0	DW						
8/24	4.1	DW						
8/31	4.2	DW						
9/8	4.2	DW						
9/14	4.1	DW						
9/21	4.0	DW						
9/28	3.9	DW						
10/5	3.7	DW						
10/12	3.7	DW						
10/19	3.7	DW						

Calibration Data Form - ATC-Temperature Probe

Date	Ref Temp (RT) ID	ATC Probe ID	Ice Water ≈ 0° C			Room Temp Water ≈ 22° C			Average Temp (°C)		Avg Temp converted to deg Rankine (°R)		% difference of RT in degrees Rankine (°R)		Tolerance betwn two measurment	Intials
m/d/yy	# (A)	# (B)	0 min	1 min	2 min	0 min	1 min	2 min	≈ 0°C	≈ 22°C	≈ 0°C	≈ 22°C	≈ 0°C	≈ 22°C		
12/21/15	1A		1.0	1.0	1.0	22.0	22.0	22.0	1.0	22.0	493.5	531.3	0.000	0.30	1.5% of RT in °R	DW
		ATC 1	1.1	1.0	0.9	22.9	22.9	22.9	1.0	22.9	493.5	532.9				
		H-1	1.00	0.9	0.9	21.6	21.7	21.8	0.9	21.7	493.4	530.7	0.024	0.10		

Note: Reference Tempertaure used was a Standard Mercury Glass Thermometer.
Degrees Rankine [°R] = ([°C] + 273.15) × 9⁄5

AIR ANALYSIS REPORT

DETERMINATION OF AMMONIA EMISSIONS FROM STATIONARY SOURCES BY SCAQMD METHOD 207.1

Prepared for:

Mr. C.E. Schmidt
C. E. Schmidt
19200 Live Oak Road
Red Bluff, CA 96080

Sampling Date: 02/05/16
Report Date: 02/16/16

Prepared by:

Almega Environmental & Technical Services
10602 Walker St.
Cypress, CA 90630

Report Number: c9922
200 Series

Prepared by: ______________________
Douglass Williams, Laboratory Manager

Reviewed by: ______________________
John Phillips, President

Almega
ENVIRONMENTAL

LABORATORY REPORT

Determinaton of Ammonia emissions by SCAQMD Method 207.1

Date Analyzed:	12-Feb-16	Client:	CES
Sampling Date:	4-Feb-16	Unit:	n/a
Project No.:	c9922	Lab No.:	A 018

Sample ID	Lab ID	Sample (V) volume, ml	mV (P)	mg of NH_3-N/L (C)	mg NH_3 (N) per sample	Detection limit, mg
A - 201	A 018 - A 201	41	158.6	0.108	**0.005**	0.004
A - 201 spike*	A 018 - A 201	41	12.1	49.933		0.004
A - 202	A 018 - A 202	41	158.0	0.111	**0.006**	0.004
A - 203	A 018 - A 203	41	159.0	0.106	**0.005**	0.004
A - 204	A 018 - A 204	41	158.4	0.109	**0.005**	0.004
A - 205	A 018 - A 205	41	159.1	0.106	**0.005**	0.004
A - 206	A 018 - A 206	41	159.3	0.105	**0.005**	0.004
A - 206 spike*	A 018 - A 206	41	12.1	49.933		0.004

Lab ID	C1	C2	Cavg	RPD (< 5%) %	Cspike1	Cspike2	% R average
A - 201	0.11	0.11	0.11	0.00	49.93	49.93	110
A - 206	0.10	0.10	0.10	0.00	49.93	49.93	110

*Spike recovery = 110%

N = C * 17.03/14.01 * V/1000

Where:

N - Net sample collection (mg)
Cavg - concentrtion of NH3-N/L from analysis
17.03 - MW of Ammonia
14.01 - MW of Nitrogen
V - Sample volume, ml

$$C = 10^{(P-B)/M}$$

Where:

C - Measured concentrtion of Ammonia
P - mV
B - Intercept
M - Slope

RPD=(C1-C2)/Cavg*100

Where:

RPD-Relative Percent Difference

%R=(Cspike*0.044-Csample*0.042)/2.0*100

Where:

%R-Matrix Spike Percent Recovery

Checked by: ______________

Almega
ENVIRONMENTAL

LABORATORY REPORT

Determinaton of Ammonia emissions by SCAQMD Method 207.1

Date Analyzed:	16-Feb-16	Client:	CES
Sampling Date:	5-Feb-16	Unit:	n/a
Project No.:	c9922	Lab No.:	A 018

Sample ID	Lab ID	Sample (V) volume, ml	mV (P)	mg of NH_3-N/L (C)	mg NH_3 (N) per sample	Detection limit, mg
A - 215	A 018 - A 114	41	200.1	0.071	< 0.004	0.004
A - 207	A 018 - A 101	41	197.1	0.080	0.004	0.004
A - 208	A 018 - A 102	41	198.1	0.077	< 0.004	0.004
A - 209	A 018 - A 103	41	199.1	0.074	< 0.004	0.004
A - 210	A 018 - A 104	41	195.9	0.085	0.004	0.004
A - 210 spike*	A 018 - A 104	41	48.5	44.889		0.004
A - 211	A 018 - A 105	41	196.6	0.082	0.004	0.004
A - 212	A 018 - A 106	41	198.3	0.076	< 0.004	0.004
A - 213	A 018 - A 107	41	196.7	0.082	0.004	0.004
A - 214	A 018 - A 108	41	193.1	0.095	0.005	0.004

Lab ID	C1	C2	Cavg	RPD (< 5%) %	Cspike1	Cspike2	% R average
A - 210	0.08	0.08	0.08	0.00	44.89	44.89	99

*Spike recovery = 625%

N = C * 17.03/14.01 * V/1000

Where:

N - Net sample collection (mg)
Cavg - concentrtion of NH3-N/L from analysis
17.03 - MW of Ammonia
14.01 - MW of Nitrogen
V - Sample volume, ml

$C = 10^{(P-B)/M}$

Where:

C - Measured concentrtion of Ammonia
P - mV
B - Intercept
M - Slope

RPD=(C1-C2)/Cavg*100

Where:

RPD-Relative Percent Difference

%R=(Cspike*0.044-Csample*0.042)/2.0*100

Where:

%R-Matrix Spike Percent Recovery

Checked by:

Regression Calculations

Date Analyzed:	02/12/16
Sampling Date:	02/04/16
Project No.:	c9922
Analyst	DW

Client:	CES
Unit:	n/a
Lab No.:	A 018

Calib.Std mg NH_3-N/L	Log_{10} Calib Std (X)	Elect. Pot mV (Y)	(X^2)	(Y^2)	(XY)
0.5	-0.30	120.4	0.09	14496	-36.2
1	0.00	105.6	0.00	11151	0.0
5	0.70	69.1	0.49	4774.81	48.3
20	1.30	34.8	1.69	1211.04	45.3
100	2.00	-6.0	4.00	36	-12.0
Sum	**3.70**	**324**	**6.27**	**31669**	**45.3**
	(Sx)	(Sy)	(Sx^2)	(Sy^2)	(Sxy)
Average	**0.74**	**65**	**1.25**	**6334**	
	(Ax = Sx / 5)	(Ay = Sy / 5)	($Ax^2 = Sx^2 / 5$)	($Ay^2 = Sy^2 / 5$)	

$SDx = \{ [Ax^2 - (Ax)^2]*5/4\}^{1/2}$

SD_x = **<u>0.940</u>**

$SDy = \{ [Ay^2 - (Ay)^2]*5/4\}^{1/2}$

SD_y = **<u>51.69</u>**

Slope = M = Sxy-5(Ax)(Ay)/Sx²-5(Ax)²

M = **<u>-54.96</u>**

Intercept = B = Ay - M(Ax)

B = **<u>105.4</u>**

Coeff. of Determination = $r^2 = (M*SDx/Sdy)^2$

r^2 = **<u>0.999073</u>**

Relative Percent Accuracy (RPA) for Calibration Verification Standard

Date Analyzed: 02/12/16
Sampling Date: 02/04/16
Project No.: c9922
Analyst DW

Client: CES
Unit: n/a
Lab No.: A 018

Calibration Verification Standard

	mV (P)	mg of NH_3-N/L (C)	RPA (< 10%) %
CVS 1	25.3	28.72	
CVS 2	25.1	28.96	**3.01**
CVS avg		28.84	

RPA=(Cavg-28)/28*100
Where:
28 = theoretical value of check standard

Regression Calculations

Date Analyzed:	02/12/16	Client:	CES
Sampling Date:	02/04/16	Unit:	n/a
Project No.:	c9922	Lab No.:	A 018
Analyst	DW		

Calib.Std mg NH_3-N/L	Log_{10} Calib Std (X)	Elect. Pot mV (Y)	(X^2)	(Y^2)	(XY)
0.5	-0.30	150.4	0.09	22620	-45.3
1	0.00	140.6	0.00	19768	0.0
5	0.70	102.4	0.49	10485.76	71.6
20	1.30	67.8	1.69	4596.84	88.2
100	2.00	28.1	4.00	789.61	56.2
Sum	3.70	489	6.27	58261	170.7
	(Sx)	(Sy)	(Sx^2)	(Sy^2)	(Sxy)
Average	**0.74**	**98**	**1.25**	**11652**	
	(Ax = Sx / 5)	(Ay = Sy / 5)	($Ax^2 = Sx^2 / 5$)	($Ay^2 = Sy^2 / 5$)	

$SDx = \{ [Ax^2 - (Ax)^2]*5/4\}^{1/2}$

SD_x = **0.940**

$SDy = \{ [Ay^2 - (Ay)^2]*5/4\}^{1/2}$

SD_y = **50.94**

Slope = M = $Sxy-5(Ax)(Ay)/Sx^2-5(Ax)^2$

M = **-54.10**

Intercept = B = Ay - M(Ax)

B = **137.9**

Coeff. of Determination = $r^2 = (M*SDx/Sdy)^2$

r^2 = **0.997146**

Relative Percent Accuracy (RPA) for Calibration Verification Standard

Date Analyzed:	02/12/16	Client:	CES
Sampling Date:	02/04/16	Unit:	n/a
Project No.:	c9922	Lab No.:	A 018
Analyst	DW		

Calibration Verification Standard

	mV (P)	mg of NH_3-N/L (C)	RPA (< 10%) %
CVS 1	61.0	26.37	
CVS 2	61.4	25.92	**-6.62**
CVS avg		26.15	

RPA=(Cavg-28)/28*100

Where:

28 = theoretical value of check standard

c9922 Gi # A018

CE Schmidt, [illegible]D, Environmental Consultant
Chain of Custody Record

Ammonia Day 2

Form Serial Number
CES F1-02195

Client Name
Burrtec WV
Gore Compliance Test

Project Manager
Gary Koontz

Requested Completion Date

For Information Regarding These Samples Please Contact

Dr. Charles E. Schmidt
19200 Live Oak Road, Red Bluff, CA 96080
530-529-4256 Fax:530-529-4878
E-Mail SCHMIDTCE@aol.com

Client Address and Phone Number
[illegible] Cherry Ave
Fontana, CA 92335 [illegible]

Laboratory Name
Alberga Environmental

Laboratory Address
10602 Walker Street
Cypress, CA 90630

Laboratory Phone
714-[illegible]-4000

Laboratory Contact
Mr. John Phillips

Analysis Requested

Station Number/ID	Date	Time	COMP	GRAB	Sample ID Number	Media ID Number	# OF CONTAINERS	Sample Container Trap	Sample Container Vial	Sample Container Can	Sample Vol.(liters)	SCAQMD Method 207.1	Field NH3 (ppmv)	Remarks
	2/5/2016	852		x	A- 201		1		X		33.0	X		
	2/5/2016	850		x	A- 202		1		X		31.2	X		
	2/5/2016	852		x	A- 203		1		X		32.2	X		
	2/5/2016	850		x	A- 204		1		X		28.2	X		
	2/5/2016	850		x	A- 205		1		X		30.7	X		
	2/5/2016	1046		x	A- 206		1		X		28.8	X		
	2/5/2016	1046		x	A- 207		1		X		33.8	X		
	2/5/2016	1044		x	A- 208		1		X		32.8	X		
	2/5/2016	1044		x	A- 209		1		X		33.4	X		
	2/5/2016	1044		x	A- 210		1		X		31.7	X		
	2/5/2016	1247		x	A- 211		1		X		31.1	X		
	2/5/2016	1246		x	A- 212		1		X		32.8	X		
	2/5/2016	1245		x	A- 213		1		X		34	X		
	2/5/2016	1244		x	A- 214		1		X		33.9	X		
		[illegible]		x	A-215		1		x		[illegible]			

Sampler: CESchmidt	Date/Time: 2/5/16 1430	Relinquished by: CESchmidt	Date/Time: 2/5/16 1430	HAZWRAP/NEESA Y N	
				QC Level 1 2 3	
Received by:	Date/Time: 02/05/16 1430	Relinquished by:	Date/Time: 02/05/16 1610	COC	Ice
				Ana Req	Temp
Received by:	Date/Time	Relinquished by:	Date/Time	Cust Seal	pH
				Sample Condition	
Received by Laboratory:	Date/Time: 2/5/16 16:20	Sample Shipped Via: UPS FEDEX BUS [✓ Other]	Air Bill No		

Remarks

File: Burrtec WV Forms NH3 P2.xlsb Form: NH3 COC Flux D2

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Standard Receipt
Sample LOG In Checklist

Project No: 27922

Lab ID: A018

Method: m25.3/He m3C?.1

Sampling Date: 2/4 - 2/5/16

Location: CES Int:

Date & Time Rc'd: 2/5/16

Location: Box LAB Int: Dw

Arrived By: (circle) FedEx UPS Drop Off (Int) Dw Other

Condition of Package(s): (comment): ok

Package Type: Box [✓ Cooler] Other:

Number of Sample Container(s):

Correct Containers (per Method): [✓ Y] N

Preservation: (circle) [✓ ICE] DryICE ICEPacks None

Sample Conditions:

Sample Temp (C): 6.1

Ambient Temp (C): 21

Sample Temp (C): 6.1

Filter Condition: —

PH: <2.0

Components Sealed: [✓ Y] N

Sample Recovery Completed On: (date & time)

Recovered In: (circle) [✓ Field] Lab Other

Silica Gel Condition

Tedlar Bags -
Condensation: Y N

Comments:

Container(s) Requested: Glass Plastic

Additional Comments:

Determination of Ammonia by Specific Electrode

Probe 3.0: N-1

Cal Date: 12/2/15

Page: # 7

No	Sample ID	Date	Sample Volume ml, (V)	pH < 2.0	Temp. °C, (t)	Color Blue	Electrode Reading, mV, (P)	
1	Water Blank x2	2/2/16	—	[✓ Y] N	21.4	[✓ Y] N	195.3 / 194.8	
2	+1mL 0.1M NH4+		—	[✓ Y] N	"	[✓ Y] N	36.8	57.1
3	+10mL "		—	[✓ Y] N	"	[✓ Y] N	-20.3	✓
4	Std-1		—	[✓ Y] N	"	[✓ Y] N	120.4	
5	-2		—	[✓ Y] N	21.5	[✓ Y] N	105.6	
6	-3		—	[✓ Y] N	"	[✓ Y] N	69.1	59.56
7	-4		—	[✓ Y] N	"	[✓ Y] N	34.8	99.73
8	-5		—	[✓ Y] N	21.2	[✓ Y] N	-6.0	✓
9	CVS x2		—	[✓ Y] N	"	[✓ Y] N	25.3 / 25.1	✓
10	A212-114		41	[✓ Y] N		[✓ Y] N	166.3	
11	-101		"	[✓ Y] N		[✓ Y] N	153.7	
12	-102		"	[✓ Y] N		[✓ Y] N	153.5	
13	-103		"	[✓ Y] N		[✓ Y] N	154.1	
14	-104		"	[✓ Y] N		[✓ Y] N	153.7	
15	-104 dup		"	[✓ Y] N		[✓ Y] N	12.3	
16	-105		"	[✓ Y] N		[✓ Y] N	159.5	
17	-106		"	[✓ Y] N		[✓ Y] N	159.6	
18	-107		"	[✓ Y] N		[✓ Y] N	159.1	
19	-108		"	[✓ Y] N		[✓ Y] N	156.7	
20	-201		"	[✓ Y] N		[✓ Y] N	151.7	
21	Spk		"	[✓ Y] N		[✓ Y] N	158/2.1	

Comments LAB TEMP 21°

Determination of Ammonia by Specific Electrode

Page: # 8

No	Sample ID	Date	Sample Volume ml, (V)	pH < 2.0	Temp. °C, (t)	Color Blue	Electrode Reading, mV, (P)
1	[illegible]	8/12	—	[✓ Y] N	21.9	[✓ Y] N	241.7
2	AG-C 202		41	[✓ Y] N	↓	[✓ Y] N	158.0
3	203		″	[✓ Y] N		[✓ Y] N	159.0
4	204		″	[✓ Y] N		[✓ Y] N	158.4
5	205		″	[✓ Y] N		[✓ Y] N	159.1
6	206		″	[✓ Y] N		[✓ Y] N	159.5
7	207		″	[✓ Y] N		[✓ Y] N	1[illegible]1
8	[illegible]		—	[✓ Y] N		[✓ Y] N	241.7/241.7
9	[illegible]		—	[✓ Y] N		[✓ Y] N	177.1/176.3
10	[illegible]		—	[✓ Y] N		[✓ Y] N	191.3/191.0
11				Y N		Y N	
12				Y N		Y N	
13				Y N		Y N	
14				Y N		Y N	
15				Y N		Y N	
16				Y N		Y N	
17				Y N		Y N	
18				Y N		Y N	
19				Y N		Y N	
20				Y N		Y N	
21				Y N		Y N	

Comments [illegible]

Determination of Ammonia by Specific Electrode

Probe ID: 12-1
Cal Date: 12/21/15

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No	Sample ID	Date	Sample Volume ml, (V)	pH < 2.0	Temp. °C, (t)	Color Blue	Electrode Reading, mV, (P)	
1	water Blank x2	2/17	–	~~Y~~ [✓ N]	21.8	[✓ Y] N	217.8/217.0	
2	+1 mL 10M NaOH		–	[✓ Y] N	''	[✓ Y] N	56.4	✓
3	~5 min ''		–	[✓ Y] N	''	[✓ Y] N	2.1	
4	Std-1		–	[✓ Y] N	''	[✓ Y] N	150.4	
5	-2		–	[✓ Y] N	''	[✓ Y] N	140.6	
6	-3		–	[✓ Y] N	22.1	[✓ Y] N	102.4	54.1
7	-4		–	[✓ Y] N	''	[✓ Y] N	67.8	99% mC
8	-5		–	[✓ Y] N	''	[✓ Y] N	28.1	
9	CVS		–	[✓ Y] N	''	[✓ Y] N	61.0	
10	-Dup		–	[✓ Y] N	22.3	[✓ Y] N	61.4	
11	A9E 215		41	[✓ Y] N	''	[✓ Y] N	200.1	
12	207		''	[✓ Y] N	''	[✓ Y] N	197.1	
13	208		''	[✓ Y] N	22.6	[✓ Y] N	198.1	
14	209		''	[✓ Y] N	''	[✓ Y] N	199.1	
15	210		''	[✓ Y] N	''	[✓ Y] N	195.9	
16	Spk		''	[✓ Y] N	''	[✓ Y] N	48.5	
17	211		''	[✓ Y] N	''	[✓ Y] N	196.6	
18	212		''	[✓ Y] N	22.5	[✓ Y] N	196.3	
19	213		''	[✓ Y] N	''	[✓ Y] N	196.7	
20	214		''	[✓ Y] N	''	[✓ Y] N	193.1	
21	CVS x2		–	[✓ Y] N	''	[✓ Y] N	60.3/60.9	
22	diluted Blank x2		–	~~[✓ Y]~~	''	[✓ Y]	205.7/205.7	
23	water Blank x2		–	~~Y~~ [✓ N]	''	[✓ Y]	213.7/213.0	

Comments

LAB Temp 22°

Sample
REFRIGERATOR
(Big)

2015 -

Date	T⁰C	Initial	Date	T⁰C	Initial	Date	T⁰C	Initial
4/6/15	3.8	DW	10/26	3.8	DW			
4/13/15	3.9	DW	11/2	3.7	DW			
4/20/15	3.9	DW	11/9	4.0	DW			
4/27/15	4.0	DW	11/16	3.9	DW			
5/4	4.0	DW	11/23	3.8	DW			
5/11	4.0	DW	11/30	3.7	DW			
5/18	4.1	DW	12/6	3.7	DW			
5/26	40	DW	12/13	3.8	DW			
6/1	4.1	DW	12/21	3.7	DW			
6/8	4.2	DW	12/28	3.6	DW			
6/15	4.0	DW	1/4/2016	4.5	DW			
6/24	3.8	DW	1/14/16	4.3	DW			
6/29	4.2	DW	1/18	4.5	DW			
7/6	4.2	DW	1/25	4.5	DW			
7/13	4.0	DW	2/1	4.3	DW			
7/20	4.0	DW	2/8	4.0	DW			
7/27	4.1	DW						
8/2	4.0	DW						
8/10	4.1	DW						
8/17	4.0	DW						
8/24	4.1	DW						
8/31	4.2	DW						
9/7	4.2	DW						
9/14	4.1	DW						
9/21	4.0	DW						
9/28	3.9	DW						
10/5	3.7	DW						
10/12	3.7	DW						
10/19	3.7	DW						

Calibration Data Form - ATC-Temperature Probe

Date	Ref Temp (RT) ID	ATC Probe ID	Ice Water ≈ 0° C			Room Temp Water ≈ 22° C			Average Temp (°C)		Avg Temp converted to deg Rankine (°R)		% difference of RT in degrees Rankine (°R)		Tolerance betwn two measurment	Intials
m/d/yy	# (A)	# (B)	0 min	1 min	2 min	0 min	1 min	2 min	≈ 0°C	≈ 22°C	≈ 0°C	≈ 22°C	≈ 0°C	≈ 22°C		
12/21/15	1A		1.0	1.0	1.0	22.0	22.0	22.0	1.0	22.0	493.5	531.3	0.000	0.30	1.5% of RT in °R	DW
		ATC 1	1.1	1.0	0.9	22.9	22.9	22.9	1.0	22.9	493.5	532.9				
		H-1	1.00	0.9	0.9	21.6	21.7	21.8	0.9	21.7	493.4	530.7	0.024	0.10		

Note: Reference Tempertaure used was a Standard Mercury Glass Thermometer.
Degrees Rankine [°R] = ([°C] + 273.15) × 9⁄5

Attachment 2

Calibration Data

CES
6/21/15
CES

ANNUAL ROTOMETER (0-5LPM RANGE) CALIBRATION

PRIMARY STD DRY CAL DEFENDER 510
S/N 114396

ROTOMETER #12	N=10	5042.1	cc/min	✓	
	N=10	5024.6	cc/min		$\bar{X}$ = 5024 cc/m
	N=10	5003.8	cc/min		
ROTOMETER #10-4	N=10	5060.8	cc/min	✓	
	N=10	5054.9	cc/min		$\bar{X}$ = 5056 cc/m
	N=10	5050.9	cc/min		
ROTOMETER #13	N=10	5019.7	cc/m	✓	
	N=10	5018.0	cc/min		$\bar{X}$ = 5018 cc/m
	N=10	5017.2	cc/min		
ROTOMETER #10-6	N=10	5083.5	cc/m	✓	
	N=10	5079.0	cc/min		$\bar{X}$ = 5080 cc/m
	N=10	5076.3	cc/min		
ROTOMETER #10-3	N=10	4941.2	cc/min	✓	
	N=10	4939.8	cc/min		$\bar{X}$ = 4940 cc/m
	N=10	4938.0	cc/min		
ROTOMETER #10-4-1	N=10	4954.2	cc/min		
	N=10	4940.6	cc/min		$\bar{X}$ = 4945 cc/min
	N=10	4939.8	cc/min		
ROTOMETER #10-5	N=10	5062.6	cc/min		$\bar{X}$ = 5060.8
	N=10	5061.2	cc/min		5061 cc/m
	N=10	5058.5	cc/min		

Airgas

CERTIFICATE OF ANALYSIS

Grade of Product: EPA Protocol

Airgas Specialty Gases
11711 S. Alameda Street
Los Angeles , CA 90059
323-568-2208 Fax: 323-567-3666
www.airgas.com

COPY

Part Number:	E02AI99E15AC2K9	Reference Number:	48-124472983-1
Cylinder Number:	CC12935	Cylinder Volume:	146.2 CF
Laboratory:	ASG - Los Angeles - CA	Cylinder Pressure:	2015 PSIG
PGVP Number:	B32015	Valve Outlet:	590
Gas Code:	PPN,BALA	Certification Date:	Jan 13, 2015

Expiration Date: Jan 13, 2023

Certification performed in accordance with "EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards (May 2012)" document EPA 600/R-12/531, using the assay procedures listed. Analytical Methodology does not require correction for analytical interference. This cylinder has a total analytical uncertainty as stated below with a confidence level of 95%. There are no significant impurities which affect the use of this calibration mixture. All concentrations are on a volume/volume basis unless otherwise noted.

Do Not Use This Cylinder below 100 psig, i.e. 0.7 megapascals.

ANALYTICAL RESULTS

Component	Requested Concentration	Actual Concentration	Protocol Method	Total Relative Uncertainty	Assay Dates
PROPANE	85.00 PPM	87.26 PPM	G1	+/- 0.9% NIST Traceable	01/13/2015
AIR	Balance				

CALIBRATION STANDARDS

Type	Lot ID	Cylinder No	Concentration	Uncertainty	Expiration Date
NTRM	09061707	CC301749	97.82 PPM PROPANE/AIR	+/- 0.5%	Jun 05, 2019

ANALYTICAL EQUIPMENT

Instrument/Make/Model	Analytical Principle	Last Multipoint Calibration
Nicolet 6700 AHR0801551 C3H8	FTIR	Jan 12, 2015

Triad Data Available Upon Request

Approved for Release

Almega
ENVIRONMENTAL

Project # 9922 Client CES Contact Chuck Schmidt

Scope of Work Thermo TVA 2020 FID Calibration

By D. Yonemori Date 02/02/16 Sheet ____ of ____
14:45

Unit: TVA 2020

Serial #: 202015010911

Asset #: FA02481

Calibration Gas	Response
Zero Air	
3,093 ppm Propane	
8,624 ppm Propane	133 ppm
97.26 ppm Propane	
Ambient Ground	
Ambient Waist	5.3 ppm
Ambient Head	

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ENVIRONMENTAL

Project # 9922 Client CES Contact Chuck Schmidt

Scope of Work Thermo TVA 2020 FID Calibration

By D. Yonemori Date 02/03/16 Sheet ____ of ____

~~[illegible]~~ 08:10

Unit: TVA 2020

Serial #: Z02015010911

Asset #: FA02481

Calibration Gas	Response
Zero Air	3.0 ppm
3,093 ppm Propane	
9.624 ppm Propane	
97.26 ppm Propane	131 ppm
Ambient Ground	5.7 ppm
Ambient Waist	5.9 ppm
Ambient Head	6.0 ppm

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ENVIRONMENTAL

Project # 9922 Client CES Contact Chuck Schmidt

Scope of Work Thermo TVA 2020 FID Calibration

By D. Yonemori Date 02/03/16 11:45 Sheet ____ of ____

Unit: TVA 2020 Serial #: Z0Z015010911

Asset #: FA02481

Calibration Gas	Response
Zero Air	-0.7 ppm
3,093 ppm Propane	
8,624 ppm Propane	
97.26 ppm Propane	121 ppm
Ambient Ground	1.5 ppm
Ambient Waist	1.4 ppm
Ambient Head	1.4 ppm

Almega
ENVIRONMENTAL

Project # 9922 Client CES Contact Chuck Schmidt

Scope of Work Thermo TVA 2020 FID Calibration

By D. Yonemori Date 02/04/16 Sheet ____ of ____

Unit: TVA 2020 Serial #: 20201409185

Asset #: FA01690

Calibration Gas	Response 7:10 am	10:30am	14:45
Zero Air	2.4 ppm	1.6 ppm	06ppm
3.093 ppm Propane			
8.624 ppm Propane			
97.26 ppm Propane			
Ambient Ground	5.3 ppm	4.2 ppm	2.7 ppm
Ambient Waist	5.6 ppm	4.8 ppm	2.8 ppm
Ambient Head	5.9 ppm	5.0 ppm	3.2 ppm
100 ppm	110 ppm	101 ppm	93 ppm
500 ppm	543 ppm	493 ppm	464 ppm

Almega
ENVIRONMENTAL

Project # 9922 Client CES Contact Chuck Schmidt
Scope of Work Thermo TVA 2020 FID Calibration
By D. Yonemori Date 02/04/16 Sheet ______ of ______

Unit: TVA 2020 Serial #: 202015010911
Asset #: FA02481

Calibration Gas	Response
	07.10 am
Zero Air	2.1 ppm
3,093 ppm Propane	
8,624 ppm Propane	
97.26 ppm Propane	
Ambient Ground	7.7 ppm
Ambient Waist	7.2 ppm
Ambient Head	8.7 ppm
100 ppm methane	115 ppm
500 ppm methane	552 ppm

Eco-Rental Solutions

Calibration Certificate

rev 8/9/11

Work Order No.: SE-028377
Date of Service: 02/02/16

Unit Under Test: Thermo TVA 2020 FID Intrinsically Safe FID

Asset No.: FA02481 Technician: Aaron Yu Initials: AY
Serial No: 202015010911

TEST	Specification	Result
Standard Calibration	Pass/Fail	PASS

TEST STANDARDS USED:

DESCRIPTION	LOT No./EXPIRATION DATE	QUANTITY
Zero Air	Lot No. IAO-1-12 Exp. 08/20/18	1
500 ppm Methane in Air	Lot No. IAO-150A-500-2 Exp. 08/20/18	1

TEST EQUIPMENT USED:

DESCRIPTION	ASSET NO.	SERIAL NO.	DATE OF LAST CAL	DATE CAL DUE

Test Equipment and standards are traceable to National standards.

Eco-Rental Solutions

Calibration Certificate

rev 8/9/11

Work Order No.: SE-028375
Date of Service: 02/02/16

Unit Under Test: Thermo TVA 2020 FID Intrinsically Safe FID

Asset No.: FA01690 Technician: Aaron Yu Initials: AY
Serial No: 202014090185

TEST	Specification	Result
Standard Calibration	Pass/Fail	PASS

TEST STANDARDS USED:

DESCRIPTION	LOT No./EXPIRATION DATE	QUANTITY
Zero Air	Lot No. IAO-1-12 Exp. 08/20/18	1
500 ppm Methane in Air	Lot No. IAO-150A-500-2 Exp. 08/20/18	1

TEST EQUIPMENT USED:

DESCRIPTION	ASSET NO.	SERIAL NO.	DATE OF LAST CAL	DATE CAL DUE

Test Equipment and standards are traceable to National standards.

Attachment 3

Permit to Construct

South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178

Page 1
Application No.
559590

PERMIT TO CONSTRUCT

Granted as of 4/11/2014
ID 156065

Legal Owner
or Operator:
WEST VALLEY MRF, LLC
9890 CHERRY AVE
FONTANA, CA 92335

Equipment Location: 13373 NAPA ST, FONTANA, CA 92335

Equipment Description :

POSITIVE AERATION STATIC PILE (ASP) COMPOSTING SYSTEM, GREENWASTE/FOODWASTE MIXED FEEDSTOCK (100 TONS PER DAY AND 26,000 TONS PER YEAR THROUGHPUT), THREE PHASE COMPOSTING, WITH GORE® COVER, CONSISTING OF:

FEEDSTOCK GRINDING AND MIXING OPERATIONS TO BE CONDUCTED AT THE EXISTING ORGANIC PROCESSING FACILITY, USING AIR RESOURCE BOARD (ARB) REGISTERED PORTABLE GRINDING AND SCREENING EQUIPMENT AND A FRONT-END BUCKET LOADER.

CONCRETE PAD, APPROXIMATELY 240' L. X 165' W., WITH IN-FLOOR AERATION TRENCH AND LIQUID DRAIN SYSTEM, WITH LEACHATE COLLECTION AND STORAGE TANKS.

MIXED WET FEEDSTOCK PILE(S), EACH APPROXIMATELY 165' L. X 26' W. X 10' H., CONTAINING TOTAL 8,000 CUBIC YARDS OR 500 TONS FEEDSTOCK BATCH.

MOBILE WINDER MACHINE TO COVER PILES.

EACH PILE SECURELY COVERED WITH GORE COVER SYSTEM AND ALL EDGES SEALED.

EACH PILE WITH TEMPERATURE AND OXYGEN SENSOR PROBES.

AERATION BLOWER, 1100 CFM, 2H.P.

CONTROL SYSTEM WITH CONTROLLERS.DATA LOGGERS AND SOFTWARE.

Conditions :

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN ACCORDANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.

2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.

3. THIS EQUIPMENT SHALL BE OPERATED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.

FILE COPY

4. THIS PERMIT SHALL EXPIRE ONE YEAR FROM THE DATE OF ITS' ISSUANCE UNLESS AN EXTENSION OF TIME IS APPROVED IN WRITING BY THE SCAQMD. ANY EXTENSION REQUEST SHALL BE SUBMITTED IN WRITING TO THE SCAQMD, ATTN: GRAWAL@AQMD.GOV, AND SHALL INCLUDE THE REASONS THE EXTENSION IS REQUIRED, EXTENSION DURATION, AND THE STATUS OF THE PROJECT TO DATE.

5. AT LEAST 24 HOURS PRIOR TO STARTUP OF THE EQUIPMENT, THE OWNER OPERATOR SHALL NOTIFY THE SCAQMD, ATTN: GRAWAL@AQMD.GOV, THE COMPLETION OF CONSTRUCTION DATE AND INTENTION TO COMMENCE OPERATION.

6. TOTAL AMOUNT OF WET, MIXED FEEDSTOCK (FOODWASTE/GREENWASTE) PROCESSED BY THE COMPOSTING SYSTEM SHALL NOT EXCEED 100 TONS PER DAY AND 26,000 TONS PER YEAR.

7. UPON COMPLETION OF FEEDSTOCK PILE(S) CONSTRUCTION, A REPRESENTATIVE GRAB SAMPLE OF THE FEEDSTOCK MATERIAL SHALL BE TAKEN AND FOLLOWING PARAMETERS SHALL BE DETERMINED AND RECORDED.

   DIMENSIONS OF PILE (L. X W. X D.), INITIAL PILE VOLUME, TOTAL TONS AND TOTAL SURFACE AREA.
   GREENWASTE AND FOODWASTE, WT% BULK DENSITY (LBS/YD3 OR LBS/FT3), % ORGANICS, % MOISTURE, %C, %N, C: N RATIO.

8. NO AERATION SHALL BE INITIATED UNTIL PILE(S) IS (ARE) FULLY COVERED WITH GORE COVER, ALL EDGES OF COVER ARE SEALED AND TEMPERATURE AND OXYGEN MONITORING PROBES ARE IN PLACE.

9. EACH COMPOSTING PHASE OPERATION (ACTIVE/CURING/FINISHING) SHALL BE CONDUCTED, AND OPERATING PARAMETERS BE MAINTAINED AS PER MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATION. DAILY RECORDS SHALL BE KEPT FOR.

   AERATION RATE (SCFM) AND DURATION TO MAINTAIN AEROBIC CONDITION
   TEMPERATURE (0F) AND % OXYGEN READINGS
   NUMBER OF COMPOSTING DAYS FOR EACH PHASE.

10. DAILY SURFACE MONITORING (MULTIPLE POINTS FOR PILE COVER SURFACE, TOP AND SIDES) SHALL BE CONDUCTED FOR VOLATILE ORGANIC COMPOUNDS (VOCs) AND AMMONIA EMISSIONS (PPMV) USING PORTABLE ANALYZER, WITH INSTRUMENT CALIBRATION RECORDS AND % ACCURACY. MONITORING RESULTS SHALL BE RECORDED AND KEPT ON FILE.

11. THE OWNER OR OPERATOR OF THE COMPOSTING SYSTEM SHALL CONDUCT SOURCE PERFORMANCE TESTS (ALSO SEE CONDITION NO. 13) UNDER THE FOLLOWING CONDITIONS:

FILE COPY

1. A TEST PROTOCOL SHALL BE SUBMITTED TO SCAQMD NO LATER THAN 45 DAYS BEFORE THE PROPOSED TEST DATE AND SHALL BE APPROVED BY THE EXECUTIVE OFFICER BEFORE THE TEST COMMENCES. AT A MINIMUM, THE TEST PROTOCOL SHOULD INCLUDE THE FOLLOWING:

   a. A DESCRIPTION OF THE EQUIPMENT/PROCESS TESTED. INCLUDE PROCESS OPERATING PARAMETERS MONITORED AND MEASURED, INSTRUMENTS USED AND SAMPLING LOCATIONS FOR EMISSIONS MEASUREMENTS.

   b. A BRIEF PROCESS DESCRIPTION.

   c. OPERATING CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED, INCLUDING PROCESS SCHEMATIC INDICATING DIMENSIONS, INLET AIR FLOW RATE (SCFM), TEMPERATURE, % MOISTURE, FEEDSTOCK COMPOSITION AND THROUGHPUT (TONS/DAY), COMPOSTING DAYS FOR EACH STAGE, ETC.

   d. A DESCRIPTION OF THE APPROVED SAMPLING AND ANALYTICAL METHODS FOR EACH CONSTITUENT MEASURED (SEE GUIDELINES UNDER SCAQMD RULE 1133.3, ATTACHMENT A).

   e. COMPLETE CALCULATIONS FOR FLOW RATES, MEASURED UNDER COVER (UNCONTROLLED) AND COVER SURFACE (CONTROLLED) CONCENTRATIONS (PPMV), EMISSION RATES, EMISSION FACTORS FOR COMPLETE COMPOSTING - THREE PHASE (LBS OF POLLUTANT/TON OF FEEDSTOCK).

   f. A DESCRIPTION OF THE CALIBRATION AND QUALITY ASSURANCE PROCEDURES.

   g. SAMPLING FACILITIES SHALL COMPLY WITH THE DISTRICT GUIDELINES FOR CONSTRUCTION OF SAMPLING AND TESTING FACILITIES, PURSUANT TO RULE 217.

   h. A STATEMENT DETERMINING THAT THE TESTING LABORATORY QUALIFIES AS AN "INDEPENDENT TESTING LABORATORY" UNDER RULE 304 (NO CONFLICT OF INTEREST) AND SIGNED BY THE RESPONSIBLE AUTHORITY.

12. THE TEST SHALL DETERMINE THE EMISSIONS (e.g. PPMV, LBS/DAY, LBS/TON OF FEEDSTOCK THROUGHPUT) FOR:

    TOTAL NON-METHANE ORGANIC COMPOUNDS (TNMOC) AND SPECIATED ANALYSIS (EXHAUST).
    AMMONIA
    CONTROL EFFICIENCY (WT %) FOR TNMOC AND AMMONIA
    GREENHOUSE GAS (CO2, CH4, N2O, CO2e).

FILE COPY

13. THE TESTS SHALL BE CONDUCTED UPON ESTABLISHING NORMAL OPERATING CONDITIONS FOR ASP COMPOSTING. INITIALLY, THE SOURCE TESTS SHALL BE CONDUCTED FOR A SINGLE PILE, WITH KNOWN FEEDSTOCK THROUGHPUT (TONS) THAT IS PROCESSED THROUGH COMPLETE COMPOSTING CYCLES (ACTIVE, CURING AND FINISHING) RESULTING IN FINAL PRODUCT. A WRITTEN REPORT SHALL BE SUBMITTED TO THE SCAQMD WITHIN 45 DAYS AFTER SOURCE TESTS COMPLETION.

14. THE OWNER OR OPERATOR SHALL CALCULATE THE MAXIMUM INDIVIDUAL CANCER RISK (MICR), ACUTE HAZARD INDEX (HIA) AND CHRONIC HAZARD INDEX (HIC), BASED ON THE SOURCE TESTS RESULTS, USING AQMD PUBLISHED "RISK ASSESSMENT PROCEDURES FOR RULES 1401 AND 212" (VERSION 7.0), TO DETERMINE THE COMPLIANCE WITH RULE 1401. RESULTS SHALL BE SUBMITTED TO AQMD WITHIN 45 DAYS AFTER THE INITIAL TESTING IS COMPLETED.

15. ANY BREAKDOWN OR MALFUNCTION OF THIS EQUIPMENT RESULTING IN EXCESSIVE TNMOC, AMMONIA AND ODOR EMISSIONS INTO THE ATMOSPHERE SHALL BE REPORTED TO THE SCAQMD WITHIN TWENTY FOUR HOURS AFTER OCCURRENCE, AND IMMEDIATE REMEDIAL MEASURES SHALL BE UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.

16. FOODWASTE NOT DESIGNATED FOR IMMEDIATE MIXING SHALL BE STORED WITHIN THE MRF/TRANSFER BUILDING NOT LONGER THAN 48 HOURS OR COVER WITH FINISHED COMPOST UNTIL USED.

17. FEEDSTOCK GRINDING, SCREENING, ACTIVE, CURING AND FINISHED PRODUCT MATERIAL SHALL BE HANDLED IN A MANNER TO PREVENT ANY FUGITIVE DUST AND ODOR EMISSIONS.

18. PORTABLE GRINDING AND SCREENING EQUIPMENT AND A FRONT-END BUCKET LOADER USED FOR THE COMPOSTING SYSTEM SHALL HAVE VALID REGISTRATION ISSUED BY THE AIR RESOURCES BOARD (ARB), AND SHALL BE AVAILABLE UPON REQUEST BY THE SCAQMD PERSONNEL.

19. THIS EQUIPMENT SHALL BE OPERATED IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS OF RULE 1133.3.

20. ALL RECORDS REQUIRED BY THIS PERMIT SHALL BE KEPT AND MAINTAINED FOR AT LEAST TWO YEARS, AND SHALL BE MADE AVAILABLE TO SCAQMD PERSONNEL UPON REQUEST.

Approval or denial of this application for permit to operate the above equipment will be made after an inspection to determine if the equipment has been constructed in accordance with the approved plans and specifications and if the equipment can be operated in compliance with all Rules of the South Coast Quality Management District.

Please notify GAURANG RAWAL at (909) 396 - 2543 when construction of equipment is complete.

This Permit to Construct is based on plans, specifications, and data submitted as it pertains to the release of air contaminants and control measures to reduce air contaminants. No approval or opinion concerning safety and other factors in design, construction or operation of equipment is expressed or implied.

This Permit to Construct shall serve as a temporary Permit to operate provided the Executive Officer is given prior notice of such intent to operate.

This Permit to Construct will become invalid if the Permit to Operate is denied or if the application is cancelled. This PERMIT TO CONSTRUCT SHALL EXPIRE ONE YEAR FROM THE DATE OF ISSUANCE unless an extension is granted by the Executive Officer.

Dorris M Bailey

DMB/GR01

DORRIS M.BAILEY
Principal office Assistant

FILE COPY

Attachment 4

Source Test Team Contact Info

Charles E. Schmidt, PhD
19200 Live Oak Road, Red Bluff, CA 96080
530-529-4256 Fax:530-529-4878
E-Mail: schmidtce@aol.com

Thomas R. Card, PE
Environmental Management Consulting
41125 278th Way SE, Enumclaw, WA 98022
360-802-5540 Fax: 360-802-5541
E-Mail: trcard@earthlink.net

Dean Yonemori
Almega
10602 Walker Street
Cypress, CA 90630
714-889-4000

Attachment 5

Certifications

South Coast
Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765-4178
(909) 396-2000 · www.aqmd.gov

RECEIVED
JUN 15 2015
Almega

June 10, 2015

Mr. John W. Phillips
Almega Environmental
10602 Walker Street
Cypress, CA 90630

Subject: LAP Approval Notice
Reference # 93LA0827

Dear Mr. Phillips:

We completed our review of the renewal application you submitted for approval under the South Coast Air Quality Management District's Laboratory Approval Program (SCAQMD LAP). We are pleased to inform you that your firm is approved for the period beginning June 30, 2015, and ending June 30, 2016 for the following methods, subject to the requirements in the LAP Conditions For Approval Agreement and conditions listed in the attachment to this letter:

SCAQMD Methods 1-4
SCAQMD Method 10.1
SCAQMD Method 100.1
SCAQMD Method 25.1 (Sampling)
SCAQMD Method 25.1 (Analysis)
SCAQMD Method 25.3 (Analysis)
SCAQMD Methods 5.1 and 6.1
SCAQMD Method 7.1
SCAQMD Rule 1121/ 1146.2 Protocols
SCAQMD Rule 1420/1420.1 – (Lead) Source Sampling
SCAQMD Rule 1420/1420.1 – (Lead) Ambient Sampling
SCAQMD Rule 462 Testing
ASTM D6522-00/ USEPA CTM-030

Thank you for participating in the SCAQMD LAP. Your cooperation helps us to achieve the goal of the LAP: to maintain high standards of quality in the sampling and analysis of source emissions. You may direct any questions or information to LAP Coordinator, Glenn Kasai. He may be reached by telephone at (909) 396-2271, or via e-mail at gkasai@aqmd.gov.

Sincerely,

Rudy Eden, Senior Manager
Laboratory Services &
Source Test Engineering

RE:GK/gk

cc: Dipankar Sarkar

150610 LapRenewal.doc

ATTACHMENT

Conditions For Almega Environmental's LAP Approval

1) Almega shall adhere to the following requirements when conducting portable analyzer tests using CTM-030 or ASTM D6522:

    a) Deviations to CTM-030 or ASTM D6522 shall be documented in the Test Critique section of the test report;

    b) The test report shall be formatted and organized in a manner consistent with the example portable analyzer test report, dated September 24, 2011, and the District Source Test Manual, Chapter II; and,

    c) NO_2 measurements may be quantified to 10% of the NO_2 span under the following conditions:

        - Calibrations shall be conducted per Sections 7.3 and 7.6 of CTM-030 at the span, mid-span (40-60% of span), low-span (10% of span), and zero level. The low-span calibration shall satisfy the requirements in Section 4.2 of CTM-030;
        - A linearity check shall be conducted once every five days using the low-span calibration gas; and,
        - If the measured NO_2 emission is less than 10% of the NO_2 span, it shall be reported as less than 10% of the span, and added to the NO emission to determine the total NOx concentration.

State of California

Air Resources Board

Approved Independent Contractor

Almega Environmental & Technical Services

This is to certify that the company listed above has been approved by the Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, Title 17, Section 91207, until June 30, 2016, for those test methods, listed below:

ARB Source Test Methods:
1, 2, 3, 4, 5, 8
100 (CO, CO_2, NO_X, O_2, SO_2)

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

State of California

Air Resources Board

Approved Independent Contractor

Almega Environmental & Technical Services

This is to certify that the company listed above has been approved by the Air Resources Board to conduct compliance testing pursuant to California Code of Regulations, Title 17, Section 91207, until June 30, 2010, for the test method listed below:

Visible Emissions Evaluation

Dr. Michael T. Benjamin, Chief
Monitoring and Laboratory Division

Certification of No Conflict-of-Interest

CE Schmidt, Environmental Consultant
19200 Live Oak Road
Red Bluff, CA 96080

I certify that I am responsible for the testing operations of CE Schmidt, Environmental Consultant and am authorized to sign this certificate on the Company's behalf.

CE Schmidt, Environmental Consultant may conduct tests as an independent tester pursuant to SCAQMD Rule 304(k). I further certify that EMC has no conflict-of-interests, and is not related or owned in any way to the company being tested.

Company being tested: BURRTEC WEST VALLEY FACILITY

Facility: BURRTEC WEST VALLEY FACILITY

Facility ID: # 156065

Device ID: GORE COMPOST MEMBRANE/SYSTEM

Signature: CE SCHMIDT

Name (printed or typed): CE SCHMIDT

Title: CONSULTANT

Date: 8/11/2015

Fire Prevention Plan (Organics Processing Area)

RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Composting Operation
Fire Prevention and Response Plan

Badlands Landfill
November 2018

I. GENERAL

A. Purpose of Plan

The purpose of this Fire Prevention Response Plan (FPRP) for the proposed composting operation – which will utilize either the aerated static pile (ASP) or windrow composting method - at the Badlands Landfill is to meet the requirements of Section 17867(a)(9) of Title 14 of the California Code of Regulations (CCR). The regulation states, 'The operator shall provide fire prevention, protection and control measures, including, but not limited to, temperature monitoring of windrows and piles, adequate water supply for fire suppression, and the isolation of potential ignition sources from combustible materials. Fire lanes shall be provided to allow fire control equipment access to all operation areas'.

B. Background

Composting has become an important option for managing a variety of organic wastes. Biological oxidation of the readily decomposable compounds converts organic materials to a stable compost. Properly composted organic materials are suitable for use as a soil conditioner and fertilizer to improve plant growth. Composting diverts materials from landfilling and allows for the beneficial reuse of a waste product. The planned facility will incorporate a windrow composting operation (up to 300 tpd) or an ASP compost operation (up to 150 tpd).

All piles of organic materials including inbound feedstock, active compost, and finished mulches and soil amendments are monitored for temperature to avoid spontaneous combustion from high internal temperatures. Piles are monitored for temperature reading and logged daily by facility staff. The majority of the material onsite will be undergoing active composting, which has a moisture content of 40 to 60 percent and is not typically susceptible to fires. Regardless, in the event of high internal temperatures, the pile is turned and watered then monitored to reduce temperature readings.

C. Windrow Composting Method

Windrows will be formed using a frontend bucket loader creating compost windrows that measure approximately 6- to 8-feet high, approximately 10- to 12-feet wide, and 150 feet long. The windrows will be spaced at roughly 12-foot intervals to allow access to the sides of each windrow. The WRP can accommodate approximately 24 windrows at the noted dimensions.

D. ASP Composting

The proposed ASP compost facility will require the construction of a series of concrete bunkers. There will be an aisle between each bunker to allow a tarping machine to straddle each bunker and unroll cover tarps. Each bunker will have sidewalls approximately three to four feet high and a rear push-wall approximately eight feet high.

Composting with the GORE® Cover Compost System, or similar ASP system, typically occurs in three phases. Phase 1 lasts four weeks, Phase 2 lasts two weeks, and Phase 3 lasts two weeks. Phase 1 and Phase 2 are covered using a micropore cover system that helps to retain moisture and control odors and emissions. Phase 3 bunkers and finished curing areas are not covered.

Turning of the compost material between phases is performed to ensure aerobic decomposition of the organic matter. Each bunker has air supplied through the process with an appropriately sized fan. The fan is computer controlled based on pile temperature and oxygen concentration. The fan does not operate continuously.

E. Site Location and Access

The site is located east of Moreno Valley within the Badlands Landfill facility which is located north of Highway 60 and east of Theodore Street. A site location map is attached as Figure 1. The Badlands Landfill is accessed from Highway 60 via the Theodore Street exit, then north one-half mile to Ironwood Avenue, then east one mile. All traffic enters the Badlands facility, through the main gate on Ironwood Avenue. This access area is controlled by locking gates, a scale house, and video surveillance. The entrance road is a two-lane asphalt-concrete paved surface.

The composting operations are proposed to be located within the Badlands Landfill facility as shown on Figure 2.

F. Site Plan

The composting operation generally occupies an area south of the Engineering/Operations office and west of the landfill. Figures 3 and 4 show the general layout of the two composting methods of operation including the composting pads, curing piles area, stormwater detention area, and leachate area.

II. FIRE PROTECTION PROGRAM

A. Regulatory Requirement

Title 14, Chapter 3.1, Article 6, Section 17867(a)(9) of the CCR requires that "The operator shall provide fire prevention, protection and control measures, including, but not limited to, temperature monitoring of windrows and piles, adequate water supply for fire suppression, and the isolation of potential ignition sources from combustible materials. Fire lanes shall be provided to allow fire control equipment access to all operation areas."

The following sections will address the minimum requirements outlined in the CCR Section 17867(a)(9).

B. Fire Hazards

The main potential fire hazard within composting operations are large, dry, composting piles (active, curing, or a pile of overs screened out of the finished product). Water seeping into the dry compost can restart microbial activity and initiate reheating. A crack from the hot spot within the pile to the surface often develops into a vent or chimney. Air movement up through this vent draws more oxygen into the hot spot where heat is being generated, rapidly escalating the transition from a biological fire to smoke.

Surface fires (fires which start and spread on the exterior surface of materials and remain exposed) are another hazard. Surface fires could potentially be started by lightning strikes, sparks from welding equipment, sparks or heat from operating equipment which ignite oil or dust particles, and wildfire.

C. Fire Extinguishing Equipment

Fire extinguishers are located within the cabs of material handling equipment (front loaders, dozers, conveyers, etc.). They are maintained, located and identified making them readily accessible to employees without subjecting the employee to possible injury.

All fire extinguishers, fire hoses, and fire pumps will be regularly inspected or tested, maintained in effective working order, and all personnel will be familiar with their locations and use.

As part of maintaining good control of the composting process and demonstration of pathogen reduction, the temperature of the compost piles will be monitored in addition to other key parameters. If allowable temperatures of the compost piles are exceeded, moisture will be added to maintain good composting conditions well before unsafe temperatures are reached. The design of the composting operation includes appropriately designed fire lanes, which allow access of fire control equipment to the operational areas.

A fire that occurs at the composting operation may be extinguished by trained onsite personnel and/or the Riverside County Fire Department. Ample water supplies and equipment are available for fire suppression including: water trucks and an onsite water tank located within the compost area.

D. Good Housekeeping Practices

Good housekeeping is a vital part of fire prevention. Each and every employee is responsible for keeping his or her work area clean. The following points are emphasized:

- Avoid accumulating combustible materials;
- Keep all flammable and combustible materials away from ignition sources;
- Keep all exit paths clear;
- Promptly and properly clean-up spills and leaks of material and notify supervisor;
- Remove all trash and waste at the end of each shift, and place it in the appropriate waste receptacle;
- Keep all oily rags in a designated waste receptacles;
- Keep all flammables in a flammable storage cabinet at least 30 feet from sources of ignition;
- Assure adequate aeration of the pile to release heat and increase evaporation of water, a heat absorbing process. Ventilation can be achieved by mechanical aeration, or turning the pile. Ventilation can also be improved by constructing narrower, shallower windrows or piles;
- Avoid active pile depths greater than approximately 15 feet, and monitor for vents in deep piles. Use these vents to monitor internal pile temperatures if they develop;
- Visually inspect the piles to look for signs of hot spots. Indicators include evidence of vents, fissures, wet spots on the surface, and fissures of steam, hints of smoke, or a charred odor; and

- Locate the hot spot before it turns into a fire. Seek out the hottest spot in the pile during routine temperature monitoring in the active piles. If there is a suspected hotspot in a curing pile, utilize a temperature probe to monitor and identify suspected hot spot.
- Delivery of material will be observed and rubber and plastic (i.e. tires, hoses, buckets, etc.), carpet and other contaminant material will be removed. Equipment will be used to open the interior of the piles to remove larger plastic contamination. Plastic contamination will be placed in a covered bin to protect it from embers in the event of a fire.

E. No Smoking

A "No Smoking" policy is instituted where flammable and combustible liquids are used and/ or stored. These areas will be posted "No Smoking". Employees are instructed as to the reasons for the prohibitions.

F. Training

All site personnel are to be trained in good fire prevention and housekeeping techniques in order to reduce the fire starting potential. Site personnel should also be familiar with basic fire control procedures and use of fire extinguishers

Training for the fire prevention program will be conducted at the following times:

- At employee's time of hire, or transfer to a new area, and annually thereafter;
- When there have been revisions or additions to the program;
- If any employee demonstrates that he/ she may need re-training; and
- Training on the use of fire extinguishers is provided annually for employees who are designated to use fire extinguishers.

G. Special Procedures for Compost Piles

Best Management Practices (BMPs) for the prevention of fires in compost piles include:

- Providing sufficient space to avoid exceeding the fire-safe height of piles (approximately 15 feet for active piles and 18 feet for curing piles);
- Providing access to piles for firefighting equipment (12 feet wide lanes minimum along ends of pile rows);
- Providing access to adequate supply of water;
- Providing space to spread piles out;
- Monitoring internal temperature of piles during the active phase (fire potential if greater than 160°F for over six hours);
- A minimum of two loaders should be available for use in moving and spreading out stored material for firefighting; and
- Piles should be ventilated by reducing the pile size if storage pile temperatures reach greater than 160°F for six hours and after investigating fire potential is deemed possible.

- Each vehicle will be checked for burning or smoldering materials. Vehicles containing burning or smoldering materials are not allowed to add to the wastes already on the tipping pad. If a vehicle entering the site is found to contain burning or smoldering materials, it is directed to a separate area away from structures and equipment so the fire can be safely extinguished. If a visual inspection fails to identify a smoldering waste load and it is deposited with other waste, it is quickly separated with onsite equipment. Operations personnel will immediately close off access to the incident area. Once isolated, the burning materials are spread out and treated with appropriate fire suppression measures (fire retardants or water). Once extinguished, the material is continually monitored until it is determined that there is no longer a fire threat. It will then safely loaded into a truck or container for offsite disposal.
- At the ends of pile groupings, a minimum 12 feet wide fire lane exists allowing for access to the piles. Various sources of water and fire extinguishing equipment are located throughout the site. In addition, earthmoving equipment, such as dozers and loaders, are also available at the site.
- The active composting piles will be instrumented with automated temperature probes for monitoring the temperature throughout the composting process, with at least one sensor to every approximately 200 cubic yards (cy) of compost, in accordance with the CCR, Title 14, Chapter 3.1, Article 7, Section 17868.3(c)(1). Based on monitoring and operational protocol, the aeration system is activated to induce airflows through the active piles. The aeration timing and flow rates are varied as needed to optimize the composting process, minimize odors, and prevent potential subsurface fires. Additional measures include ventilating the pile to decrease the internal temperature by turning the compost stockpiles and spraying with a sprinkler.

III. General Fire Emergency Procedures

The general fire emergency procedures detailed below will be implemented when there is a fire that is not immediately contained and extinguished or too large to handle. The site fire control approach is based on leaving firefighting to the fire department with support from trained on site employees.

A. Surface Fire

Surface fires are typically accessible fires for which the traditional approach of applying water or chemicals typically is effective in containing and extinguishing the fire.

1. If a fire develops landfill personnel are equipped and trained to extinguish it. The site has immediate access to heavy equipment for fire breaks and burials, soil stock piles and water trucks. All materials handling heavy equipment have onboard fire suppression systems and hand held fire extinguishers.
2. Fire protection for site equipment is provided by frequent inspection and removal of debris and dust from under carriages and engine compartments. Regular maintenance includes inspections for oil and fuel leaks. There are portable fire extinguishers on all vehicles and heavy equipment.
3. Small fires located at the site will be extinguished by site personnel using materials and equipment as noted above by the following procedure:

    a. Approach from the upwind side of the area affected by fire.

    b. Extinguish the fire with a portable fire extinguisher or with water from the water truck and with dirt pushed by the front loaders.
    c. Proceed with caution, such that heavy equipment does not become trapped or stuck in loose refuse.
    d. Use water sensibly. A fine spray is generally as effective as a heavy stream and does not empty the truck as quickly.
    e. No heavy equipment is to approach a fire unless supported by a water truck. When the water truck becomes empty, the heavy equipment must back away from the fire until more water is available.
    f. If two water trucks are available, shuttle water trucks back and forth such that one is filling while the other is in use.
4. If the fire is assessed to be too large to handle, staff will immediately call 911 and notify the Fire Department for emergency response.

B. Internal Pile Fire

5. Fires may start internally to the pile due to a series of reactions which progressively increase the temperature of the composting materials until the ignition point is reached.
6. If a fire develops landfill personnel are equipped and trained to extinguish it. The site has immediate access to heavy equipment for fire breaks and burials, soil stockpiles and water trucks. All materials handling heavy equipment have onboard fire suppression systems and hand held fire extinguishers.
7. Fire protection for site equipment is provided by frequent inspection and removal of debris and dust from under carriages and engine compartments. Regular maintenance includes inspections for oil and fuel leaks. There are portable fire extinguishers on all vehicles and heavy equipment.
8. Small fires located at the site will be extinguished by site personnel using materials and equipment as noted above by the following procedure:

    a. Do not walk on piles or assume the extent of the fire is known. Pile fires can be much more widespread than surface smoke indicates;
    b. Shut down the aeration system;
    c. Carefully use a large wheel loader to open up the pile;
    d. A fire hose or water trucks should be available as the loader removes material to spray directly onto burning embers;
    e. Continue to break the pile up and drench the materials as they are removed and spread on the ground or stacked in small piles with water.
9. If the fire is assessed to be too large to handle, staff will immediately call 911 and notify the Fire Department for emergency response.

C. Evacuation Plan

In the event the fire is not immediately contained and extinguished, or is too large to handle, implement the following procedures:

1. NOTIFY THE FIRE DEPARTMENT
    a. Call 911 and inform the dispatcher of the site address, location of the fire, type of fire, and whether it is likely to spread out of the immediate area;
    b. Follow all fire department instructions;
    c. One person should be at the Main Gate to direct the fire trucks and other traffic; and

   d. One person should take charge near the location of the fire to direct fire trucks & direct traffic flow to maintain free and unimpeded access to the fire.

2. IMMEDIATELY NOTIFY OTHERS & EVACUATE THE AREA
   a. Notify anyone in the immediate area and contact a Supervisor or Manager;
   b. If possible, remove all vehicles from the site of the fire.
   c. Evacuate the area.

IV. Protection of Public Health and Safety, and Environment

Numerous environmental control and monitoring measures, which are overseen by various regulatory agencies, are in place at the site. In the event of a fire, these agencies will be notified regarding potential environmental issues and appropriate mitigation and response measures as needed. Notification could include items such as runoff from chemical firefighting retardants or air emissions from the burning product.

A. LOCAL FIRE CONTROL AGENCY

The Riverside County Fire Department responds to any fire emergencies at the site. The nearest fire station is Fire Station #58 located at 28040 Eucalyptus Avenue, Moreno Valley, CA, 92555. It is located 4.6 miles from the site.

B. Site Access

Access to the site is by Ironwood Avenue through the main entrance gate and scale house.

Badlands Sanitary Landfill

31125 Ironwood Ave., Moreno Valley, CA 92555

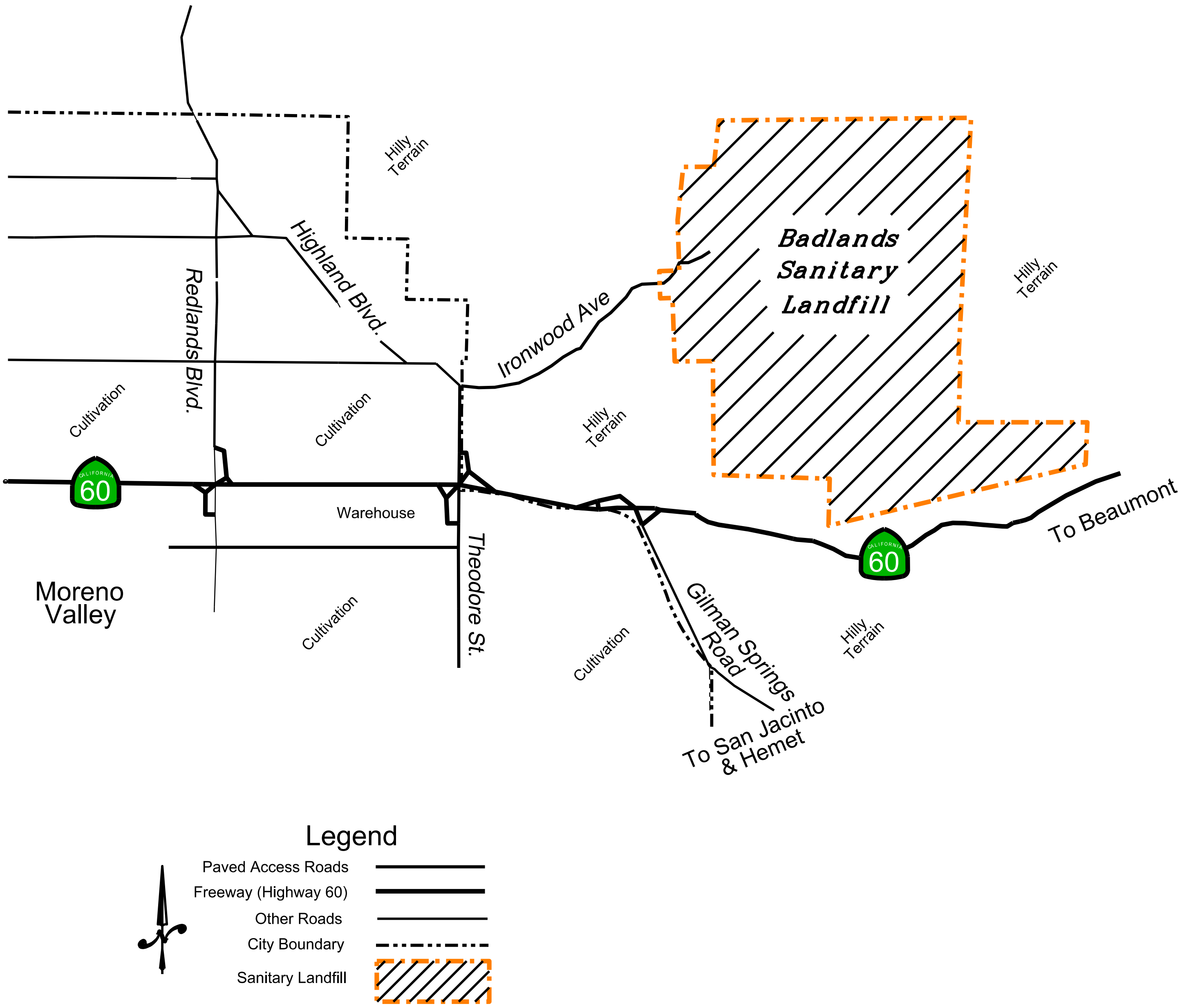


Figure 1

RIVERSIDE COUNTY DEPARTMENT OF WASTE RESOURCES

Hans Kernkamp General Manager - Chief Engineer

Scale: 1" = 3400'

0 1700 3400 5100 6800 8500

Badlands (Closed) Sanitary Landfill

Vicinity Map

Project Title:	Vicinity Maps - 2017	Designed By:	mwm	Scale:	1"=3400'
Folder/File:	Vicinity Maps - 2017/	Drawn By:	mwm	Date:	Apr 2017
Model Name:	Badlands-2017-Vicinity.dgn - Default	Checked By:	.	Flight Date:	n/a

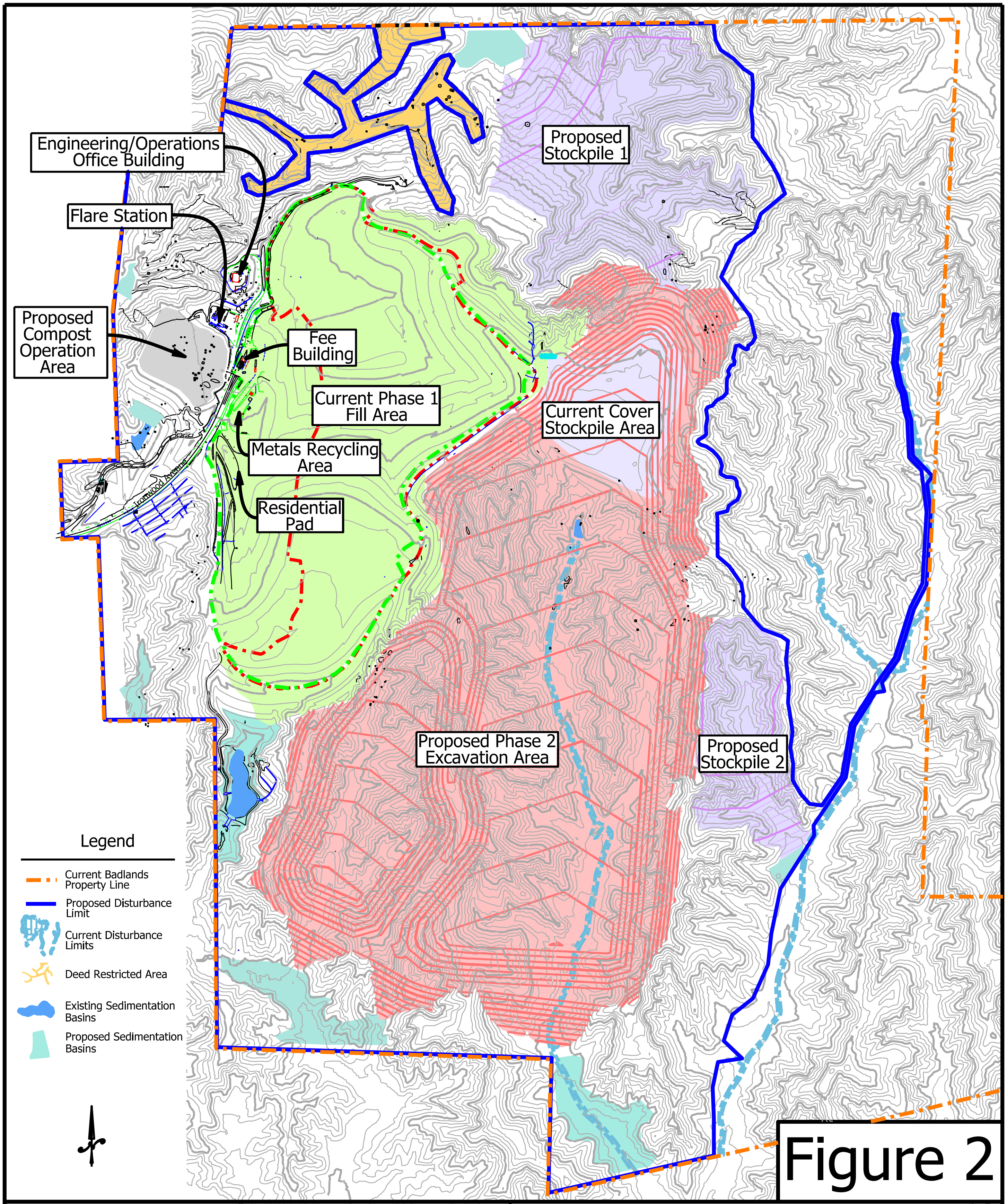


Figure 2

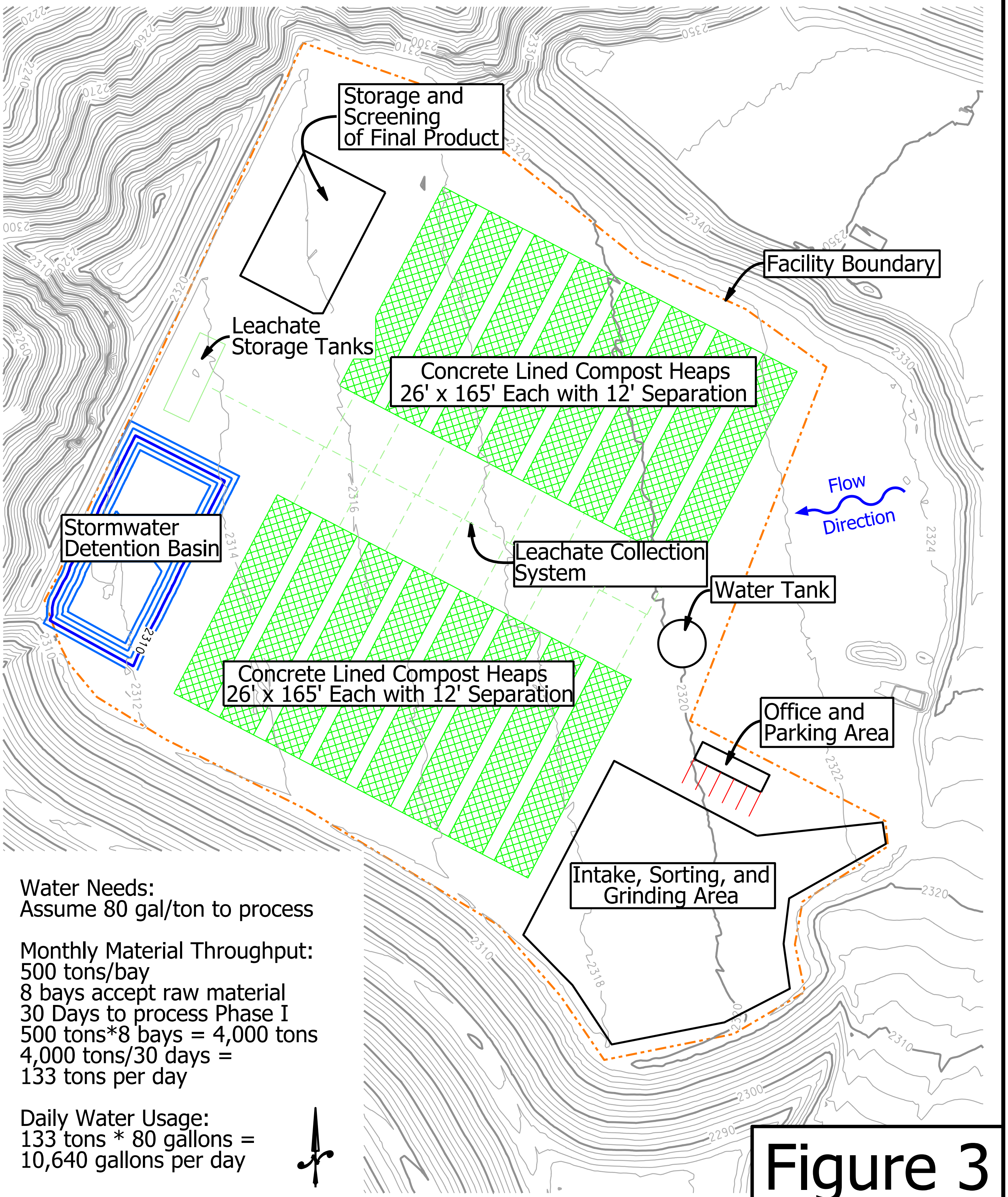
RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES
Hans Kernkamp, General Manager-Chief Engineer

Scale: 1" = 1000'
0 500 1000 1500 2000 2500
Datum is mean sea level Contour Interval is x feet

Badlands Sanitary Landfill

Site Map

Project Title:	sites/Badlands	Designed By:	KJJ	Scale:	1"=1000'
Folder/File:	18ba/projects/compost area design	Drawn By:	KJJ	Date:	29 November 2018
Model Name:		Checked By:	AC	Flight Date:	May 2015



Water Needs:
Assume 80 gal/ton to process

Monthly Material Throughput:
500 tons/bay
8 bays accept raw material
30 Days to process Phase I
500 tons*8 bays = 4,000 tons
4,000 tons/30 days =
133 tons per day

Daily Water Usage:
133 tons * 80 gallons =
10,640 gallons per day

Figure 3

RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES
Hans Kernkamp, General Manager-Chief Engineer

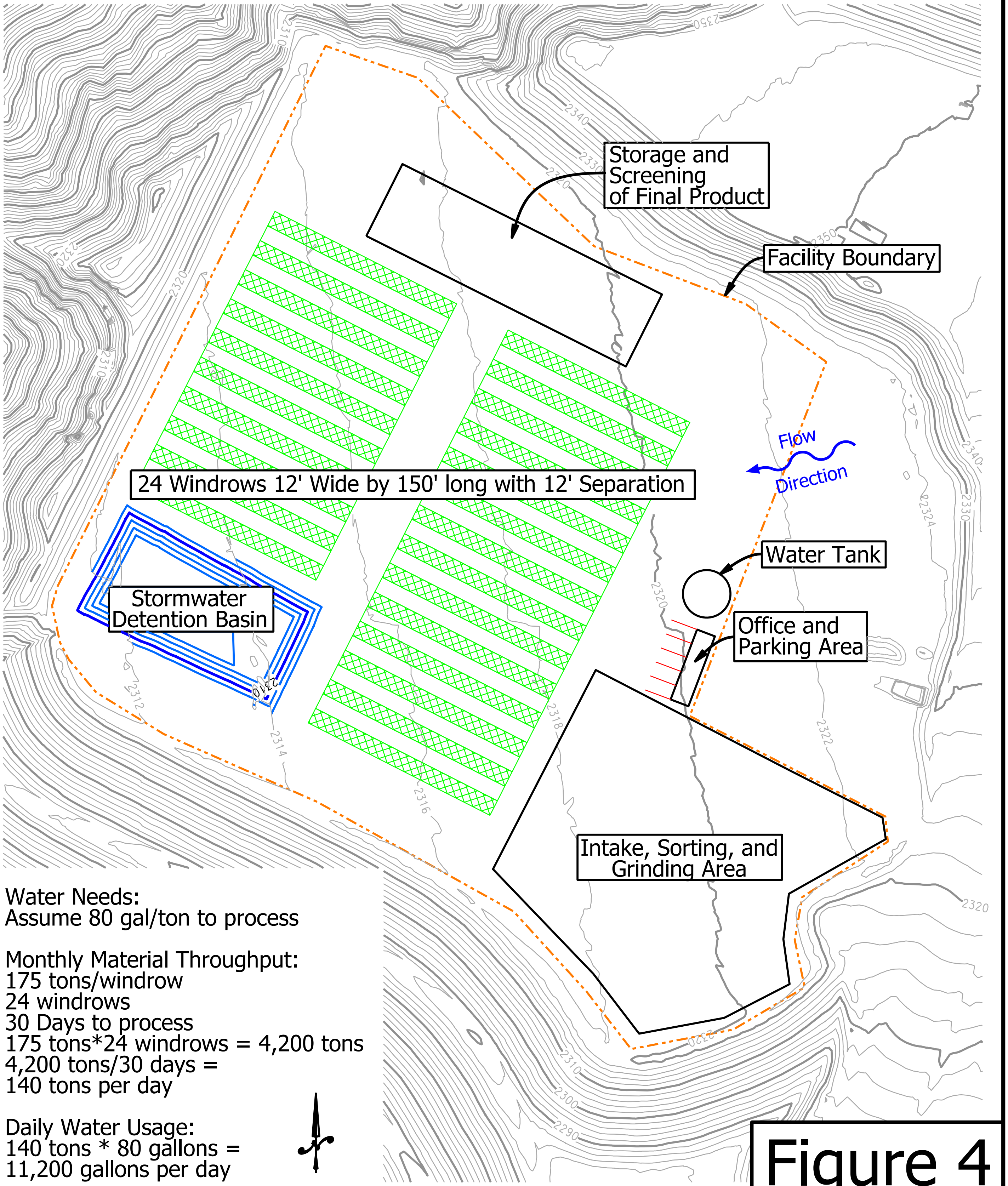
Scale: 1" = 100'
0 50 100 150 200 250
Datum is mean sea level Contour Interval is x feet

Badlands Sanitary Landfill

Aerated Static Pile Compost

Figure 2-12

Project Title:	BLIP Exhibits	Designed By:	KJJ	Scale:	1"=100'
Folder/File:	Sites/badlands/17ba/Projects/Blip Exhibits	Drawn By:	KJJ	Date:	March 9, 2018
Model Name:		Checked By:	AC	Flight Date:	May 2015



Water Needs:
Assume 80 gal/ton to process

Monthly Material Throughput:
175 tons/windrow
24 windrows
30 Days to process
175 tons*24 windrows = 4,200 tons
4,200 tons/30 days =
140 tons per day

Daily Water Usage:
140 tons * 80 gallons =
11,200 gallons per day

Figure 4

RIVERSIDE COUNTY
DEPARTMENT OF WASTE RESOURCES
Hans Kernkamp, General Manager-Chief Engineer

Badlands Sanitary Landfill

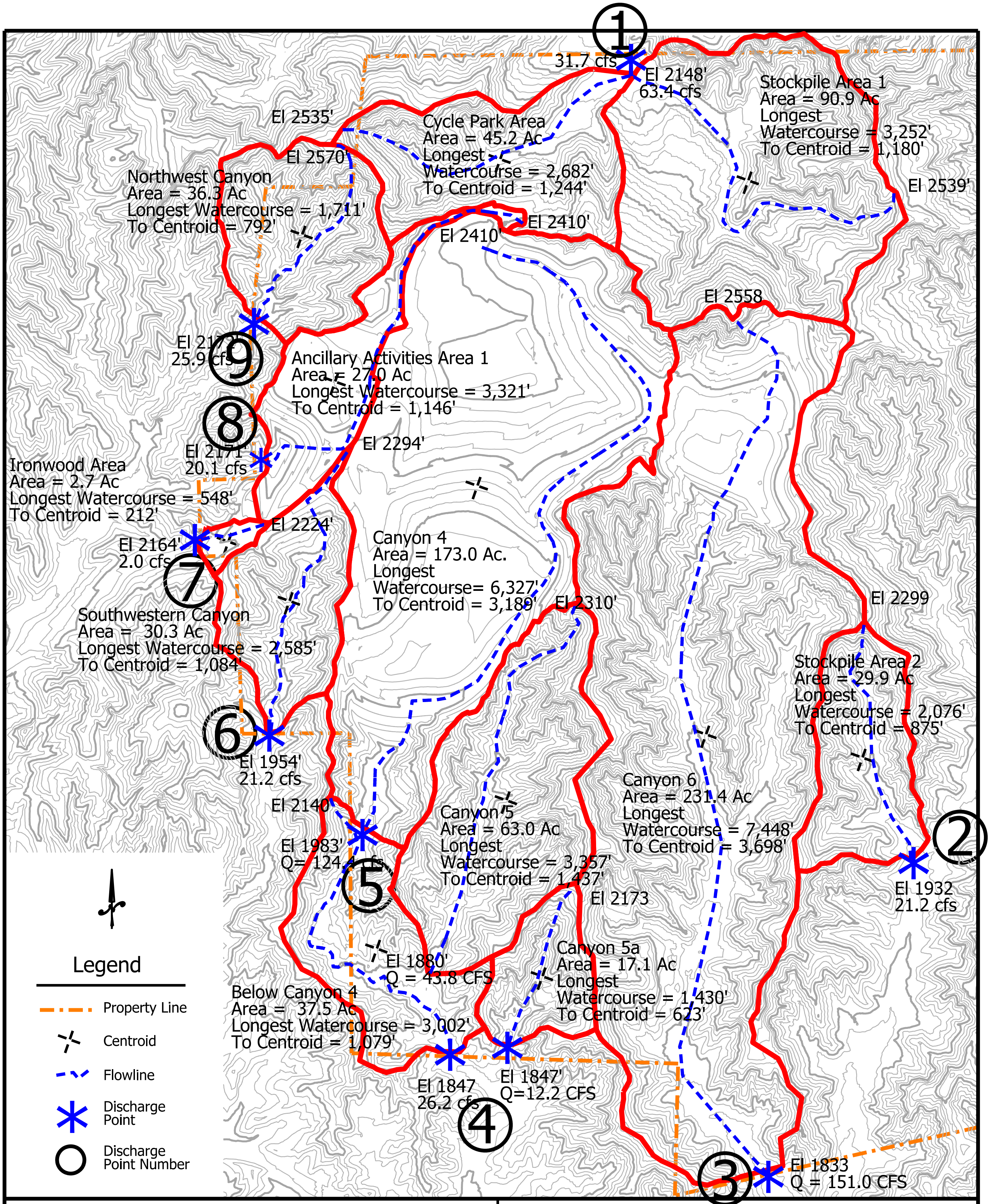
Windrow Compost

Scale: 1" = 100'
0 50 100 150 200 250
Datum is mean sea level Contour Interval is x feet

Project Title:	BLIP Exhibits	Designed By:	KJJ	Scale:	1"=100'
Folder/File:	Sites/badlands/17ba/Projects/Blip Exhibits	Drawn By:	KJJ	Date:	March 9, 2018
Model Name:		Checked By:	AC	Flight Date:	May 2015

Hydrology Study

Pre and Post Project Hydrology Comparison



RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Badlands Sanitary Landfill

Discharge Points

Figure 99

Scale: 1" = 1000'

0 500 1000 1500 2000 2500

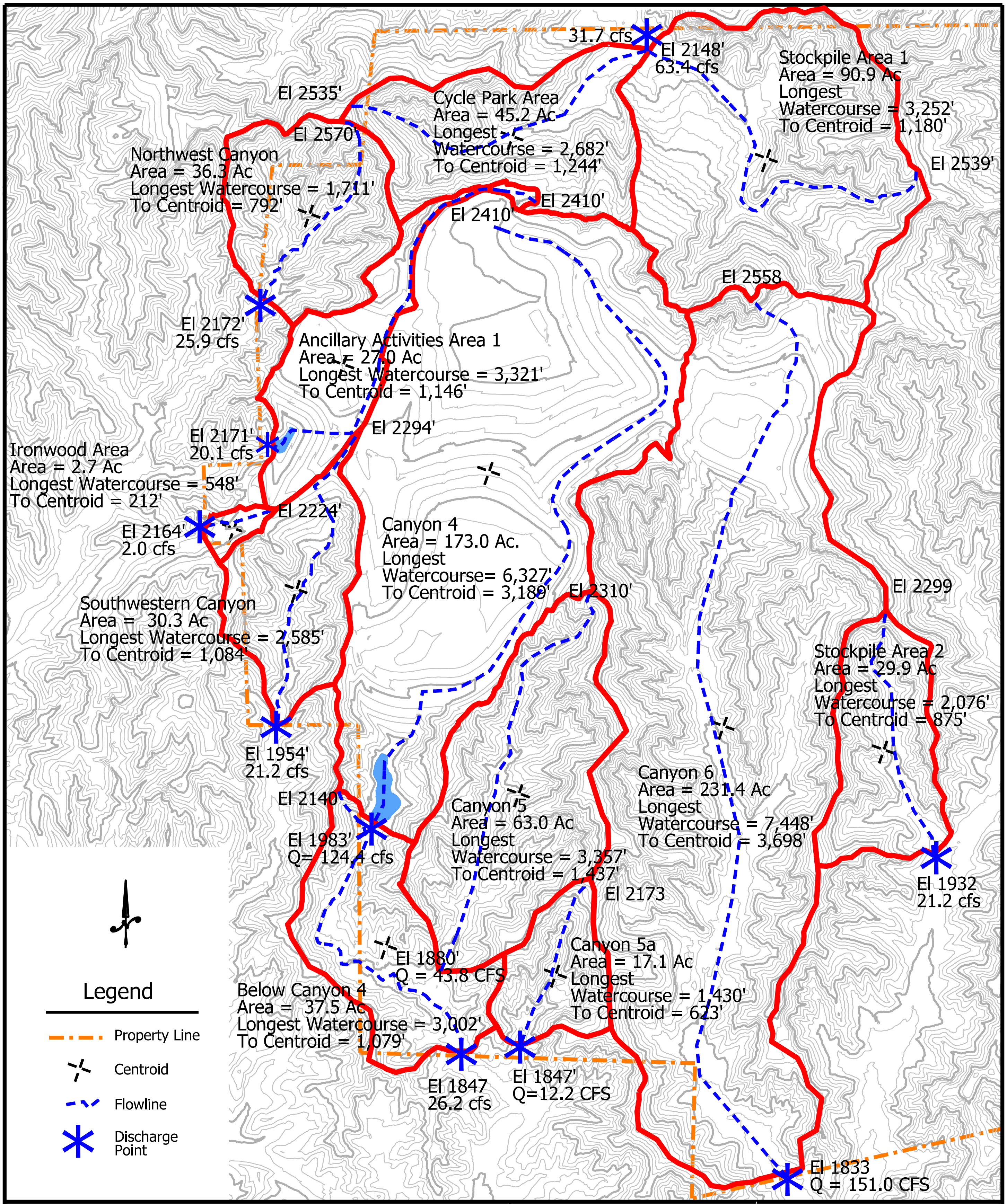
Datum is mean sea level Contour Interval is 20 feet

Project Title: Current Hydrology	Designed By:	KJJ	Scale:	1"=1000'
Folder/File: sites\badlands\ba18\Projects\Hydrology	Drawn By:	KJJ	Date:	March 27, 2018
Model Name:	Checked By:	AC	Flight Date:	May 2015

Discharge Point	Pre-Expansion			Post-Expansion		
	cfs	Acres	cfs/acre	cfs	Acres	cfs/acre
1	95.1	136.1	0.699	92.2	128.7	0.716
2	21.2	29.9	0.709	22.4	30.9	0.725
3	151	231.4	0.653	182.4	259.3	0.703
4	82.2	117.6	0.699	125.9	173.8	0.724
5	124.4	173	0.719	74.1	102.4	0.724
6	21.2	30.3	0.700	19.4	27.2	0.713
7	2	2.7	0.741	3	4	0.750
8	20.1	27	0.744	25.1	33.9	0.740
9	25.9	36.3	0.713	25.4	35.7	0.711

Totals	543.1	784.3	0.709	569.9	795.9	0.723

Pre Project Hydrology



RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Badlands Sanitary Landfill

Current Hydrology

Figure 99

Scale: 1" = 1000'

0 500 1000 1500 2000 2500

Datum is mean sea level Contour Interval is 20 feet

Project Title:	Current Hydrology	Designed By:	KJJ	Scale:	1"=1000'
Folder/File:	sites\badlands\ba18\Projects\Hydrology	Drawn By:	KJJ	Date:	March 27, 2018
Model Name:		Checked By:	AC	Flight Date:	May 2015

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: stockpile1areapre24100.out


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      -----------------------------------------------------------------
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      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Badlands Landfill
      Stockpile Area 1 Prelandfill
      24 our 100 year storm event

      -----------------------------------------------------------------
--
      Drainage Area =      90.90(Ac.)  =      0.142 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      90.90(Ac.)  =
0.142 Sq. Mi.
      Length along longest watercourse =    3252.00(Ft.)
      Length along longest watercourse measured to centroid =    1180.00
(Ft.)
      Length along longest watercourse =      0.616 Mi.
      Length along longest watercourse measured to centroid =      0.223
Mi.
      Difference in elevation =     391.00(Ft.)
      Slope along watercourse =    634.8339 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.133 Hr.
      Lag time =     7.96 Min.
      25% of lag time =     1.99 Min.
      40% of lag time =     3.18 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             90.90           2.00              181.80

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             90.90           5.50              499.95

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.98 %
      Adjusted average point rain =    5.499(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          90.900           93.00         0.000
       Total Area Entered =     90.90(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083         62.852         11.602              10.629
          2   0.167        125.705         35.016              32.078
          3   0.250        188.557         16.089              14.740
          4   0.333        251.410          8.785               8.048
          5   0.417        314.262          6.080               5.570
          6   0.500        377.115          4.315               3.953
          7   0.583        439.967          3.230               2.959
          8   0.667        502.820          2.637               2.415
          9   0.750        565.672          2.238               2.051
         10   0.833        628.525          1.895               1.736
         11   0.917        691.377          1.644               1.506
         12   1.000        754.230          1.422               1.303
         13   1.083        817.082          1.188               1.089
```

```
         14   1.167        879.935           1.131              1.036
         15   1.250        942.787           1.131              1.036
         16   1.333       1005.640           1.596              1.462
                                    Sum = 100.000   Sum=      91.610
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |  Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
  28   2.33     0.13      0.088         0.058      ---          0.03
  29   2.42     0.13      0.088         0.058      ---          0.03
  30   2.50     0.13      0.088         0.057      ---          0.03
  31   2.58     0.17      0.110         0.057      ---          0.05
  32   2.67     0.17      0.110         0.057      ---          0.05
  33   2.75     0.17      0.110         0.057      ---          0.05
  34   2.83     0.17      0.110         0.057      ---          0.05
  35   2.92     0.17      0.110         0.056      ---          0.05
  36   3.00     0.17      0.110         0.056      ---          0.05
  37   3.08     0.17      0.110         0.056      ---          0.05
  38   3.17     0.17      0.110         0.056      ---          0.05
  39   3.25     0.17      0.110         0.055      ---          0.05
  40   3.33     0.17      0.110         0.055      ---          0.05
  41   3.42     0.17      0.110         0.055      ---          0.06
  42   3.50     0.17      0.110         0.055      ---          0.06
  43   3.58     0.17      0.110         0.054      ---          0.06
  44   3.67     0.17      0.110         0.054      ---          0.06
  45   3.75     0.17      0.110         0.054      ---          0.06
  46   3.83     0.20      0.132         0.054      ---          0.08
  47   3.92     0.20      0.132         0.054      ---          0.08
  48   4.00     0.20      0.132         0.053      ---          0.08
  49   4.08     0.20      0.132         0.053      ---          0.08
  50   4.17     0.20      0.132         0.053      ---          0.08
  51   4.25     0.20      0.132         0.053      ---          0.08
```

```
 52   4.33     0.23      0.154        0.052      ---        0.10
 53   4.42     0.23      0.154        0.052      ---        0.10
 54   4.50     0.23      0.154        0.052      ---        0.10
 55   4.58     0.23      0.154        0.052      ---        0.10
 56   4.67     0.23      0.154        0.052      ---        0.10
 57   4.75     0.23      0.154        0.051      ---        0.10
 58   4.83     0.27      0.176        0.051      ---        0.12
 59   4.92     0.27      0.176        0.051      ---        0.13
 60   5.00     0.27      0.176        0.051      ---        0.13
 61   5.08     0.20      0.132        0.050      ---        0.08
 62   5.17     0.20      0.132        0.050      ---        0.08
 63   5.25     0.20      0.132        0.050      ---        0.08
 64   5.33     0.23      0.154        0.050      ---        0.10
 65   5.42     0.23      0.154        0.050      ---        0.10
 66   5.50     0.23      0.154        0.049      ---        0.10
 67   5.58     0.27      0.176        0.049      ---        0.13
 68   5.67     0.27      0.176        0.049      ---        0.13
 69   5.75     0.27      0.176        0.049      ---        0.13
 70   5.83     0.27      0.176        0.048      ---        0.13
 71   5.92     0.27      0.176        0.048      ---        0.13
 72   6.00     0.27      0.176        0.048      ---        0.13
 73   6.08     0.30      0.198        0.048      ---        0.15
 74   6.17     0.30      0.198        0.048      ---        0.15
 75   6.25     0.30      0.198        0.047      ---        0.15
 76   6.33     0.30      0.198        0.047      ---        0.15
 77   6.42     0.30      0.198        0.047      ---        0.15
 78   6.50     0.30      0.198        0.047      ---        0.15
 79   6.58     0.33      0.220        0.047      ---        0.17
 80   6.67     0.33      0.220        0.046      ---        0.17
 81   6.75     0.33      0.220        0.046      ---        0.17
 82   6.83     0.33      0.220        0.046      ---        0.17
 83   6.92     0.33      0.220        0.046      ---        0.17
 84   7.00     0.33      0.220        0.046      ---        0.17
 85   7.08     0.33      0.220        0.045      ---        0.17
 86   7.17     0.33      0.220        0.045      ---        0.17
 87   7.25     0.33      0.220        0.045      ---        0.18
 88   7.33     0.37      0.242        0.045      ---        0.20
 89   7.42     0.37      0.242        0.044      ---        0.20
 90   7.50     0.37      0.242        0.044      ---        0.20
 91   7.58     0.40      0.264        0.044      ---        0.22
 92   7.67     0.40      0.264        0.044      ---        0.22
 93   7.75     0.40      0.264        0.044      ---        0.22
 94   7.83     0.43      0.286        0.043      ---        0.24
 95   7.92     0.43      0.286        0.043      ---        0.24
 96   8.00     0.43      0.286        0.043      ---        0.24
 97   8.08     0.50      0.330        0.043      ---        0.29
 98   8.17     0.50      0.330        0.043      ---        0.29
 99   8.25     0.50      0.330        0.042      ---        0.29
100   8.33     0.50      0.330        0.042      ---        0.29
101   8.42     0.50      0.330        0.042      ---        0.29
102   8.50     0.50      0.330        0.042      ---        0.29
103   8.58     0.53      0.352        0.042      ---        0.31
104   8.67     0.53      0.352        0.041      ---        0.31
105   8.75     0.53      0.352        0.041      ---        0.31
106   8.83     0.57      0.374        0.041      ---        0.33
107   8.92     0.57      0.374        0.041      ---        0.33
108   9.00     0.57      0.374        0.041      ---        0.33
109   9.08     0.63      0.418        0.041      ---        0.38
110   9.17     0.63      0.418        0.040      ---        0.38
111   9.25     0.63      0.418        0.040      ---        0.38
```

```
112   9.33     0.67      0.440         0.040       ---          0.40
113   9.42     0.67      0.440         0.040       ---          0.40
114   9.50     0.67      0.440         0.040       ---          0.40
115   9.58     0.70      0.462         0.039       ---          0.42
116   9.67     0.70      0.462         0.039       ---          0.42
117   9.75     0.70      0.462         0.039       ---          0.42
118   9.83     0.73      0.484         0.039       ---          0.45
119   9.92     0.73      0.484         0.039       ---          0.45
120  10.00     0.73      0.484         0.038       ---          0.45
121  10.08     0.50      0.330         0.038       ---          0.29
122  10.17     0.50      0.330         0.038       ---          0.29
123  10.25     0.50      0.330         0.038       ---          0.29
124  10.33     0.50      0.330         0.038       ---          0.29
125  10.42     0.50      0.330         0.038       ---          0.29
126  10.50     0.50      0.330         0.037       ---          0.29
127  10.58     0.67      0.440         0.037       ---          0.40
128  10.67     0.67      0.440         0.037       ---          0.40
129  10.75     0.67      0.440         0.037       ---          0.40
130  10.83     0.67      0.440         0.037       ---          0.40
131  10.92     0.67      0.440         0.036       ---          0.40
132  11.00     0.67      0.440         0.036       ---          0.40
133  11.08     0.63      0.418         0.036       ---          0.38
134  11.17     0.63      0.418         0.036       ---          0.38
135  11.25     0.63      0.418         0.036       ---          0.38
136  11.33     0.63      0.418         0.036       ---          0.38
137  11.42     0.63      0.418         0.035       ---          0.38
138  11.50     0.63      0.418         0.035       ---          0.38
139  11.58     0.57      0.374         0.035       ---          0.34
140  11.67     0.57      0.374         0.035       ---          0.34
141  11.75     0.57      0.374         0.035       ---          0.34
142  11.83     0.60      0.396         0.034       ---          0.36
143  11.92     0.60      0.396         0.034       ---          0.36
144  12.00     0.60      0.396         0.034       ---          0.36
145  12.08     0.83      0.550         0.034       ---          0.52
146  12.17     0.83      0.550         0.034       ---          0.52
147  12.25     0.83      0.550         0.034       ---          0.52
148  12.33     0.87      0.572         0.033       ---          0.54
149  12.42     0.87      0.572         0.033       ---          0.54
150  12.50     0.87      0.572         0.033       ---          0.54
151  12.58     0.93      0.616         0.033       ---          0.58
152  12.67     0.93      0.616         0.033       ---          0.58
153  12.75     0.93      0.616         0.033       ---          0.58
154  12.83     0.97      0.638         0.032       ---          0.61
155  12.92     0.97      0.638         0.032       ---          0.61
156  13.00     0.97      0.638         0.032       ---          0.61
157  13.08     1.13      0.748         0.032       ---          0.72
158  13.17     1.13      0.748         0.032       ---          0.72
159  13.25     1.13      0.748         0.032       ---          0.72
160  13.33     1.13      0.748         0.031       ---          0.72
161  13.42     1.13      0.748         0.031       ---          0.72
162  13.50     1.13      0.748         0.031       ---          0.72
163  13.58     0.77      0.506         0.031       ---          0.47
164  13.67     0.77      0.506         0.031       ---          0.48
165  13.75     0.77      0.506         0.031       ---          0.48
166  13.83     0.77      0.506         0.031       ---          0.48
167  13.92     0.77      0.506         0.030       ---          0.48
168  14.00     0.77      0.506         0.030       ---          0.48
169  14.08     0.90      0.594         0.030       ---          0.56
170  14.17     0.90      0.594         0.030       ---          0.56
171  14.25     0.90      0.594         0.030       ---          0.56
```

```
172  14.33     0.87      0.572          0.030       ---           0.54
173  14.42     0.87      0.572          0.029       ---           0.54
174  14.50     0.87      0.572          0.029       ---           0.54
175  14.58     0.87      0.572          0.029       ---           0.54
176  14.67     0.87      0.572          0.029       ---           0.54
177  14.75     0.87      0.572          0.029       ---           0.54
178  14.83     0.83      0.550          0.029       ---           0.52
179  14.92     0.83      0.550          0.029       ---           0.52
180  15.00     0.83      0.550          0.028       ---           0.52
181  15.08     0.80      0.528          0.028       ---           0.50
182  15.17     0.80      0.528          0.028       ---           0.50
183  15.25     0.80      0.528          0.028       ---           0.50
184  15.33     0.77      0.506          0.028       ---           0.48
185  15.42     0.77      0.506          0.028       ---           0.48
186  15.50     0.77      0.506          0.028       ---           0.48
187  15.58     0.63      0.418          0.027       ---           0.39
188  15.67     0.63      0.418          0.027       ---           0.39
189  15.75     0.63      0.418          0.027       ---           0.39
190  15.83     0.63      0.418          0.027       ---           0.39
191  15.92     0.63      0.418          0.027       ---           0.39
192  16.00     0.63      0.418          0.027       ---           0.39
193  16.08     0.13      0.088          0.027       ---           0.06
194  16.17     0.13      0.088          0.026       ---           0.06
195  16.25     0.13      0.088          0.026       ---           0.06
196  16.33     0.13      0.088          0.026       ---           0.06
197  16.42     0.13      0.088          0.026       ---           0.06
198  16.50     0.13      0.088          0.026       ---           0.06
199  16.58     0.10      0.066          0.026       ---           0.04
200  16.67     0.10      0.066          0.026       ---           0.04
201  16.75     0.10      0.066          0.026       ---           0.04
202  16.83     0.10      0.066          0.025       ---           0.04
203  16.92     0.10      0.066          0.025       ---           0.04
204  17.00     0.10      0.066          0.025       ---           0.04
205  17.08     0.17      0.110          0.025       ---           0.08
206  17.17     0.17      0.110          0.025       ---           0.09
207  17.25     0.17      0.110          0.025       ---           0.09
208  17.33     0.17      0.110          0.025       ---           0.09
209  17.42     0.17      0.110          0.025       ---           0.09
210  17.50     0.17      0.110          0.024       ---           0.09
211  17.58     0.17      0.110          0.024       ---           0.09
212  17.67     0.17      0.110          0.024       ---           0.09
213  17.75     0.17      0.110          0.024       ---           0.09
214  17.83     0.13      0.088          0.024       ---           0.06
215  17.92     0.13      0.088          0.024       ---           0.06
216  18.00     0.13      0.088          0.024       ---           0.06
217  18.08     0.13      0.088          0.024       ---           0.06
218  18.17     0.13      0.088          0.023       ---           0.06
219  18.25     0.13      0.088          0.023       ---           0.06
220  18.33     0.13      0.088          0.023       ---           0.06
221  18.42     0.13      0.088          0.023       ---           0.06
222  18.50     0.13      0.088          0.023       ---           0.06
223  18.58     0.10      0.066          0.023       ---           0.04
224  18.67     0.10      0.066          0.023       ---           0.04
225  18.75     0.10      0.066          0.023       ---           0.04
226  18.83     0.07      0.044          0.023       ---           0.02
227  18.92     0.07      0.044          0.022       ---           0.02
228  19.00     0.07      0.044          0.022       ---           0.02
229  19.08     0.10      0.066          0.022       ---           0.04
230  19.17     0.10      0.066          0.022       ---           0.04
231  19.25     0.10      0.066          0.022       ---           0.04
```

```
232  19.33     0.13      0.088         0.022      ---          0.07
233  19.42     0.13      0.088         0.022      ---          0.07
234  19.50     0.13      0.088         0.022      ---          0.07
235  19.58     0.10      0.066         0.022      ---          0.04
236  19.67     0.10      0.066         0.022      ---          0.04
237  19.75     0.10      0.066         0.021      ---          0.04
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                    Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      90.9(Ac.)/[(In)/(Ft.)] =      35.1(Ac.Ft)
```

```
      Total soil loss =      0.87(In)
      Total soil loss =     6.574(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     1528143.1 Cubic Feet
      Total soil loss =      286353.2 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     63.380(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       17.5      35.0      52.5
70.0

-----------------------------------------------------------------------
    0+ 5       0.0003      0.05  Q         |         |         |
|
    0+10       0.0016      0.19  Q         |         |         |
|
    0+15       0.0034      0.25  Q         |         |         |
|
    0+20       0.0052      0.26  Q         |         |         |
|
    0+25       0.0067      0.22  Q         |         |         |
|
    0+30       0.0082      0.22  Q         |         |         |
|
    0+35       0.0098      0.23  Q         |         |         |
|
    0+40       0.0114      0.24  Q         |         |         |
|
    0+45       0.0132      0.26  Q         |         |         |
|
    0+50       0.0168      0.51  Q         |         |         |
|
    0+55       0.0253      1.24  Q         |         |         |
|
    1+ 0       0.0362      1.59  Q         |         |         |
|
    1+ 5       0.0469      1.55  Q         |         |         |
|
    1+10       0.0537      0.99  Q         |         |         |
|
    1+15       0.0590      0.77  Q         |         |         |
|
    1+20       0.0637      0.69  Q         |         |         |
|
    1+25       0.0681      0.64  Q         |         |         |
|
    1+30       0.0724      0.61  Q         |         |         |
|
```

```
    1+35           0.0765      0.61  Q         |         |         |
|
    1+40           0.0807      0.61  Q         |         |         |
|
    1+45           0.0849      0.61  Q         |         |         |
|
    1+50           0.0908      0.86  Q         |         |         |
|
    1+55           0.1017      1.57  Q         |         |         |
|
    2+ 0           0.1148      1.91  VQ        |         |         |
|
    2+ 5           0.1294      2.12  VQ        |         |         |
|
    2+10           0.1449      2.24  VQ        |         |         |
|
    2+15           0.1609      2.33  VQ        |         |         |
|
    2+20           0.1773      2.38  VQ        |         |         |
|
    2+25           0.1943      2.46  VQ        |         |         |
|
    2+30           0.2117      2.53  VQ        |         |         |
|
    2+35           0.2311      2.82  VQ        |         |         |
|
    2+40           0.2557      3.58  V Q       |         |         |
|
    2+45           0.2830      3.95  V Q       |         |         |
|
    2+50           0.3117      4.18  V Q       |         |         |
|
    2+55           0.3417      4.34  V Q       |         |         |
|
    3+ 0           0.3725      4.48  V Q       |         |         |
|
    3+ 5           0.4041      4.59  V Q       |         |         |
|
    3+10           0.4363      4.67  V Q       |         |         |
|
    3+15           0.4689      4.74  V Q       |         |         |
|
    3+20           0.5019      4.79  V Q       |         |         |
|
    3+25           0.5353      4.85  V Q       |         |         |
|
    3+30           0.5691      4.90  V Q       |         |         |
|
    3+35           0.6031      4.94  V Q       |         |         |
|
    3+40           0.6375      4.99  V Q       |         |         |
|
    3+45           0.6721      5.03  V Q       |         |         |
|
    3+50           0.7087      5.32  V  Q      |         |         |
|
    3+55           0.7504      6.05  V  Q      |         |         |
|
    4+ 0           0.7944      6.39  V  Q      |         |         |
|
```

```
    4+ 5       0.8398      6.59  V  Q      |         |         |
|
    4+10       0.8861      6.73  |V Q      |         |         |
|
    4+15       0.9333      6.84  |V Q      |         |         |
|
    4+20       0.9826      7.16  |V  Q     |         |         |
|
    4+25       1.0373      7.94  |V  Q     |         |         |
|
    4+30       1.0946      8.33  |V  Q     |         |         |
|
    4+35       1.1536      8.57  |V  Q     |         |         |
|
    4+40       1.2138      8.74  |V  Q     |         |         |
|
    4+45       1.2750      8.88  |V   Q    |         |         |
|
    4+50       1.3385      9.22  |V   Q    |         |         |
|
    4+55       1.4075     10.02  |V   Q    |         |         |
|
    5+ 0       1.4794     10.44  |V   Q    |         |         |
|
    5+ 5       1.5499     10.24  |V   Q    |         |         |
|
    5+10       1.6119      9.00  |V   Q    |         |         |
|
    5+15       1.6703      8.49  |V  Q     |         |         |
|
    5+20       1.7287      8.48  |V  Q     |         |         |
|
    5+25       1.7909      9.03  | V  Q    |         |         |
|
    5+30       1.8548      9.27  | V  Q    |         |         |
|
    5+35       1.9212      9.64  | V  Q    |         |         |
|
    5+40       1.9930     10.42  | V  Q    |         |         |
|
    5+45       2.0673     10.79  | V   Q   |         |         |
|
    5+50       2.1430     11.00  | V   Q   |         |         |
|
    5+55       2.2198     11.15  | V   Q   |         |         |
|
    6+ 0       2.2974     11.27  | V   Q   |         |         |
|
    6+ 5       2.3774     11.61  | V   Q   |         |         |
|
    6+10       2.4626     12.37  | V    Q  |         |         |
|
    6+15       2.5504     12.75  | V    Q  |         |         |
|
    6+20       2.6395     12.94  |  V   Q  |         |         |
|
    6+25       2.7300     13.14  |  V   Q  |         |         |
|
    6+30       2.8216     13.30  |  V   Q  |         |         |
|
```

```
    6+35       2.9157     13.67  |  V   Q  |         |         |
|
    6+40       3.0154     14.47  |  V    Q |         |         |
|
    6+45       3.1179     14.89  |  V    Q |         |         |
|
    6+50       3.2223     15.15  |  V    Q |         |         |
|
    6+55       3.3278     15.33  |  V    Q |         |         |
|
    7+ 0       3.4343     15.46  |  V    Q |         |         |
|
    7+ 5       3.5416     15.57  |   V   Q |         |         |
|
    7+10       3.6494     15.66  |   V   Q |         |         |
|
    7+15       3.7579     15.75  |   V    Q|         |         |
|
    7+20       3.8686     16.08  |   V    Q|         |         |
|
    7+25       3.9846     16.83  |   V    Q|         |         |
|
    7+30       4.1031     17.21  |   V    Q|         |         |
|
    7+35       4.2247     17.66  |   V     Q         |         |
|
    7+40       4.3523     18.53  |   V     Q         |         |
|
    7+45       4.4830     18.98  |    V    Q         |         |
|
    7+50       4.6174     19.51  |    V    |Q        |         |
|
    7+55       4.7579     20.41  |    V    |Q        |         |
|
    8+ 0       4.9018     20.88  |    V    |Q        |         |
|
    8+ 5       5.0509     21.65  |    V    | Q       |         |
|
    8+10       5.2113     23.29  |    V    |  Q      |         |
|
    8+15       5.3774     24.12  |     V   |  Q      |         |
|
    8+20       5.5469     24.62  |     V   |   Q     |         |
|
    8+25       5.7190     24.99  |     V   |   Q     |         |
|
    8+30       5.8931     25.28  |     V   |   Q     |         |
|
    8+35       6.0705     25.76  |     V   |   Q     |         |
|
    8+40       6.2540     26.64  |      V  |    Q    |         |
|
    8+45       6.4408     27.13  |      V  |    Q    |         |
|
    8+50       6.6315     27.69  |      V  |    Q    |         |
|
    8+55       6.8286     28.62  |      V  |     Q   |         |
|
    9+ 0       7.0293     29.13  |       V |     Q   |         |
|
```

```
    9+ 5       7.2355     29.94  |       V |      Q  |         |
|
    9+10       7.4531     31.59  |       V |       Q |         |
|
    9+15       7.6765     32.44  |       V |       Q |         |
|
    9+20       7.9052     33.21  |        V|       Q |         |
|
    9+25       8.1412     34.27  |        V|        Q|         |
|
    9+30       8.3812     34.85  |        V|        Q|         |
|
    9+35       8.6255     35.48  |        V|         Q         |
|
    9+40       8.8768     36.48  |         V         Q         |
|
    9+45       9.1320     37.05  |         V         |Q        |
|
    9+50       9.3915     37.68  |         V         |Q        |
|
    9+55       9.6578     38.67  |         |V        | Q       |
|
   10+ 0       9.9280     39.22  |         |V        | Q       |
|
   10+ 5      10.1894     37.96  |         |V        |Q        |
|
   10+10      10.4187     33.29  |         |V       Q|         |
|
   10+15      10.6339     31.25  |         | V    Q  |         |
|
   10+20      10.8420     30.21  |         | V    Q  |         |
|
   10+25      11.0450     29.48  |         | V   Q   |         |
|
   10+30      11.2447     28.99  |         | V   Q   |         |
|
   10+35      11.4500     29.81  |         |  V   Q  |         |
|
   10+40      11.6776     33.04  |         |  V    Q |         |
|
   10+45      11.9146     34.42  |         |  V     Q|         |
|
   10+50      12.1564     35.11  |         |  V      Q         |
|
   10+55      12.4011     35.53  |         |   V     Q         |
|
   11+ 0      12.6476     35.80  |         |   V     Q         |
|
   11+ 5      12.8940     35.77  |         |   V     Q         |
|
   11+10      13.1364     35.19  |         |   V     Q         |
|
   11+15      13.3771     34.95  |         |    V   Q|         |
|
   11+20      13.6164     34.75  |         |    V   Q|         |
|
   11+25      13.8562     34.81  |         |    V   Q|         |
|
   11+30      14.0965     34.89  |         |     V  Q|         |
|
```

```
   11+35      14.3340     34.49  |         |     V  Q|         |
|
   11+40      14.5623     33.15  |         |     V Q |         |
|
   11+45      14.7868     32.59  |         |     V Q |         |
|
   11+50      15.0114     32.61  |         |      VQ |         |
|
   11+55      15.2390     33.05  |         |      VQ |         |
|
   12+ 0      15.4676     33.19  |         |      VQ |         |
|
   12+ 5      15.7077     34.87  |         |      V Q|         |
|
   12+10      15.9819     39.82  |         |       V | Q       |
|
   12+15      16.2717     42.08  |         |       V |   Q     |
|
   12+20      16.5715     43.52  |         |       V |   Q     |
|
   12+25      16.8820     45.09  |         |        V|    Q    |
|
   12+30      17.1990     46.03  |         |        V|     Q   |
|
   12+35      17.5236     47.13  |         |        V|     Q   |
|
   12+40      17.8614     49.04  |         |         V       Q |
|
   12+45      18.2064     50.09  |         |         V       Q |
|
   12+50      18.5575     50.99  |         |         |V       Q|
|
   12+55      18.9175     52.26  |         |         |V       Q|
|
   13+ 0      19.2828     53.05  |         |         |V        Q
|
   13+ 5      19.6600     54.78  |         |         | V       |Q
|
   13+10      20.0646     58.74  |         |         | V       |  Q
|
   13+15      20.4829     60.74  |         |         |  V      |   Q
|
   13+20      20.9102     62.04  |         |         |  V      |    Q
|
   13+25      21.3427     62.81  |         |         |   V     |    Q
|
   13+30      21.7792     63.38  |         |         |   V     |     Q
|
   13+35      22.2012     61.27  |         |         |    V    |    Q
|
   13+40      22.5721     53.86  |         |         |    V    Q
|
   13+45      22.9206     50.61  |         |         |     V Q |
|
   13+50      23.2578     48.95  |         |         |     VQ  |
|
   13+55      23.5870     47.81  |         |         |     VQ  |
|
   14+ 0      23.9109     47.03  |         |         |     QV  |
|
```

```
   14+ 5      24.2374     47.42  |         |         |      Q  |
|
   14+10      24.5803     49.78  |         |         |       Q |
|
   14+15      24.9296     50.71  |         |         |       Q |
|
   14+20      25.2804     50.94  |         |         |       VQ|
|
   14+25      25.6273     50.38  |         |         |       QV|
|
   14+30      25.9724     50.10  |         |         |       QV|
|
   14+35      26.3163     49.93  |         |         |       Q V
|
   14+40      26.6591     49.78  |         |         |       Q V
|
   14+45      27.0010     49.64  |         |         |       Q V
|
   14+50      27.3395     49.15  |         |         |       Q |V
|
   14+55      27.6738     48.54  |         |         |      Q  |V
|
   15+ 0      28.0065     48.30  |         |         |      Q  |V
|
   15+ 5      28.3368     47.96  |         |         |      Q  | V
|
   15+10      28.6619     47.20  |         |         |     Q   | V
|
   15+15      28.9847     46.87  |         |         |     Q   |  V
|
   15+20      29.3050     46.51  |         |         |     Q   |  V
|
   15+25      29.6192     45.62  |         |         |     Q   |  V
|
   15+30      29.9302     45.15  |         |         |    Q    |   V
|
   15+35      30.2326     43.92  |         |         |    Q    |   V
|
   15+40      30.5143     40.90  |         |         |  Q      |   V
|
   15+45      30.7860     39.45  |         |         | Q       |    V
|
   15+50      31.0521     38.63  |         |         | Q       |    V
|
   15+55      31.3141     38.04  |         |         |Q        |    V
|
   16+ 0      31.5731     37.61  |         |         |Q        |    V
|
   16+ 5      31.8056     33.76  |         |        Q|         |     V
|
   16+10      31.9635     22.92  |         |  Q      |         |     V
|
   16+15      32.0863     17.83  |         Q         |         |     V
|
   16+20      32.1894     14.98  |       Q |         |         |     V
|
   16+25      32.2789     13.00  |      Q  |         |         |     V
|
   16+30      32.3586     11.57  |     Q   |         |         |     V
|
```

```
   16+35      32.4291     10.24  |    Q    |         |         |     V
|
   16+40      32.4887      8.66  |   Q     |         |         |      V
|
   16+45      32.5409      7.58  |   Q     |         |         |      V
|
   16+50      32.5872      6.71  |  Q      |         |         |      V
|
   16+55      32.6292      6.10  |  Q      |         |         |      V
|
   17+ 0      32.6677      5.60  |  Q      |         |         |      V
|
   17+ 5      32.7067      5.65  |  Q      |         |         |      V
|
   17+10      32.7527      6.68  |  Q      |         |         |      V
|
   17+15      32.8006      6.95  |  Q      |         |         |      V
|
   17+20      32.8474      6.80  |  Q      |         |         |      V
|
   17+25      32.8958      7.02  |   Q     |         |         |      V
|
   17+30      32.9452      7.18  |   Q     |         |         |      V
|
   17+35      32.9955      7.30  |   Q     |         |         |      V
|
   17+40      33.0464      7.39  |   Q     |         |         |      V
|
   17+45      33.0979      7.47  |   Q     |         |         |      V
|
   17+50      33.1481      7.29  |   Q     |         |         |      V
|
   17+55      33.1940      6.66  |  Q      |         |         |      V
|
   18+ 0      33.2381      6.41  |  Q      |         |         |      V
|
   18+ 5      33.2814      6.29  |  Q      |         |         |      V
|
   18+10      33.3243      6.22  |  Q      |         |         |      V
|
   18+15      33.3669      6.19  |  Q      |         |         |       V
|
   18+20      33.4097      6.20  |  Q      |         |         |       V
|
   18+25      33.4521      6.16  |  Q      |         |         |       V
|
   18+30      33.4943      6.13  |  Q      |         |         |       V
|
   18+35      33.5347      5.86  |  Q      |         |         |       V
|
   18+40      33.5700      5.14  | Q       |         |         |       V
|
   18+45      33.6031      4.79  | Q       |         |         |       V
|
   18+50      33.6331      4.37  | Q       |         |         |       V
|
   18+55      33.6574      3.53  | Q       |         |         |       V
|
   19+ 0      33.6788      3.10  |Q        |         |         |       V
|
```

```
   19+ 5      33.7000      3.07  |Q         |         |         |       V
|
   19+10      33.7248      3.61  | Q        |         |         |       V
|
   19+15      33.7511      3.81  | Q        |         |         |       V
|
   19+20      33.7796      4.13  | Q        |         |         |       V
|
   19+25      33.8132      4.88  | Q        |         |         |       V
|
   19+30      33.8492      5.23  | Q        |         |         |       V
|
   19+35      33.8849      5.19  | Q        |         |         |       V
|
   19+40      33.9167      4.61  | Q        |         |         |       V
|
   19+45      33.9468      4.37  | Q        |         |         |       V
|
   19+50      33.9745      4.02  | Q        |         |         |       V
|
   19+55      33.9970      3.26  |Q         |         |         |       V
|
   20+ 0      34.0170      2.91  |Q         |         |         |       V
|
   20+ 5      34.0373      2.94  |Q         |         |         |       V
|
   20+10      34.0617      3.54  | Q        |         |         |       V
|
   20+15      34.0878      3.79  | Q        |         |         |       V
|
   20+20      34.1148      3.93  | Q        |         |         |       V
|
   20+25      34.1424      4.00  | Q        |         |         |       V
|
   20+30      34.1702      4.04  | Q        |         |         |       V
|
   20+35      34.1983      4.08  | Q        |         |         |       V
|
   20+40      34.2265      4.09  | Q        |         |         |
V|
   20+45      34.2547      4.09  | Q        |         |         |
V|
   20+50      34.2811      3.85  | Q        |         |         |
V|
   20+55      34.3029      3.16  |Q         |         |         |
V|
   21+ 0      34.3225      2.85  |Q         |         |         |
V|
   21+ 5      34.3425      2.91  |Q         |         |         |
V|
   21+10      34.3668      3.52  | Q        |         |         |
V|
   21+15      34.3928      3.79  | Q        |         |         |
V|
   21+20      34.4184      3.70  | Q        |         |         |
V|
   21+25      34.4395      3.07  |Q         |         |         |
V|
   21+30      34.4588      2.80  |Q         |         |         |
V|
```

```
    21+35      34.4787      2.89  |Q         |         |         |
V|
    21+40      34.5028      3.50  | Q        |         |         |
V|
    21+45      34.5287      3.76  | Q        |         |         |
V|
    21+50      34.5539      3.66  | Q        |         |         |
V|
    21+55      34.5749      3.04  |Q         |         |         |
V|
    22+ 0      34.5939      2.77  |Q         |         |         |
V|
    22+ 5      34.6136      2.85  |Q         |         |         |
V|
    22+10      34.6376      3.48  |Q         |         |         |
V|
    22+15      34.6635      3.77  | Q        |         |         |
V|
    22+20      34.6890      3.70  | Q        |         |         |
V|
    22+25      34.7101      3.08  |Q         |         |         |
V|
    22+30      34.7295      2.81  |Q         |         |         |
V|
    22+35      34.7477      2.65  |Q         |         |         |
V|
    22+40      34.7655      2.58  |Q         |         |         |
V|
    22+45      34.7829      2.54  |Q         |         |         |
V|
    22+50      34.8003      2.52  |Q         |         |         |
V|
    22+55      34.8174      2.48  |Q         |         |         |
V|
    23+ 0      34.8343      2.45  |Q         |         |         |
V|
    23+ 5      34.8509      2.41  |Q         |         |         |
V|
    23+10      34.8674      2.40  |Q         |         |         |
V|
    23+15      34.8839      2.40  |Q         |         |         |
V|
    23+20      34.9005      2.41  |Q         |         |         |
V|
    23+25      34.9170      2.39  |Q         |         |         |
V|
    23+30      34.9333      2.37  |Q         |         |         |
V|
    23+35      34.9495      2.34  |Q         |         |         |
V|
    23+40      34.9656      2.35  |Q         |         |         |
V|
    23+45      34.9818      2.35  |Q         |         |         |
V|
    23+50      34.9980      2.35  |Q         |         |         |
V|
    23+55      35.0143      2.36  |Q         |         |         |
V|
    24+ 0      35.0305      2.36  |Q         |         |         |
V|
```

```
   24+ 5      35.0449      2.08  |Q         |         |         |
V|
   24+10      35.0535      1.26  Q          |         |         |
V|
   24+15      35.0596      0.88  Q          |         |         |
V|
   24+20      35.0642      0.67  Q          |         |         |
V|
   24+25      35.0678      0.53  Q          |         |         |
V|
   24+30      35.0708      0.43  Q          |         |         |
V|
   24+35      35.0732      0.35  Q          |         |         |
V|
   24+40      35.0752      0.29  Q          |         |         |
V|
   24+45      35.0768      0.24  Q          |         |         |
V|
   24+50      35.0781      0.19  Q          |         |         |
V|
   24+55      35.0792      0.15  Q          |         |         |
V|
   25+ 0      35.0800      0.12  Q          |         |         |
V|
   25+ 5      35.0806      0.09  Q          |         |         |
V|
   25+10      35.0811      0.06  Q          |         |         |
V|
   25+15      35.0813      0.04  Q          |         |         |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: cycleparkpre24100.out


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Badlands landfill
      Cycle Park Area Prelandfill
      24 hour 100 year storm event

      -----------------------------------------------------------------
--
      Drainage Area =      45.20(Ac.)  =      0.071 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      45.20(Ac.)  =
0.071 Sq. Mi.
      Length along longest watercourse =    2682.00(Ft.)
      Length along longest watercourse measured to centroid =    1244.00
(Ft.)
      Length along longest watercourse =      0.508 Mi.
      Length along longest watercourse measured to centroid =      0.236
Mi.
      Difference in elevation =     387.00(Ft.)
      Slope along watercourse =    761.8792 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.121 Hr.
      Lag time =     7.29 Min.
      25% of lag time =     1.82 Min.
      40% of lag time =     2.91 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             45.20             2.00                  90.40

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             45.20             5.50                 248.60

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          45.200           93.00         0.000
       Total Area Entered =     45.20(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000       0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                            Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083          68.622         13.435              6.120
          2   0.167         137.243         36.215             16.497
          3   0.250         205.865         15.381              7.006
          4   0.333         274.487          8.635              3.934
          5   0.417         343.109          5.856              2.668
          6   0.500         411.730          4.091              1.863
          7   0.583         480.352          3.107              1.415
          8   0.667         548.974          2.626              1.196
          9   0.750         617.595          2.143              0.976
         10   0.833         686.217          1.841              0.839
         11   0.917         754.839          1.574              0.717
         12   1.000         823.461          1.300              0.592
         13   1.083         892.082          1.235              0.563
```

```
         14   1.167        960.704          1.235              0.563
         15   1.250       1029.326          1.325              0.604
                                    Sum = 100.000   Sum=      45.553
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08      0.07      0.044          0.065     0.040          0.00
   2   0.17      0.07      0.044          0.064     0.040          0.00
   3   0.25      0.07      0.044          0.064     0.040          0.00
   4   0.33      0.10      0.066          0.064      ---           0.00
   5   0.42      0.10      0.066          0.064      ---           0.00
   6   0.50      0.10      0.066          0.063      ---           0.00
   7   0.58      0.10      0.066          0.063      ---           0.00
   8   0.67      0.10      0.066          0.063      ---           0.00
   9   0.75      0.10      0.066          0.063      ---           0.00
  10   0.83      0.13      0.088          0.062      ---           0.03
  11   0.92      0.13      0.088          0.062      ---           0.03
  12   1.00      0.13      0.088          0.062      ---           0.03
  13   1.08      0.10      0.066          0.062      ---           0.00
  14   1.17      0.10      0.066          0.061      ---           0.00
  15   1.25      0.10      0.066          0.061      ---           0.00
  16   1.33      0.10      0.066          0.061      ---           0.01
  17   1.42      0.10      0.066          0.061      ---           0.01
  18   1.50      0.10      0.066          0.060      ---           0.01
  19   1.58      0.10      0.066          0.060      ---           0.01
  20   1.67      0.10      0.066          0.060      ---           0.01
  21   1.75      0.10      0.066          0.060      ---           0.01
  22   1.83      0.13      0.088          0.059      ---           0.03
  23   1.92      0.13      0.088          0.059      ---           0.03
  24   2.00      0.13      0.088          0.059      ---           0.03
  25   2.08      0.13      0.088          0.059      ---           0.03
  26   2.17      0.13      0.088          0.058      ---           0.03
  27   2.25      0.13      0.088          0.058      ---           0.03
  28   2.33      0.13      0.088          0.058      ---           0.03
  29   2.42      0.13      0.088          0.058      ---           0.03
  30   2.50      0.13      0.088          0.057      ---           0.03
  31   2.58      0.17      0.110          0.057      ---           0.05
  32   2.67      0.17      0.110          0.057      ---           0.05
  33   2.75      0.17      0.110          0.057      ---           0.05
  34   2.83      0.17      0.110          0.057      ---           0.05
  35   2.92      0.17      0.110          0.056      ---           0.05
  36   3.00      0.17      0.110          0.056      ---           0.05
  37   3.08      0.17      0.110          0.056      ---           0.05
  38   3.17      0.17      0.110          0.056      ---           0.05
  39   3.25      0.17      0.110          0.055      ---           0.05
  40   3.33      0.17      0.110          0.055      ---           0.05
  41   3.42      0.17      0.110          0.055      ---           0.06
  42   3.50      0.17      0.110          0.055      ---           0.06
  43   3.58      0.17      0.110          0.054      ---           0.06
  44   3.67      0.17      0.110          0.054      ---           0.06
  45   3.75      0.17      0.110          0.054      ---           0.06
  46   3.83      0.20      0.132          0.054      ---           0.08
  47   3.92      0.20      0.132          0.054      ---           0.08
  48   4.00      0.20      0.132          0.053      ---           0.08
  49   4.08      0.20      0.132          0.053      ---           0.08
  50   4.17      0.20      0.132          0.053      ---           0.08
  51   4.25      0.20      0.132          0.053      ---           0.08
  52   4.33      0.23      0.154          0.052      ---           0.10
```

```
 53   4.42      0.23       0.154         0.052       ---           0.10
 54   4.50      0.23       0.154         0.052       ---           0.10
 55   4.58      0.23       0.154         0.052       ---           0.10
 56   4.67      0.23       0.154         0.052       ---           0.10
 57   4.75      0.23       0.154         0.051       ---           0.10
 58   4.83      0.27       0.176         0.051       ---           0.12
 59   4.92      0.27       0.176         0.051       ---           0.13
 60   5.00      0.27       0.176         0.051       ---           0.13
 61   5.08      0.20       0.132         0.050       ---           0.08
 62   5.17      0.20       0.132         0.050       ---           0.08
 63   5.25      0.20       0.132         0.050       ---           0.08
 64   5.33      0.23       0.154         0.050       ---           0.10
 65   5.42      0.23       0.154         0.050       ---           0.10
 66   5.50      0.23       0.154         0.049       ---           0.10
 67   5.58      0.27       0.176         0.049       ---           0.13
 68   5.67      0.27       0.176         0.049       ---           0.13
 69   5.75      0.27       0.176         0.049       ---           0.13
 70   5.83      0.27       0.176         0.048       ---           0.13
 71   5.92      0.27       0.176         0.048       ---           0.13
 72   6.00      0.27       0.176         0.048       ---           0.13
 73   6.08      0.30       0.198         0.048       ---           0.15
 74   6.17      0.30       0.198         0.048       ---           0.15
 75   6.25      0.30       0.198         0.047       ---           0.15
 76   6.33      0.30       0.198         0.047       ---           0.15
 77   6.42      0.30       0.198         0.047       ---           0.15
 78   6.50      0.30       0.198         0.047       ---           0.15
 79   6.58      0.33       0.220         0.047       ---           0.17
 80   6.67      0.33       0.220         0.046       ---           0.17
 81   6.75      0.33       0.220         0.046       ---           0.17
 82   6.83      0.33       0.220         0.046       ---           0.17
 83   6.92      0.33       0.220         0.046       ---           0.17
 84   7.00      0.33       0.220         0.046       ---           0.17
 85   7.08      0.33       0.220         0.045       ---           0.17
 86   7.17      0.33       0.220         0.045       ---           0.17
 87   7.25      0.33       0.220         0.045       ---           0.18
 88   7.33      0.37       0.242         0.045       ---           0.20
 89   7.42      0.37       0.242         0.044       ---           0.20
 90   7.50      0.37       0.242         0.044       ---           0.20
 91   7.58      0.40       0.264         0.044       ---           0.22
 92   7.67      0.40       0.264         0.044       ---           0.22
 93   7.75      0.40       0.264         0.044       ---           0.22
 94   7.83      0.43       0.286         0.043       ---           0.24
 95   7.92      0.43       0.286         0.043       ---           0.24
 96   8.00      0.43       0.286         0.043       ---           0.24
 97   8.08      0.50       0.330         0.043       ---           0.29
 98   8.17      0.50       0.330         0.043       ---           0.29
 99   8.25      0.50       0.330         0.042       ---           0.29
100   8.33      0.50       0.330         0.042       ---           0.29
101   8.42      0.50       0.330         0.042       ---           0.29
102   8.50      0.50       0.330         0.042       ---           0.29
103   8.58      0.53       0.352         0.042       ---           0.31
104   8.67      0.53       0.352         0.041       ---           0.31
105   8.75      0.53       0.352         0.041       ---           0.31
106   8.83      0.57       0.374         0.041       ---           0.33
107   8.92      0.57       0.374         0.041       ---           0.33
108   9.00      0.57       0.374         0.041       ---           0.33
109   9.08      0.63       0.418         0.041       ---           0.38
110   9.17      0.63       0.418         0.040       ---           0.38
111   9.25      0.63       0.418         0.040       ---           0.38
112   9.33      0.67       0.440         0.040       ---           0.40
```

```
113   9.42     0.67      0.440         0.040      ---          0.40
114   9.50     0.67      0.440         0.040      ---          0.40
115   9.58     0.70      0.462         0.039      ---          0.42
116   9.67     0.70      0.462         0.039      ---          0.42
117   9.75     0.70      0.462         0.039      ---          0.42
118   9.83     0.73      0.484         0.039      ---          0.45
119   9.92     0.73      0.484         0.039      ---          0.45
120  10.00     0.73      0.484         0.038      ---          0.45
121  10.08     0.50      0.330         0.038      ---          0.29
122  10.17     0.50      0.330         0.038      ---          0.29
123  10.25     0.50      0.330         0.038      ---          0.29
124  10.33     0.50      0.330         0.038      ---          0.29
125  10.42     0.50      0.330         0.038      ---          0.29
126  10.50     0.50      0.330         0.037      ---          0.29
127  10.58     0.67      0.440         0.037      ---          0.40
128  10.67     0.67      0.440         0.037      ---          0.40
129  10.75     0.67      0.440         0.037      ---          0.40
130  10.83     0.67      0.440         0.037      ---          0.40
131  10.92     0.67      0.440         0.036      ---          0.40
132  11.00     0.67      0.440         0.036      ---          0.40
133  11.08     0.63      0.418         0.036      ---          0.38
134  11.17     0.63      0.418         0.036      ---          0.38
135  11.25     0.63      0.418         0.036      ---          0.38
136  11.33     0.63      0.418         0.036      ---          0.38
137  11.42     0.63      0.418         0.035      ---          0.38
138  11.50     0.63      0.418         0.035      ---          0.38
139  11.58     0.57      0.374         0.035      ---          0.34
140  11.67     0.57      0.374         0.035      ---          0.34
141  11.75     0.57      0.374         0.035      ---          0.34
142  11.83     0.60      0.396         0.034      ---          0.36
143  11.92     0.60      0.396         0.034      ---          0.36
144  12.00     0.60      0.396         0.034      ---          0.36
145  12.08     0.83      0.550         0.034      ---          0.52
146  12.17     0.83      0.550         0.034      ---          0.52
147  12.25     0.83      0.550         0.034      ---          0.52
148  12.33     0.87      0.572         0.033      ---          0.54
149  12.42     0.87      0.572         0.033      ---          0.54
150  12.50     0.87      0.572         0.033      ---          0.54
151  12.58     0.93      0.616         0.033      ---          0.58
152  12.67     0.93      0.616         0.033      ---          0.58
153  12.75     0.93      0.616         0.033      ---          0.58
154  12.83     0.97      0.638         0.032      ---          0.61
155  12.92     0.97      0.638         0.032      ---          0.61
156  13.00     0.97      0.638         0.032      ---          0.61
157  13.08     1.13      0.748         0.032      ---          0.72
158  13.17     1.13      0.748         0.032      ---          0.72
159  13.25     1.13      0.748         0.032      ---          0.72
160  13.33     1.13      0.748         0.031      ---          0.72
161  13.42     1.13      0.748         0.031      ---          0.72
162  13.50     1.13      0.748         0.031      ---          0.72
163  13.58     0.77      0.506         0.031      ---          0.47
164  13.67     0.77      0.506         0.031      ---          0.48
165  13.75     0.77      0.506         0.031      ---          0.48
166  13.83     0.77      0.506         0.031      ---          0.48
167  13.92     0.77      0.506         0.030      ---          0.48
168  14.00     0.77      0.506         0.030      ---          0.48
169  14.08     0.90      0.594         0.030      ---          0.56
170  14.17     0.90      0.594         0.030      ---          0.56
171  14.25     0.90      0.594         0.030      ---          0.56
172  14.33     0.87      0.572         0.030      ---          0.54
```

173	14.42	0.87	0.572	0.029	---	0.54
174	14.50	0.87	0.572	0.029	---	0.54
175	14.58	0.87	0.572	0.029	---	0.54
176	14.67	0.87	0.572	0.029	---	0.54
177	14.75	0.87	0.572	0.029	---	0.54
178	14.83	0.83	0.550	0.029	---	0.52
179	14.92	0.83	0.550	0.029	---	0.52
180	15.00	0.83	0.550	0.028	---	0.52
181	15.08	0.80	0.528	0.028	---	0.50
182	15.17	0.80	0.528	0.028	---	0.50
183	15.25	0.80	0.528	0.028	---	0.50
184	15.33	0.77	0.506	0.028	---	0.48
185	15.42	0.77	0.506	0.028	---	0.48
186	15.50	0.77	0.506	0.028	---	0.48
187	15.58	0.63	0.418	0.027	---	0.39
188	15.67	0.63	0.418	0.027	---	0.39
189	15.75	0.63	0.418	0.027	---	0.39
190	15.83	0.63	0.418	0.027	---	0.39
191	15.92	0.63	0.418	0.027	---	0.39
192	16.00	0.63	0.418	0.027	---	0.39
193	16.08	0.13	0.088	0.027	---	0.06
194	16.17	0.13	0.088	0.026	---	0.06
195	16.25	0.13	0.088	0.026	---	0.06
196	16.33	0.13	0.088	0.026	---	0.06
197	16.42	0.13	0.088	0.026	---	0.06
198	16.50	0.13	0.088	0.026	---	0.06
199	16.58	0.10	0.066	0.026	---	0.04
200	16.67	0.10	0.066	0.026	---	0.04
201	16.75	0.10	0.066	0.026	---	0.04
202	16.83	0.10	0.066	0.025	---	0.04
203	16.92	0.10	0.066	0.025	---	0.04
204	17.00	0.10	0.066	0.025	---	0.04
205	17.08	0.17	0.110	0.025	---	0.08
206	17.17	0.17	0.110	0.025	---	0.09
207	17.25	0.17	0.110	0.025	---	0.09
208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.07
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07

```
233  19.42     0.13      0.088         0.022      ---          0.07
234  19.50     0.13      0.088         0.022      ---          0.07
235  19.58     0.10      0.066         0.022      ---          0.04
236  19.67     0.10      0.066         0.022      ---          0.04
237  19.75     0.10      0.066         0.021      ---          0.04
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      45.2(Ac.)/[(In)/(Ft.)] =      17.4(Ac.Ft)
     Total soil loss =      0.87(In)
```

```
      Total soil loss =     3.269(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      759949.1 Cubic Feet
      Total soil loss =      142389.2 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     31.663(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0
40.0

-----------------------------------------------------------------------
    0+ 5       0.0002      0.03  Q         |         |         |
|
    0+10       0.0009      0.10  Q         |         |         |
|
    0+15       0.0018      0.13  Q         |         |         |
|
    0+20       0.0027      0.13  Q         |         |         |
|
    0+25       0.0035      0.11  Q         |         |         |
|
    0+30       0.0042      0.11  Q         |         |         |
|
    0+35       0.0050      0.11  Q         |         |         |
|
    0+40       0.0059      0.12  Q         |         |         |
|
    0+45       0.0068      0.13  Q         |         |         |
|
    0+50       0.0087      0.28  Q         |         |         |
|
    0+55       0.0131      0.65  Q         |         |         |
|
    1+ 0       0.0188      0.81  Q         |         |         |
|
    1+ 5       0.0241      0.78  Q         |         |         |
|
    1+10       0.0274      0.48  Q         |         |         |
|
    1+15       0.0301      0.38  Q         |         |         |
|
    1+20       0.0324      0.34  Q         |         |         |
|
    1+25       0.0346      0.31  Q         |         |         |
|
    1+30       0.0367      0.30  Q         |         |         |
|
    1+35       0.0388      0.30  Q         |         |         |
```

```
|
    1+40        0.0408      0.30  Q          |          |          |
|
    1+45        0.0429      0.31  Q          |          |          |
|
    1+50        0.0460      0.45  Q          |          |          |
|
    1+55        0.0516      0.82  Q          |          |          |
|
    2+ 0        0.0584      0.98  Q          |          |          |
|
    2+ 5        0.0657      1.07  VQ         |          |          |
|
    2+10        0.0735      1.12  VQ         |          |          |
|
    2+15        0.0815      1.16  VQ         |          |          |
|
    2+20        0.0898      1.20  VQ         |          |          |
|
    2+25        0.0983      1.24  VQ         |          |          |
|
    2+30        0.1071      1.27  VQ         |          |          |
|
    2+35        0.1170      1.44  VQ         |          |          |
|
    2+40        0.1296      1.83  VQ         |          |          |
|
    2+45        0.1434      2.01  V Q        |          |          |
|
    2+50        0.1580      2.12  V Q        |          |          |
|
    2+55        0.1731      2.20  V Q        |          |          |
|
    3+ 0        0.1887      2.26  V Q        |          |          |
|
    3+ 5        0.2045      2.30  V Q        |          |          |
|
    3+10        0.2207      2.34  V Q        |          |          |
|
    3+15        0.2370      2.37  V Q        |          |          |
|
    3+20        0.2536      2.40  V Q        |          |          |
|
    3+25        0.2703      2.43  V Q        |          |          |
|
    3+30        0.2872      2.45  V Q        |          |          |
|
    3+35        0.3042      2.47  V Q        |          |          |
|
    3+40        0.3214      2.50  V Q        |          |          |
|
    3+45        0.3388      2.52  V Q        |          |          |
|
    3+50        0.3571      2.67  V Q        |          |          |
|
    3+55        0.3781      3.04  V  Q       |          |          |
|
    4+ 0        0.4001      3.20  V  Q       |          |          |
|
    4+ 5        0.4229      3.30  V  Q       |          |          |
```

```
|
    4+10       0.4461      3.37  |V Q      |         |         |
|
    4+15       0.4697      3.42  |V Q      |         |         |
|
    4+20       0.4944      3.60  |V Q      |         |         |
|
    4+25       0.5220      4.00  |V Q      |         |         |
|
    4+30       0.5508      4.18  |V  Q     |         |         |
|
    4+35       0.5804      4.30  |V  Q     |         |         |
|
    4+40       0.6106      4.38  |V  Q     |         |         |
|
    4+45       0.6412      4.45  |V  Q     |         |         |
|
    4+50       0.6731      4.64  |V  Q     |         |         |
|
    4+55       0.7079      5.05  |V   Q    |         |         |
|
    5+ 0       0.7441      5.25  |V   Q    |         |         |
|
    5+ 5       0.7791      5.09  |V   Q    |         |         |
|
    5+10       0.8098      4.45  |V  Q     |         |         |
|
    5+15       0.8388      4.21  |V  Q     |         |         |
|
    5+20       0.8678      4.22  |V  Q     |         |         |
|
    5+25       0.8989      4.52  | V Q     |         |         |
|
    5+30       0.9309      4.63  | V Q     |         |         |
|
    5+35       0.9641      4.82  | V Q     |         |         |
|
    5+40       1.0000      5.22  | V  Q    |         |         |
|
    5+45       1.0371      5.39  | V  Q    |         |         |
|
    5+50       1.0749      5.49  | V  Q    |         |         |
|
    5+55       1.1133      5.57  | V  Q    |         |         |
|
    6+ 0       1.1521      5.63  | V  Q    |         |         |
|
    6+ 5       1.1920      5.80  | V  Q    |         |         |
|
    6+10       1.2346      6.19  | V   Q   |         |         |
|
    6+15       1.2784      6.36  | V   Q   |         |         |
|
    6+20       1.3231      6.49  |  V  Q   |         |         |
|
    6+25       1.3685      6.58  |  V  Q   |         |         |
|
    6+30       1.4143      6.66  |  V  Q   |         |         |
|
    6+35       1.4615      6.85  |  V  Q   |         |         |
```

```
|
    6+40       1.5115      7.26  |  V   Q  |         |         |
|
    6+45       1.5629      7.46  |  V   Q  |         |         |
|
    6+50       1.6151      7.57  |  V   Q  |         |         |
|
    6+55       1.6678      7.66  |  V   Q  |         |         |
|
    7+ 0       1.7210      7.72  |  V   Q  |         |         |
|
    7+ 5       1.7745      7.77  |   V  Q  |         |         |
|
    7+10       1.8284      7.82  |   V  Q  |         |         |
|
    7+15       1.8826      7.87  |   V  Q  |         |         |
|
    7+20       1.9379      8.03  |   V   Q |         |         |
|
    7+25       1.9959      8.42  |   V   Q |         |         |
|
    7+30       2.0550      8.59  |   V   Q |         |         |
|
    7+35       2.1159      8.84  |   V   Q |         |         |
|
    7+40       2.1798      9.28  |   V    Q|         |         |
|
    7+45       2.2452      9.50  |    V   Q|         |         |
|
    7+50       2.3125      9.76  |    V   Q|         |         |
|
    7+55       2.3828     10.22  |    V    Q         |         |
|
    8+ 0       2.4548     10.44  |    V    Q         |         |
|
    8+ 5       2.5295     10.86  |    V    Q         |         |
|
    8+10       2.6101     11.69  |    V    |Q        |         |
|
    8+15       2.6933     12.09  |     V   | Q       |         |
|
    8+20       2.7783     12.33  |     V   | Q       |         |
|
    8+25       2.8644     12.51  |     V   | Q       |         |
|
    8+30       2.9516     12.65  |     V   | Q       |         |
|
    8+35       3.0403     12.89  |     V   | Q       |         |
|
    8+40       3.1322     13.34  |      V  |  Q      |         |
|
    8+45       3.2257     13.57  |      V  |  Q      |         |
|
    8+50       3.3211     13.85  |      V  |  Q      |         |
|
    8+55       3.4198     14.33  |      V  |   Q     |         |
|
    9+ 0       3.5202     14.57  |       V |   Q     |         |
|
    9+ 5       3.6234     14.99  |       V |   Q     |         |
```

```
|
    9+10       3.7325     15.84  |       V |    Q    |         |
|
    9+15       3.8444     16.24  |       V |     Q   |         |
|
    9+20       3.9588     16.61  |        V|     Q   |         |
|
    9+25       4.0768     17.14  |        V|      Q  |         |
|
    9+30       4.1968     17.42  |        V|      Q  |         |
|
    9+35       4.3190     17.74  |        V|      Q  |         |
|
    9+40       4.4447     18.26  |         V       Q |         |
|
    9+45       4.5723     18.53  |         V       Q |         |
|
    9+50       4.7021     18.84  |         V       Q |         |
|
    9+55       4.8353     19.34  |         |V       Q|         |
|
   10+ 0       4.9703     19.60  |         |V       Q|         |
|
   10+ 5       5.1000     18.83  |         |V      Q |         |
|
   10+10       5.2131     16.42  |         |V    Q   |         |
|
   10+15       5.3195     15.45  |         | V  Q    |         |
|
   10+20       5.4223     14.92  |         | V Q     |         |
|
   10+25       5.5226     14.57  |         | V Q     |         |
|
   10+30       5.6214     14.34  |         | V Q     |         |
|
   10+35       5.7236     14.83  |         |  VQ     |         |
|
   10+40       5.8372     16.50  |         |  V  Q   |         |
|
   10+45       5.9554     17.16  |         |  V   Q  |         |
|
   10+50       6.0758     17.48  |         |  V   Q  |         |
|
   10+55       6.1976     17.69  |         |   V  Q  |         |
|
   11+ 0       6.3203     17.82  |         |   V  Q  |         |
|
   11+ 5       6.4426     17.76  |         |   V  Q  |         |
|
   11+10       6.5629     17.45  |         |    V Q  |         |
|
   11+15       6.6822     17.32  |         |    V Q  |         |
|
   11+20       6.8015     17.34  |         |    V Q  |         |
|
   11+25       6.9211     17.36  |         |    V Q  |         |
|
   11+30       7.0409     17.40  |         |     VQ  |         |
|
   11+35       7.1592     17.17  |         |     VQ  |         |
```

```
|
   11+40       7.2727     16.48  |         |     Q   |         |
|
   11+45       7.3845     16.23  |         |     Q   |         |
|
   11+50       7.4959     16.18  |         |     QV  |         |
|
   11+55       7.6089     16.42  |         |     QV  |         |
|
   12+ 0       7.7225     16.48  |         |     QV  |         |
|
   12+ 5       7.8426     17.45  |         |      Q  |         |
|
   12+10       7.9803     19.99  |         |       VQ|         |
|
   12+15       8.1253     21.06  |         |       V |Q        |
|
   12+20       8.2755     21.80  |         |       V |Q        |
|
   12+25       8.4310     22.58  |         |        V| Q       |
|
   12+30       8.5896     23.03  |         |        V|  Q      |
|
   12+35       8.7521     23.60  |         |         V  Q      |
|
   12+40       8.9213     24.57  |         |         V   Q     |
|
   12+45       9.0940     25.06  |         |         V    Q    |
|
   12+50       9.2699     25.55  |         |         |V   Q    |
|
   12+55       9.4503     26.19  |         |         |V    Q   |
|
   13+ 0       9.6332     26.56  |         |         | V   Q   |
|
   13+ 5       9.8225     27.49  |         |         | V    Q  |
|
   13+10      10.0259     29.53  |         |         | V      Q|
|
   13+15      10.2359     30.50  |         |         |  V      Q
|
   13+20      10.4496     31.02  |         |         |  V      |Q
|
   13+25      10.6658     31.39  |         |         |   V     |Q
|
   13+30      10.8838     31.66  |         |         |   V     |Q
|
   13+35      11.0931     30.39  |         |         |    V    Q
|
   13+40      11.2761     26.57  |         |         |    VQ   |
|
   13+45      11.4485     25.03  |         |         |    QV   |
|
   13+50      11.6151     24.19  |         |         |   Q V   |
|
   13+55      11.7780     23.64  |         |         |  Q   V  |
|
   14+ 0      11.9383     23.28  |         |         |  Q   V  |
|
   14+ 5      12.1004     23.54  |         |         |  Q   V  |
```

```
|
   14+10      12.2710     24.78  |         |         |   Q   V |
|
   14+15      12.4448     25.23  |         |         |    Q  V |
|
   14+20      12.6187     25.24  |         |         |    Q  V |
|
   14+25      12.7905     24.95  |         |         |   Q    V|
|
   14+30      12.9615     24.82  |         |         |   Q    V|
|
   14+35      13.1318     24.73  |         |         |   Q     V
|
   14+40      13.3015     24.65  |         |         |   Q     V
|
   14+45      13.4707     24.55  |         |         |   Q     V
|
   14+50      13.6392     24.47  |         |         |   Q     |V
|
   14+55      13.8055     24.15  |         |         |   Q     |V
|
   15+ 0      13.9710     24.03  |         |         |   Q     | V
|
   15+ 5      14.1353     23.85  |         |         |  Q      | V
|
   15+10      14.2969     23.47  |         |         |  Q      | V
|
   15+15      14.4575     23.32  |         |         |  Q      |  V
|
   15+20      14.6163     23.06  |         |         |  Q      |  V
|
   15+25      14.7721     22.61  |         |         | Q       |  V
|
   15+30      14.9262     22.38  |         |         | Q       |   V
|
   15+35      15.0758     21.72  |         |         |Q        |   V
|
   15+40      15.2147     20.17  |         |         Q         |   V
|
   15+45      15.3489     19.48  |         |        Q|         |    V
|
   15+50      15.4803     19.08  |         |        Q|         |    V
|
   15+55      15.6098     18.80  |         |       Q |         |    V
|
   16+ 0      15.7378     18.59  |         |       Q |         |     V
|
   16+ 5      15.8509     16.42  |         |     Q   |         |     V
|
   16+10      15.9257     10.85  |         Q         |         |     V
|
   16+15      15.9837      8.43  |       Q |         |         |     V
|
   16+20      16.0323      7.05  |      Q  |         |         |     V
|
   16+25      16.0743      6.10  |     Q   |         |         |     V
|
   16+30      16.1117      5.43  |    Q    |         |         |     V
|
   16+35      16.1446      4.78  |   Q     |         |         |      V
```

```
|
   16+40      16.1721      3.98  |  Q      |         |         |      V
|
   16+45      16.1959      3.46  |  Q      |         |         |      V
|
   16+50      16.2172      3.10  |  Q      |         |         |      V
|
   16+55      16.2366      2.81  | Q       |         |         |      V
|
   17+ 0      16.2543      2.58  | Q       |         |         |      V
|
   17+ 5      16.2725      2.64  | Q       |         |         |      V
|
   17+10      16.2943      3.16  |  Q      |         |         |      V
|
   17+15      16.3167      3.25  |  Q      |         |         |      V
|
   17+20      16.3402      3.41  |  Q      |         |         |      V
|
   17+25      16.3644      3.52  |  Q      |         |         |      V
|
   17+30      16.3891      3.59  |  Q      |         |         |      V
|
   17+35      16.4143      3.65  |  Q      |         |         |      V
|
   17+40      16.4397      3.70  |  Q      |         |         |      V
|
   17+45      16.4654      3.73  |  Q      |         |         |      V
|
   17+50      16.4905      3.64  |  Q      |         |         |      V
|
   17+55      16.5133      3.31  |  Q      |         |         |      V
|
   18+ 0      16.5353      3.19  |  Q      |         |         |      V
|
   18+ 5      16.5569      3.13  |  Q      |         |         |      V
|
   18+10      16.5782      3.11  |  Q      |         |         |       V
|
   18+15      16.5996      3.10  |  Q      |         |         |       V
|
   18+20      16.6207      3.07  |  Q      |         |         |       V
|
   18+25      16.6417      3.05  |  Q      |         |         |       V
|
   18+30      16.6626      3.03  |  Q      |         |         |       V
|
   18+35      16.6825      2.88  | Q       |         |         |       V
|
   18+40      16.6998      2.51  | Q       |         |         |       V
|
   18+45      16.7159      2.35  | Q       |         |         |       V
|
   18+50      16.7306      2.12  | Q       |         |         |       V
|
   18+55      16.7422      1.69  |Q        |         |         |       V
|
   19+ 0      16.7524      1.49  |Q        |         |         |       V
|
   19+ 5      16.7628      1.51  |Q        |         |         |       V
```

```
|
     19+10      16.7752      1.79  |Q        |         |         |       V
|
     19+15      16.7882      1.89  |Q        |         |         |       V
|
     19+20      16.8024      2.07  | Q       |         |         |       V
|
     19+25      16.8193      2.45  | Q       |         |         |       V
|
     19+30      16.8373      2.62  | Q       |         |         |       V
|
     19+35      16.8550      2.57  | Q       |         |         |       V
|
     19+40      16.8707      2.27  | Q       |         |         |       V
|
     19+45      16.8855      2.16  | Q       |         |         |       V
|
     19+50      16.8991      1.98  |Q        |         |         |       V
|
     19+55      16.9101      1.59  |Q        |         |         |       V
|
     20+ 0      16.9199      1.42  |Q        |         |         |       V
|
     20+ 5      16.9300      1.47  |Q        |         |         |       V
|
     20+10      16.9423      1.78  |Q        |         |         |       V
|
     20+15      16.9554      1.91  |Q        |         |         |       V
|
     20+20      16.9689      1.96  |Q        |         |         |       V
|
     20+25      16.9827      1.99  |Q        |         |         |       V
|
     20+30      16.9965      2.02  | Q       |         |         |       V
|
     20+35      17.0105      2.02  | Q       |         |         |
V|
     20+40      17.0244      2.02  | Q       |         |         |
V|
     20+45      17.0383      2.02  | Q       |         |         |
V|
     20+50      17.0514      1.90  |Q        |         |         |
V|
     20+55      17.0620      1.54  |Q        |         |         |
V|
     21+ 0      17.0716      1.39  |Q        |         |         |
V|
     21+ 5      17.0816      1.46  |Q        |         |         |
V|
     21+10      17.0938      1.78  |Q        |         |         |
V|
     21+15      17.1070      1.91  |Q        |         |         |
V|
     21+20      17.1196      1.83  |Q        |         |         |
V|
     21+25      17.1299      1.50  |Q        |         |         |
V|
     21+30      17.1394      1.37  |Q        |         |         |
V|
     21+35      17.1493      1.44  |Q        |         |         |
```

```
V|
   21+40       17.1613       1.75  |Q         |         |         |
V|
   21+45       17.1743       1.88  |Q         |         |         |
V|
   21+50       17.1868       1.81  |Q         |         |         |
V|
   21+55       17.1970       1.49  |Q         |         |         |
V|
   22+ 0       17.2063       1.35  |Q         |         |         |
V|
   22+ 5       17.2162       1.43  |Q         |         |         |
V|
   22+10       17.2283       1.76  |Q         |         |         |
V|
   22+15       17.2414       1.90  |Q         |         |         |
V|
   22+20       17.2539       1.83  |Q         |         |         |
V|
   22+25       17.2643       1.50  |Q         |         |         |
V|
   22+30       17.2737       1.37  |Q         |         |         |
V|
   22+35       17.2828       1.31  |Q         |         |         |
V|
   22+40       17.2916       1.28  |Q         |         |         |
V|
   22+45       17.3003       1.26  |Q         |         |         |
V|
   22+50       17.3088       1.24  |Q         |         |         |
V|
   22+55       17.3172       1.22  |Q         |         |         |
V|
   23+ 0       17.3255       1.20  |Q         |         |         |
V|
   23+ 5       17.3337       1.20  |Q         |         |         |
V|
   23+10       17.3420       1.19  |Q         |         |         |
V|
   23+15       17.3502       1.20  |Q         |         |         |
V|
   23+20       17.3584       1.19  |Q         |         |         |
V|
   23+25       17.3665       1.18  |Q         |         |         |
V|
   23+30       17.3745       1.16  |Q         |         |         |
V|
   23+35       17.3825       1.17  |Q         |         |         |
V|
   23+40       17.3906       1.17  |Q         |         |         |
V|
   23+45       17.3986       1.17  |Q         |         |         |
V|
   23+50       17.4067       1.17  |Q         |         |         |
V|
   23+55       17.4148       1.17  |Q         |         |         |
V|
   24+ 0       17.4228       1.17  |Q         |         |         |
V|
   24+ 5       17.4298       1.02  |Q         |         |         |
```

```
V|
   24+10      17.4339      0.59  Q          |          |          |
V|
   24+15      17.4367      0.41  Q          |          |          |
V|
   24+20      17.4389      0.31  Q          |          |          |
V|
   24+25      17.4405      0.24  Q          |          |          |
V|
   24+30      17.4418      0.19  Q          |          |          |
V|
   24+35      17.4429      0.16  Q          |          |          |
V|
   24+40      17.4438      0.13  Q          |          |          |
V|
   24+45      17.4445      0.10  Q          |          |          |
V|
   24+50      17.4450      0.08  Q          |          |          |
V|
   24+55      17.4454      0.06  Q          |          |          |
V|
   25+ 0      17.4457      0.04  Q          |          |          |
V|
   25+ 5      17.4459      0.03  Q          |          |          |
V|
   25+10      17.4460      0.02  Q          |          |          |
V|
----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: prenwcanyon24100.out

      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Badlands Landfill
      Northwest Canyon Prelandfill
      24 hour 100 year storm event

      -----------------------------------------------------------------
--
      Drainage Area =      36.30(Ac.)  =      0.057 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      36.30(Ac.)  =
0.057 Sq. Mi.
      Length along longest watercourse =    1711.00(Ft.)
      Length along longest watercourse measured to centroid =     792.00
(Ft.)
      Length along longest watercourse =      0.324 Mi.
      Length along longest watercourse measured to centroid =      0.150
Mi.
      Difference in elevation =     398.00(Ft.)
      Slope along watercourse =   1228.1940 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.079 Hr.
      Lag time =     4.73 Min.
      25% of lag time =     1.18 Min.
      40% of lag time =     1.89 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
       36.30              2.00                    72.60

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             36.30              5.50                   199.65

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          36.300           93.00         0.000
       Total Area Entered =     36.30(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083       105.818        24.371            8.916
          2   0.167       211.636        38.170           13.964
          3   0.250       317.454        13.329            4.876
          4   0.333       423.272         7.321            2.678
          5   0.417       529.090         4.717            1.726
          6   0.500       634.908         3.524            1.289
          7   0.583       740.726         2.741            1.003
          8   0.667       846.544         2.111            0.772
          9   0.750       952.362         1.906            0.697
         10   0.833      1058.180         1.810            0.662
                                   Sum = 100.000   Sum=      36.584
-----------------------------------------------------------------------
```

```
Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)    Effective
     (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
 1   0.08     0.07      0.044         0.065     0.040         0.00
 2   0.17     0.07      0.044         0.064     0.040         0.00
 3   0.25     0.07      0.044         0.064     0.040         0.00
 4   0.33     0.10      0.066         0.064      ---          0.00
 5   0.42     0.10      0.066         0.064      ---          0.00
 6   0.50     0.10      0.066         0.063      ---          0.00
 7   0.58     0.10      0.066         0.063      ---          0.00
 8   0.67     0.10      0.066         0.063      ---          0.00
 9   0.75     0.10      0.066         0.063      ---          0.00
10   0.83     0.13      0.088         0.062      ---          0.03
11   0.92     0.13      0.088         0.062      ---          0.03
12   1.00     0.13      0.088         0.062      ---          0.03
13   1.08     0.10      0.066         0.062      ---          0.00
14   1.17     0.10      0.066         0.061      ---          0.00
15   1.25     0.10      0.066         0.061      ---          0.00
16   1.33     0.10      0.066         0.061      ---          0.01
17   1.42     0.10      0.066         0.061      ---          0.01
18   1.50     0.10      0.066         0.060      ---          0.01
19   1.58     0.10      0.066         0.060      ---          0.01
20   1.67     0.10      0.066         0.060      ---          0.01
21   1.75     0.10      0.066         0.060      ---          0.01
22   1.83     0.13      0.088         0.059      ---          0.03
23   1.92     0.13      0.088         0.059      ---          0.03
24   2.00     0.13      0.088         0.059      ---          0.03
25   2.08     0.13      0.088         0.059      ---          0.03
26   2.17     0.13      0.088         0.058      ---          0.03
27   2.25     0.13      0.088         0.058      ---          0.03
28   2.33     0.13      0.088         0.058      ---          0.03
29   2.42     0.13      0.088         0.058      ---          0.03
30   2.50     0.13      0.088         0.057      ---          0.03
31   2.58     0.17      0.110         0.057      ---          0.05
32   2.67     0.17      0.110         0.057      ---          0.05
33   2.75     0.17      0.110         0.057      ---          0.05
34   2.83     0.17      0.110         0.057      ---          0.05
35   2.92     0.17      0.110         0.056      ---          0.05
36   3.00     0.17      0.110         0.056      ---          0.05
37   3.08     0.17      0.110         0.056      ---          0.05
38   3.17     0.17      0.110         0.056      ---          0.05
39   3.25     0.17      0.110         0.055      ---          0.05
40   3.33     0.17      0.110         0.055      ---          0.05
41   3.42     0.17      0.110         0.055      ---          0.06
42   3.50     0.17      0.110         0.055      ---          0.06
43   3.58     0.17      0.110         0.054      ---          0.06
44   3.67     0.17      0.110         0.054      ---          0.06
45   3.75     0.17      0.110         0.054      ---          0.06
46   3.83     0.20      0.132         0.054      ---          0.08
47   3.92     0.20      0.132         0.054      ---          0.08
48   4.00     0.20      0.132         0.053      ---          0.08
49   4.08     0.20      0.132         0.053      ---          0.08
50   4.17     0.20      0.132         0.053      ---          0.08
51   4.25     0.20      0.132         0.053      ---          0.08
52   4.33     0.23      0.154         0.052      ---          0.10
53   4.42     0.23      0.154         0.052      ---          0.10
54   4.50     0.23      0.154         0.052      ---          0.10
55   4.58     0.23      0.154         0.052      ---          0.10
56   4.67     0.23      0.154         0.052      ---          0.10
57   4.75     0.23      0.154         0.051      ---          0.10
```

58	4.83	0.27	0.176	0.051	---	0.12
59	4.92	0.27	0.176	0.051	---	0.13
60	5.00	0.27	0.176	0.051	---	0.13
61	5.08	0.20	0.132	0.050	---	0.08
62	5.17	0.20	0.132	0.050	---	0.08
63	5.25	0.20	0.132	0.050	---	0.08
64	5.33	0.23	0.154	0.050	---	0.10
65	5.42	0.23	0.154	0.050	---	0.10
66	5.50	0.23	0.154	0.049	---	0.10
67	5.58	0.27	0.176	0.049	---	0.13
68	5.67	0.27	0.176	0.049	---	0.13
69	5.75	0.27	0.176	0.049	---	0.13
70	5.83	0.27	0.176	0.048	---	0.13
71	5.92	0.27	0.176	0.048	---	0.13
72	6.00	0.27	0.176	0.048	---	0.13
73	6.08	0.30	0.198	0.048	---	0.15
74	6.17	0.30	0.198	0.048	---	0.15
75	6.25	0.30	0.198	0.047	---	0.15
76	6.33	0.30	0.198	0.047	---	0.15
77	6.42	0.30	0.198	0.047	---	0.15
78	6.50	0.30	0.198	0.047	---	0.15
79	6.58	0.33	0.220	0.047	---	0.17
80	6.67	0.33	0.220	0.046	---	0.17
81	6.75	0.33	0.220	0.046	---	0.17
82	6.83	0.33	0.220	0.046	---	0.17
83	6.92	0.33	0.220	0.046	---	0.17
84	7.00	0.33	0.220	0.046	---	0.17
85	7.08	0.33	0.220	0.045	---	0.17
86	7.17	0.33	0.220	0.045	---	0.17
87	7.25	0.33	0.220	0.045	---	0.18
88	7.33	0.37	0.242	0.045	---	0.20
89	7.42	0.37	0.242	0.044	---	0.20
90	7.50	0.37	0.242	0.044	---	0.20
91	7.58	0.40	0.264	0.044	---	0.22
92	7.67	0.40	0.264	0.044	---	0.22
93	7.75	0.40	0.264	0.044	---	0.22
94	7.83	0.43	0.286	0.043	---	0.24
95	7.92	0.43	0.286	0.043	---	0.24
96	8.00	0.43	0.286	0.043	---	0.24
97	8.08	0.50	0.330	0.043	---	0.29
98	8.17	0.50	0.330	0.043	---	0.29
99	8.25	0.50	0.330	0.042	---	0.29
100	8.33	0.50	0.330	0.042	---	0.29
101	8.42	0.50	0.330	0.042	---	0.29
102	8.50	0.50	0.330	0.042	---	0.29
103	8.58	0.53	0.352	0.042	---	0.31
104	8.67	0.53	0.352	0.041	---	0.31
105	8.75	0.53	0.352	0.041	---	0.31
106	8.83	0.57	0.374	0.041	---	0.33
107	8.92	0.57	0.374	0.041	---	0.33
108	9.00	0.57	0.374	0.041	---	0.33
109	9.08	0.63	0.418	0.041	---	0.38
110	9.17	0.63	0.418	0.040	---	0.38
111	9.25	0.63	0.418	0.040	---	0.38
112	9.33	0.67	0.440	0.040	---	0.40
113	9.42	0.67	0.440	0.040	---	0.40
114	9.50	0.67	0.440	0.040	---	0.40
115	9.58	0.70	0.462	0.039	---	0.42
116	9.67	0.70	0.462	0.039	---	0.42
117	9.75	0.70	0.462	0.039	---	0.42

```
118   9.83     0.73      0.484         0.039      ---          0.45
119   9.92     0.73      0.484         0.039      ---          0.45
120  10.00     0.73      0.484         0.038      ---          0.45
121  10.08     0.50      0.330         0.038      ---          0.29
122  10.17     0.50      0.330         0.038      ---          0.29
123  10.25     0.50      0.330         0.038      ---          0.29
124  10.33     0.50      0.330         0.038      ---          0.29
125  10.42     0.50      0.330         0.038      ---          0.29
126  10.50     0.50      0.330         0.037      ---          0.29
127  10.58     0.67      0.440         0.037      ---          0.40
128  10.67     0.67      0.440         0.037      ---          0.40
129  10.75     0.67      0.440         0.037      ---          0.40
130  10.83     0.67      0.440         0.037      ---          0.40
131  10.92     0.67      0.440         0.036      ---          0.40
132  11.00     0.67      0.440         0.036      ---          0.40
133  11.08     0.63      0.418         0.036      ---          0.38
134  11.17     0.63      0.418         0.036      ---          0.38
135  11.25     0.63      0.418         0.036      ---          0.38
136  11.33     0.63      0.418         0.036      ---          0.38
137  11.42     0.63      0.418         0.035      ---          0.38
138  11.50     0.63      0.418         0.035      ---          0.38
139  11.58     0.57      0.374         0.035      ---          0.34
140  11.67     0.57      0.374         0.035      ---          0.34
141  11.75     0.57      0.374         0.035      ---          0.34
142  11.83     0.60      0.396         0.034      ---          0.36
143  11.92     0.60      0.396         0.034      ---          0.36
144  12.00     0.60      0.396         0.034      ---          0.36
145  12.08     0.83      0.550         0.034      ---          0.52
146  12.17     0.83      0.550         0.034      ---          0.52
147  12.25     0.83      0.550         0.034      ---          0.52
148  12.33     0.87      0.572         0.033      ---          0.54
149  12.42     0.87      0.572         0.033      ---          0.54
150  12.50     0.87      0.572         0.033      ---          0.54
151  12.58     0.93      0.616         0.033      ---          0.58
152  12.67     0.93      0.616         0.033      ---          0.58
153  12.75     0.93      0.616         0.033      ---          0.58
154  12.83     0.97      0.638         0.032      ---          0.61
155  12.92     0.97      0.638         0.032      ---          0.61
156  13.00     0.97      0.638         0.032      ---          0.61
157  13.08     1.13      0.748         0.032      ---          0.72
158  13.17     1.13      0.748         0.032      ---          0.72
159  13.25     1.13      0.748         0.032      ---          0.72
160  13.33     1.13      0.748         0.031      ---          0.72
161  13.42     1.13      0.748         0.031      ---          0.72
162  13.50     1.13      0.748         0.031      ---          0.72
163  13.58     0.77      0.506         0.031      ---          0.47
164  13.67     0.77      0.506         0.031      ---          0.48
165  13.75     0.77      0.506         0.031      ---          0.48
166  13.83     0.77      0.506         0.031      ---          0.48
167  13.92     0.77      0.506         0.030      ---          0.48
168  14.00     0.77      0.506         0.030      ---          0.48
169  14.08     0.90      0.594         0.030      ---          0.56
170  14.17     0.90      0.594         0.030      ---          0.56
171  14.25     0.90      0.594         0.030      ---          0.56
172  14.33     0.87      0.572         0.030      ---          0.54
173  14.42     0.87      0.572         0.029      ---          0.54
174  14.50     0.87      0.572         0.029      ---          0.54
175  14.58     0.87      0.572         0.029      ---          0.54
176  14.67     0.87      0.572         0.029      ---          0.54
177  14.75     0.87      0.572         0.029      ---          0.54
```

178	14.83	0.83	0.550	0.029	---	0.52
179	14.92	0.83	0.550	0.029	---	0.52
180	15.00	0.83	0.550	0.028	---	0.52
181	15.08	0.80	0.528	0.028	---	0.50
182	15.17	0.80	0.528	0.028	---	0.50
183	15.25	0.80	0.528	0.028	---	0.50
184	15.33	0.77	0.506	0.028	---	0.48
185	15.42	0.77	0.506	0.028	---	0.48
186	15.50	0.77	0.506	0.028	---	0.48
187	15.58	0.63	0.418	0.027	---	0.39
188	15.67	0.63	0.418	0.027	---	0.39
189	15.75	0.63	0.418	0.027	---	0.39
190	15.83	0.63	0.418	0.027	---	0.39
191	15.92	0.63	0.418	0.027	---	0.39
192	16.00	0.63	0.418	0.027	---	0.39
193	16.08	0.13	0.088	0.027	---	0.06
194	16.17	0.13	0.088	0.026	---	0.06
195	16.25	0.13	0.088	0.026	---	0.06
196	16.33	0.13	0.088	0.026	---	0.06
197	16.42	0.13	0.088	0.026	---	0.06
198	16.50	0.13	0.088	0.026	---	0.06
199	16.58	0.10	0.066	0.026	---	0.04
200	16.67	0.10	0.066	0.026	---	0.04
201	16.75	0.10	0.066	0.026	---	0.04
202	16.83	0.10	0.066	0.025	---	0.04
203	16.92	0.10	0.066	0.025	---	0.04
204	17.00	0.10	0.066	0.025	---	0.04
205	17.08	0.17	0.110	0.025	---	0.08
206	17.17	0.17	0.110	0.025	---	0.09
207	17.25	0.17	0.110	0.025	---	0.09
208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.07
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07
233	19.42	0.13	0.088	0.022	---	0.07
234	19.50	0.13	0.088	0.022	---	0.07
235	19.58	0.10	0.066	0.022	---	0.04
236	19.67	0.10	0.066	0.022	---	0.04
237	19.75	0.10	0.066	0.021	---	0.04

```
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      36.3(Ac.)/[(In)/(Ft.)] =      14.0(Ac.Ft)
     Total soil loss =      0.87(In)
     Total soil loss =     2.625(Ac.Ft)
     Total rainfall =      5.50(In)
     Flood volume =      610325.7 Cubic Feet
     Total soil loss =      114352.4 Cubic Feet
     ------------------------------------------------------------------
```

```
--
       Peak flow rate of this hydrograph =     25.865(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0003      0.04  Q         |         |         |
|
    0+10       0.0010      0.10  Q         |         |         |
|
    0+15       0.0018      0.12  Q         |         |         |
|
    0+20       0.0026      0.11  Q         |         |         |
|
    0+25       0.0032      0.09  Q         |         |         |
|
    0+30       0.0039      0.09  Q         |         |         |
|
    0+35       0.0046      0.10  Q         |         |         |
|
    0+40       0.0053      0.11  Q         |         |         |
|
    0+45       0.0061      0.12  Q         |         |         |
|
    0+50       0.0083      0.32  Q         |         |         |
|
    0+55       0.0127      0.63  Q         |         |         |
|
    1+ 0       0.0178      0.75  Q         |         |         |
|
    1+ 5       0.0221      0.62  Q         |         |         |
|
    1+10       0.0246      0.36  Q         |         |         |
|
    1+15       0.0266      0.29  Q         |         |         |
|
    1+20       0.0284      0.26  Q         |         |         |
|
    1+25       0.0301      0.25  Q         |         |         |
|
    1+30       0.0318      0.24  Q         |         |         |
|
    1+35       0.0335      0.25  Q         |         |         |
|
    1+40       0.0351      0.24  Q         |         |         |
|
    1+45       0.0367      0.23  Q         |         |         |
|
```

```
    1+50       0.0396      0.42  Q         |         |         |
|
    1+55       0.0447      0.74  Q         |         |         |
|
    2+ 0       0.0505      0.85  VQ        |         |         |
|
    2+ 5       0.0569      0.92  VQ        |         |         |
|
    2+10       0.0636      0.97  VQ        |         |         |
|
    2+15       0.0705      1.01  VQ        |         |         |
|
    2+20       0.0776      1.04  VQ        |         |         |
|
    2+25       0.0849      1.06  VQ        |         |         |
|
    2+30       0.0924      1.09  VQ        |         |         |
|
    2+35       0.1014      1.31  VQ        |         |         |
|
    2+40       0.1126      1.62  V Q       |         |         |
|
    2+45       0.1245      1.74  V Q       |         |         |
|
    2+50       0.1370      1.80  V Q       |         |         |
|
    2+55       0.1497      1.85  V Q       |         |         |
|
    3+ 0       0.1627      1.89  V Q       |         |         |
|
    3+ 5       0.1759      1.92  V Q       |         |         |
|
    3+10       0.1893      1.94  V Q       |         |         |
|
    3+15       0.2029      1.97  V Q       |         |         |
|
    3+20       0.2166      1.99  V Q       |         |         |
|
    3+25       0.2304      2.00  V Q       |         |         |
|
    3+30       0.2442      2.01  V Q       |         |         |
|
    3+35       0.2581      2.02  V Q       |         |         |
|
    3+40       0.2720      2.03  V Q       |         |         |
|
    3+45       0.2860      2.03  V Q       |         |         |
|
    3+50       0.3015      2.24  V Q       |         |         |
|
    3+55       0.3190      2.55  V  Q      |         |         |
|
    4+ 0       0.3374      2.67  V  Q      |         |         |
|
    4+ 5       0.3563      2.74  |V Q      |         |         |
|
    4+10       0.3754      2.78  |V Q      |         |         |
|
    4+15       0.3949      2.82  |V Q      |         |         |
|
```

```
    4+20       0.4158      3.05  |V  Q     |         |          |
|
    4+25       0.4391      3.38  |V  Q     |         |          |
|
    4+30       0.4633      3.51  |V  Q     |         |          |
|
    4+35       0.4880      3.59  |V  Q     |         |          |
|
    4+40       0.5131      3.64  |V  Q     |         |          |
|
    4+45       0.5384      3.67  |V  Q     |         |          |
|
    4+50       0.5652      3.90  |V   Q    |         |          |
|
    4+55       0.5944      4.23  |V   Q    |         |          |
|
    5+ 0       0.6244      4.36  |V   Q    |         |          |
|
    5+ 5       0.6524      4.05  |V   Q    |         |          |
|
    5+10       0.6763      3.48  |V  Q     |         |          |
|
    5+15       0.6991      3.31  |V  Q     |         |          |
|
    5+20       0.7226      3.41  | V Q     |         |          |
|
    5+25       0.7479      3.67  | V Q     |         |          |
|
    5+30       0.7737      3.74  | V Q     |         |          |
|
    5+35       0.8011      3.98  | V  Q    |         |          |
|
    5+40       0.8307      4.30  | V  Q    |         |          |
|
    5+45       0.8611      4.41  | V  Q    |         |          |
|
    5+50       0.8919      4.47  | V  Q    |         |          |
|
    5+55       0.9231      4.53  | V   Q   |         |          |
|
    6+ 0       0.9547      4.58  | V   Q   |         |          |
|
    6+ 5       0.9879      4.83  | V   Q   |         |          |
|
    6+10       1.0234      5.16  | V   Q   |         |          |
|
    6+15       1.0598      5.29  |  V   Q  |         |          |
|
    6+20       1.0968      5.37  |  V   Q  |         |          |
|
    6+25       1.1341      5.42  |  V   Q  |         |          |
|
    6+30       1.1716      5.45  |  V   Q  |         |          |
|
    6+35       1.2107      5.68  |  V   Q  |         |          |
|
    6+40       1.2521      6.01  |  V    Q |         |          |
|
    6+45       1.2944      6.14  |  V    Q |         |          |
|
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    6+50       1.3373      6.22  |  V    Q |         |         |
|
    6+55       1.3804      6.27  |  V    Q |         |         |
|
    7+ 0       1.4238      6.30  |   V   Q |         |         |
|
    7+ 5       1.4674      6.33  |   V   Q |         |         |
|
    7+10       1.5112      6.36  |   V   Q |         |         |
|
    7+15       1.5552      6.38  |   V   Q |         |         |
|
    7+20       1.6006      6.60  |   V   Q |         |         |
|
    7+25       1.6482      6.91  |   V    Q|         |         |
|
    7+30       1.6966      7.03  |   V    Q|         |         |
|
    7+35       1.7468      7.29  |   V    Q|         |         |
|
    7+40       1.7995      7.64  |    V    Q         |         |
|
    7+45       1.8531      7.79  |    V    Q         |         |
|
    7+50       1.9087      8.07  |    V    Q         |         |
|
    7+55       1.9668      8.44  |    V    |Q        |         |
|
    8+ 0       2.0260      8.60  |    V    |Q        |         |
|
    8+ 5       2.0887      9.09  |    V    | Q       |         |
|
    8+10       2.1560      9.77  |     V   |  Q      |         |
|
    8+15       2.2251     10.04  |     V   |  Q      |         |
|
    8+20       2.2953     10.20  |     V   |  Q      |         |
|
    8+25       2.3663     10.30  |     V   |  Q      |         |
|
    8+30       2.4377     10.38  |     V   |  Q      |         |
|
    8+35       2.5110     10.64  |      V  |   Q     |         |
|
    8+40       2.5867     10.99  |      V  |   Q     |         |
|
    8+45       2.6634     11.13  |      V  |   Q     |         |
|
    8+50       2.7421     11.43  |      V  |    Q    |         |
|
    8+55       2.8232     11.78  |       V |    Q    |         |
|
    9+ 0       2.9053     11.92  |       V |    Q    |         |
|
    9+ 5       2.9907     12.40  |       V |     Q   |         |
|
    9+10       3.0808     13.08  |       V |      Q  |         |
|
    9+15       3.1727     13.34  |        V|      Q  |         |
|
```

```
    9+20       3.2671     13.70  |        V|       Q |         |
|
    9+25       3.3642     14.11  |        V|       Q |         |
|
    9+30       3.4627     14.30  |        V|        Q|         |
|
    9+35       3.5634     14.62  |         V        Q|         |
|
    9+40       3.6667     15.00  |         V         Q         |
|
    9+45       3.7712     15.18  |         V         Q         |
|
    9+50       3.8779     15.49  |         |V        Q         |
|
    9+55       3.9871     15.86  |         |V        |Q        |
|
   10+ 0       4.0974     16.02  |         |V        |Q        |
|
   10+ 5       4.1990     14.75  |         |V       Q|         |
|
   10+10       4.2861     12.66  |         | V   Q   |         |
|
   10+15       4.3685     11.96  |         | V  Q    |         |
|
   10+20       4.4483     11.59  |         | V  Q    |         |
|
   10+25       4.5264     11.34  |         | V  Q    |         |
|
   10+30       4.6033     11.17  |         |  VQ     |         |
|
   10+35       4.6861     12.02  |         |  V  Q   |         |
|
   10+40       4.7786     13.44  |         |  V   Q  |         |
|
   10+45       4.8742     13.88  |         |  V    Q |         |
|
   10+50       4.9711     14.07  |         |   V   Q |         |
|
   10+55       5.0694     14.27  |         |   V    Q|         |
|
   11+ 0       5.1687     14.42  |         |   V    Q|         |
|
   11+ 5       5.2675     14.34  |         |    V   Q|         |
|
   11+10       5.3648     14.12  |         |    V  Q |         |
|
   11+15       5.4619     14.10  |         |    V  Q |         |
|
   11+20       5.5591     14.12  |         |    V  Q |         |
|
   11+25       5.6562     14.09  |         |     V Q |         |
|
   11+30       5.7530     14.07  |         |     V Q |         |
|
   11+35       5.8471     13.66  |         |     V Q |         |
|
   11+40       5.9369     13.03  |         |     VQ  |         |
|
   11+45       6.0251     12.81  |         |      Q  |         |
|
```

```
   11+50       6.1138     12.88  |         |      Q  |         |
|
   11+55       6.2042     13.12  |         |      Q  |         |
|
   12+ 0       6.2949     13.18  |         |      Q  |         |
|
   12+ 5       6.3953     14.57  |         |       VQ|         |
|
   12+10       6.5105     16.73  |         |       V | Q       |
|
   12+15       6.6309     17.49  |         |       V |  Q      |
|
   12+20       6.7556     18.10  |         |        V|   Q     |
|
   12+25       6.8843     18.69  |         |        V|   Q     |
|
   12+30       7.0153     19.02  |         |         V    Q    |
|
   12+35       7.1506     19.65  |         |         V     Q   |
|
   12+40       7.2912     20.42  |         |         V      Q  |
|
   12+45       7.4343     20.78  |         |         |V     Q  |
|
   12+50       7.5805     21.22  |         |         |V      Q |
|
   12+55       7.7295     21.63  |         |         | V     Q |
|
   13+ 0       7.8797     21.82  |         |         | V      Q|
|
   13+ 5       8.0376     22.92  |         |         | V       Q
|
   13+10       8.2066     24.54  |         |         |  V      | Q
|
   13+15       8.3797     25.14  |         |         |  V      |  Q
|
   13+20       8.5552     25.49  |         |         |   V     |  Q
|
   13+25       8.7323     25.70  |         |         |   V     |   Q
|
   13+30       8.9104     25.87  |         |         |    V    |   Q
|
   13+35       9.0746     23.84  |         |         |    V    |Q
|
   13+40       9.2161     20.55  |         |         |     VQ  |
|
   13+45       9.3500     19.45  |         |         |    QV   |
|
   13+50       9.4800     18.88  |         |         |    Q V  |
|
   13+55       9.6072     18.47  |         |         |   Q  V  |
|
   14+ 0       9.7323     18.16  |         |         |   Q  V  |
|
   14+ 5       9.8612     18.71  |         |         |   Q   V |
|
   14+10       9.9972     19.76  |         |         |     Q V |
|
   14+15      10.1351     20.02  |         |         |     Q V |
|
```

```
   14+20      10.2722     19.91  |         |         |     Q  V|
|
   14+25      10.4083     19.76  |         |         |     Q  V|
|
   14+30      10.5445     19.77  |         |         |     Q   V
|
   14+35      10.6809     19.80  |         |         |     Q   V
|
   14+40      10.8175     19.84  |         |         |     Q   V
|
   14+45      10.9544     19.88  |         |         |     Q   |V
|
   14+50      11.0902     19.72  |         |         |     Q   |V
|
   14+55      11.2239     19.41  |         |         |    Q    | V
|
   15+ 0      11.3567     19.29  |         |         |    Q    | V
|
   15+ 5      11.4877     19.02  |         |         |    Q    | V
|
   15+10      11.6164     18.68  |         |         |   Q     |  V
|
   15+15      11.7442     18.55  |         |         |   Q     |  V
|
   15+20      11.8701     18.28  |         |         |   Q     |  V
|
   15+25      11.9936     17.92  |         |         |  Q      |   V
|
   15+30      12.1160     17.78  |         |         |  Q      |   V
|
   15+35      12.2324     16.90  |         |         | Q       |   V
|
   15+40      12.3400     15.62  |         |         Q         |    V
|
   15+45      12.4444     15.16  |         |         Q         |    V
|
   15+50      12.5469     14.89  |         |        Q|         |    V
|
   15+55      12.6484     14.73  |         |        Q|         |     V
|
   16+ 0      12.7489     14.60  |         |        Q|         |     V
|
   16+ 5      12.8285     11.56  |         |    Q    |         |     V
|
   16+10      12.8760      6.89  |        Q|         |         |     V
|
   16+15      12.9119      5.22  |     Q   |         |         |     V
|
   16+20      12.9414      4.28  |    Q    |         |         |     V
|
   16+25      12.9670      3.72  |   Q     |         |         |      V
|
   16+30      12.9897      3.30  |   Q     |         |         |      V
|
   16+35      13.0088      2.78  |  Q      |         |         |      V
|
   16+40      13.0241      2.22  | Q       |         |         |      V
|
   16+45      13.0371      1.89  | Q       |         |         |      V
|
```

```
   16+50      13.0482      1.61  | Q       |         |         |      V
|
   16+55      13.0591      1.58  | Q       |         |         |      V
|
   17+ 0      13.0698      1.56  | Q       |         |         |      V
|
   17+ 5      13.0831      1.93  | Q       |         |         |      V
|
   17+10      13.1005      2.53  |  Q      |         |         |      V
|
   17+15      13.1194      2.74  |  Q      |         |         |      V
|
   17+20      13.1390      2.84  |  Q      |         |         |      V
|
   17+25      13.1591      2.93  |  Q      |         |         |      V
|
   17+30      13.1797      2.99  |  Q      |         |         |      V
|
   17+35      13.2006      3.04  |   Q     |         |         |      V
|
   17+40      13.2218      3.07  |   Q     |         |         |      V
|
   17+45      13.2432      3.11  |   Q     |         |         |      V
|
   17+50      13.2635      2.95  |  Q      |         |         |      V
|
   17+55      13.2817      2.64  |  Q      |         |         |      V
|
   18+ 0      13.2992      2.54  |  Q      |         |         |      V
|
   18+ 5      13.3163      2.49  |  Q      |         |         |       V
|
   18+10      13.3332      2.45  |  Q      |         |         |       V
|
   18+15      13.3499      2.43  |  Q      |         |         |       V
|
   18+20      13.3665      2.41  |  Q      |         |         |       V
|
   18+25      13.3830      2.40  |  Q      |         |         |       V
|
   18+30      13.3994      2.39  |  Q      |         |         |       V
|
   18+35      13.4145      2.18  | Q       |         |         |       V
|
   18+40      13.4274      1.88  | Q       |         |         |       V
|
   18+45      13.4396      1.77  | Q       |         |         |       V
|
   18+50      13.4501      1.52  | Q       |         |         |       V
|
   18+55      13.4582      1.18  |Q        |         |         |       V
|
   19+ 0      13.4654      1.05  |Q        |         |         |       V
|
   19+ 5      13.4735      1.17  |Q        |         |         |       V
|
   19+10      13.4833      1.42  |Q        |         |         |       V
|
   19+15      13.4935      1.49  |Q        |         |         |       V
|
```

```
     19+20       13.5053       1.71  | Q        |         |         |       V
 |
     19+25       13.5194       2.05  | Q        |         |         |       V
 |
     19+30       13.5344       2.17  | Q        |         |         |       V
 |
     19+35       13.5485       2.04  | Q        |         |         |       V
 |
     19+40       13.5608       1.80  | Q        |         |         |       V
 |
     19+45       13.5728       1.74  | Q        |         |         |       V
 |
     19+50       13.5833       1.52  | Q        |         |         |       V
 |
     19+55       13.5915       1.20  |Q         |         |         |       V
 |
     20+ 0       13.5989       1.08  |Q         |         |         |       V
 |
     20+ 5       13.6073       1.21  |Q         |         |         |       V
 |
     20+10       13.6174       1.47  |Q         |         |         |       V
 |
     20+15       13.6279       1.54  | Q        |         |         |       V
 |
     20+20       13.6387       1.56  | Q        |         |         |       V
 |
     20+25       13.6496       1.58  | Q        |         |         |       V
 |
     20+30       13.6606       1.60  | Q        |         |         |       V
 |
     20+35       13.6717       1.61  | Q        |         |         |
V|
     20+40       13.6830       1.63  | Q        |         |         |
V|
     20+45       13.6944       1.65  | Q        |         |         |
V|
     20+50       13.7045       1.47  |Q         |         |         |
V|
     20+55       13.7125       1.17  |Q         |         |         |
V|
     21+ 0       13.7199       1.06  |Q         |         |         |
V|
     21+ 5       13.7282       1.20  |Q         |         |         |
V|
     21+10       13.7383       1.48  |Q         |         |         |
V|
     21+15       13.7491       1.56  | Q        |         |         |
V|
     21+20       13.7587       1.40  |Q         |         |         |
V|
     21+25       13.7664       1.12  |Q         |         |         |
V|
     21+30       13.7735       1.03  |Q         |         |         |
V|
     21+35       13.7816       1.17  |Q         |         |         |
V|
     21+40       13.7916       1.46  |Q         |         |         |
V|
     21+45       13.8024       1.56  | Q        |         |         |
V|
```

```
        21+50       13.8121       1.42  |Q         |          |          |
     V|
        21+55       13.8200       1.13  |Q         |          |          |
     V|
        22+ 0       13.8271       1.04  |Q         |          |          |
     V|
        22+ 5       13.8353       1.19  |Q         |          |          |
     V|
        22+10       13.8455       1.48  |Q         |          |          |
     V|
        22+15       13.8564       1.57  | Q        |          |          |
     V|
        22+20       13.8662       1.43  |Q         |          |          |
     V|
        22+25       13.8741       1.15  |Q         |          |          |
     V|
        22+30       13.8814       1.06  |Q         |          |          |
     V|
        22+35       13.8883       1.01  |Q         |          |          |
     V|
        22+40       13.8951       0.99  |Q         |          |          |
     V|
        22+45       13.9019       0.98  |Q         |          |          |
     V|
        22+50       13.9085       0.97  |Q         |          |          |
     V|
        22+55       13.9151       0.96  |Q         |          |          |
     V|
        23+ 0       13.9216       0.94  |Q         |          |          |
     V|
        23+ 5       13.9280       0.93  |Q         |          |          |
     V|
        23+10       13.9344       0.93  |Q         |          |          |
     V|
        23+15       13.9409       0.93  |Q         |          |          |
     V|
        23+20       13.9473       0.93  |Q         |          |          |
     V|
        23+25       13.9537       0.94  |Q         |          |          |
     V|
        23+30       13.9602       0.94  |Q         |          |          |
     V|
        23+35       13.9667       0.94  |Q         |          |          |
     V|
        23+40       13.9731       0.94  |Q         |          |          |
     V|
        23+45       13.9796       0.94  |Q         |          |          |
     V|
        23+50       13.9861       0.94  |Q         |          |          |
     V|
        23+55       13.9926       0.94  |Q         |          |          |
     V|
        24+ 0       13.9991       0.94  |Q         |          |          |
     V|
        24+ 5       14.0040       0.71  Q          |          |          |
     V|
        24+10       14.0064       0.35  Q          |          |          |
     V|
        24+15       14.0080       0.23  Q          |          |          |
     V|
```

```
    24+20      14.0091      0.16  Q          |          |          |
V|
    24+25      14.0099      0.11  Q          |          |          |
V|
    24+30      14.0104      0.08  Q          |          |          |
V|
    24+35      14.0108      0.05  Q          |          |          |
V|
    24+40      14.0110      0.04  Q          |          |          |
V|
    24+45      14.0112      0.02  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: Ancillaryareapre24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Ancillary Area Prelandfill
      24 hr 100 yr storm event

      ------------------------------------------------------------------
--
      Drainage Area =      27.00(Ac.)  =      0.042 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      27.00(Ac.)  =
0.042 Sq. Mi.
      Length along longest watercourse =    3321.00(Ft.)
      Length along longest watercourse measured to centroid =    1146.00
(Ft.)
      Length along longest watercourse =      0.629 Mi.
      Length along longest watercourse measured to centroid =      0.217
Mi.
      Difference in elevation =     239.00(Ft.)
      Slope along watercourse =    379.9819 Ft./Mi.
      Average Manning's 'N' = 0.025
      Lag time =    0.091 Hr.
      Lag time =     5.46 Min.
      25% of lag time =     1.37 Min.
      40% of lag time =     2.19 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             27.00              2.00                   54.00

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             27.00              5.50                  148.50

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          27.000           93.00         0.750
       Total Area Entered =     27.00(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.750        0.012       1.000
0.012
                                                          Sum (F) =
0.012
      Area averaged mean soil loss (F) (In/Hr) =  0.012
      Minimum soil loss rate ((In/Hr)) =  0.006
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.300
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083          91.506         11.675              3.177
          2   0.167         183.013         54.050             14.707
          3   0.250         274.519         20.354              5.539
          4   0.333         366.026          8.403              2.287
          5   0.417         457.532          3.452              0.939
          6   0.500         549.039          1.046              0.285
          7   0.583         640.545          0.642              0.175
          8   0.667         732.052          0.378              0.103
                                    Sum = 100.000   Sum=      27.211
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
```

```
     (Hr.)  Percent   (In/Hr)          Max   |   Low         (In/Hr)
  1   0.08     0.07     0.044           0.021       ---           0.02
  2   0.17     0.07     0.044           0.021       ---           0.02
  3   0.25     0.07     0.044           0.021       ---           0.02
  4   0.33     0.10     0.066           0.021       ---           0.05
  5   0.42     0.10     0.066           0.021       ---           0.05
  6   0.50     0.10     0.066           0.021       ---           0.05
  7   0.58     0.10     0.066           0.020       ---           0.05
  8   0.67     0.10     0.066           0.020       ---           0.05
  9   0.75     0.10     0.066           0.020       ---           0.05
 10   0.83     0.13     0.088           0.020       ---           0.07
 11   0.92     0.13     0.088           0.020       ---           0.07
 12   1.00     0.13     0.088           0.020       ---           0.07
 13   1.08     0.10     0.066           0.020       ---           0.05
 14   1.17     0.10     0.066           0.020       ---           0.05
 15   1.25     0.10     0.066           0.020       ---           0.05
 16   1.33     0.10     0.066           0.020       ---           0.05
 17   1.42     0.10     0.066           0.020       ---           0.05
 18   1.50     0.10     0.066           0.020       ---           0.05
 19   1.58     0.10     0.066           0.020       ---           0.05
 20   1.67     0.10     0.066           0.019       ---           0.05
 21   1.75     0.10     0.066           0.019       ---           0.05
 22   1.83     0.13     0.088           0.019       ---           0.07
 23   1.92     0.13     0.088           0.019       ---           0.07
 24   2.00     0.13     0.088           0.019       ---           0.07
 25   2.08     0.13     0.088           0.019       ---           0.07
 26   2.17     0.13     0.088           0.019       ---           0.07
 27   2.25     0.13     0.088           0.019       ---           0.07
 28   2.33     0.13     0.088           0.019       ---           0.07
 29   2.42     0.13     0.088           0.019       ---           0.07
 30   2.50     0.13     0.088           0.019       ---           0.07
 31   2.58     0.17     0.110           0.019       ---           0.09
 32   2.67     0.17     0.110           0.019       ---           0.09
 33   2.75     0.17     0.110           0.018       ---           0.09
 34   2.83     0.17     0.110           0.018       ---           0.09
 35   2.92     0.17     0.110           0.018       ---           0.09
 36   3.00     0.17     0.110           0.018       ---           0.09
 37   3.08     0.17     0.110           0.018       ---           0.09
 38   3.17     0.17     0.110           0.018       ---           0.09
 39   3.25     0.17     0.110           0.018       ---           0.09
 40   3.33     0.17     0.110           0.018       ---           0.09
 41   3.42     0.17     0.110           0.018       ---           0.09
 42   3.50     0.17     0.110           0.018       ---           0.09
 43   3.58     0.17     0.110           0.018       ---           0.09
 44   3.67     0.17     0.110           0.018       ---           0.09
 45   3.75     0.17     0.110           0.018       ---           0.09
 46   3.83     0.20     0.132           0.017       ---           0.11
 47   3.92     0.20     0.132           0.017       ---           0.11
 48   4.00     0.20     0.132           0.017       ---           0.11
 49   4.08     0.20     0.132           0.017       ---           0.11
 50   4.17     0.20     0.132           0.017       ---           0.11
 51   4.25     0.20     0.132           0.017       ---           0.11
 52   4.33     0.23     0.154           0.017       ---           0.14
 53   4.42     0.23     0.154           0.017       ---           0.14
 54   4.50     0.23     0.154           0.017       ---           0.14
 55   4.58     0.23     0.154           0.017       ---           0.14
 56   4.67     0.23     0.154           0.017       ---           0.14
 57   4.75     0.23     0.154           0.017       ---           0.14
 58   4.83     0.27     0.176           0.017       ---           0.16
 59   4.92     0.27     0.176           0.017       ---           0.16
```

60	5.00	0.27	0.176	0.016	---	0.16
61	5.08	0.20	0.132	0.016	---	0.12
62	5.17	0.20	0.132	0.016	---	0.12
63	5.25	0.20	0.132	0.016	---	0.12
64	5.33	0.23	0.154	0.016	---	0.14
65	5.42	0.23	0.154	0.016	---	0.14
66	5.50	0.23	0.154	0.016	---	0.14
67	5.58	0.27	0.176	0.016	---	0.16
68	5.67	0.27	0.176	0.016	---	0.16
69	5.75	0.27	0.176	0.016	---	0.16
70	5.83	0.27	0.176	0.016	---	0.16
71	5.92	0.27	0.176	0.016	---	0.16
72	6.00	0.27	0.176	0.016	---	0.16
73	6.08	0.30	0.198	0.016	---	0.18
74	6.17	0.30	0.198	0.015	---	0.18
75	6.25	0.30	0.198	0.015	---	0.18
76	6.33	0.30	0.198	0.015	---	0.18
77	6.42	0.30	0.198	0.015	---	0.18
78	6.50	0.30	0.198	0.015	---	0.18
79	6.58	0.33	0.220	0.015	---	0.20
80	6.67	0.33	0.220	0.015	---	0.20
81	6.75	0.33	0.220	0.015	---	0.20
82	6.83	0.33	0.220	0.015	---	0.21
83	6.92	0.33	0.220	0.015	---	0.21
84	7.00	0.33	0.220	0.015	---	0.21
85	7.08	0.33	0.220	0.015	---	0.21
86	7.17	0.33	0.220	0.015	---	0.21
87	7.25	0.33	0.220	0.015	---	0.21
88	7.33	0.37	0.242	0.015	---	0.23
89	7.42	0.37	0.242	0.014	---	0.23
90	7.50	0.37	0.242	0.014	---	0.23
91	7.58	0.40	0.264	0.014	---	0.25
92	7.67	0.40	0.264	0.014	---	0.25
93	7.75	0.40	0.264	0.014	---	0.25
94	7.83	0.43	0.286	0.014	---	0.27
95	7.92	0.43	0.286	0.014	---	0.27
96	8.00	0.43	0.286	0.014	---	0.27
97	8.08	0.50	0.330	0.014	---	0.32
98	8.17	0.50	0.330	0.014	---	0.32
99	8.25	0.50	0.330	0.014	---	0.32
100	8.33	0.50	0.330	0.014	---	0.32
101	8.42	0.50	0.330	0.014	---	0.32
102	8.50	0.50	0.330	0.014	---	0.32
103	8.58	0.53	0.352	0.014	---	0.34
104	8.67	0.53	0.352	0.013	---	0.34
105	8.75	0.53	0.352	0.013	---	0.34
106	8.83	0.57	0.374	0.013	---	0.36
107	8.92	0.57	0.374	0.013	---	0.36
108	9.00	0.57	0.374	0.013	---	0.36
109	9.08	0.63	0.418	0.013	---	0.40
110	9.17	0.63	0.418	0.013	---	0.40
111	9.25	0.63	0.418	0.013	---	0.40
112	9.33	0.67	0.440	0.013	---	0.43
113	9.42	0.67	0.440	0.013	---	0.43
114	9.50	0.67	0.440	0.013	---	0.43
115	9.58	0.70	0.462	0.013	---	0.45
116	9.67	0.70	0.462	0.013	---	0.45
117	9.75	0.70	0.462	0.013	---	0.45
118	9.83	0.73	0.484	0.013	---	0.47
119	9.92	0.73	0.484	0.013	---	0.47

```
120  10.00     0.73      0.484         0.012      ---          0.47
121  10.08     0.50      0.330         0.012      ---          0.32
122  10.17     0.50      0.330         0.012      ---          0.32
123  10.25     0.50      0.330         0.012      ---          0.32
124  10.33     0.50      0.330         0.012      ---          0.32
125  10.42     0.50      0.330         0.012      ---          0.32
126  10.50     0.50      0.330         0.012      ---          0.32
127  10.58     0.67      0.440         0.012      ---          0.43
128  10.67     0.67      0.440         0.012      ---          0.43
129  10.75     0.67      0.440         0.012      ---          0.43
130  10.83     0.67      0.440         0.012      ---          0.43
131  10.92     0.67      0.440         0.012      ---          0.43
132  11.00     0.67      0.440         0.012      ---          0.43
133  11.08     0.63      0.418         0.012      ---          0.41
134  11.17     0.63      0.418         0.012      ---          0.41
135  11.25     0.63      0.418         0.012      ---          0.41
136  11.33     0.63      0.418         0.012      ---          0.41
137  11.42     0.63      0.418         0.011      ---          0.41
138  11.50     0.63      0.418         0.011      ---          0.41
139  11.58     0.57      0.374         0.011      ---          0.36
140  11.67     0.57      0.374         0.011      ---          0.36
141  11.75     0.57      0.374         0.011      ---          0.36
142  11.83     0.60      0.396         0.011      ---          0.38
143  11.92     0.60      0.396         0.011      ---          0.38
144  12.00     0.60      0.396         0.011      ---          0.38
145  12.08     0.83      0.550         0.011      ---          0.54
146  12.17     0.83      0.550         0.011      ---          0.54
147  12.25     0.83      0.550         0.011      ---          0.54
148  12.33     0.87      0.572         0.011      ---          0.56
149  12.42     0.87      0.572         0.011      ---          0.56
150  12.50     0.87      0.572         0.011      ---          0.56
151  12.58     0.93      0.616         0.011      ---          0.61
152  12.67     0.93      0.616         0.011      ---          0.61
153  12.75     0.93      0.616         0.011      ---          0.61
154  12.83     0.97      0.638         0.011      ---          0.63
155  12.92     0.97      0.638         0.010      ---          0.63
156  13.00     0.97      0.638         0.010      ---          0.63
157  13.08     1.13      0.748         0.010      ---          0.74
158  13.17     1.13      0.748         0.010      ---          0.74
159  13.25     1.13      0.748         0.010      ---          0.74
160  13.33     1.13      0.748         0.010      ---          0.74
161  13.42     1.13      0.748         0.010      ---          0.74
162  13.50     1.13      0.748         0.010      ---          0.74
163  13.58     0.77      0.506         0.010      ---          0.50
164  13.67     0.77      0.506         0.010      ---          0.50
165  13.75     0.77      0.506         0.010      ---          0.50
166  13.83     0.77      0.506         0.010      ---          0.50
167  13.92     0.77      0.506         0.010      ---          0.50
168  14.00     0.77      0.506         0.010      ---          0.50
169  14.08     0.90      0.594         0.010      ---          0.58
170  14.17     0.90      0.594         0.010      ---          0.58
171  14.25     0.90      0.594         0.010      ---          0.58
172  14.33     0.87      0.572         0.010      ---          0.56
173  14.42     0.87      0.572         0.010      ---          0.56
174  14.50     0.87      0.572         0.010      ---          0.56
175  14.58     0.87      0.572         0.009      ---          0.56
176  14.67     0.87      0.572         0.009      ---          0.56
177  14.75     0.87      0.572         0.009      ---          0.56
178  14.83     0.83      0.550         0.009      ---          0.54
179  14.92     0.83      0.550         0.009      ---          0.54
```

```
180  15.00     0.83      0.550         0.009       ---           0.54
181  15.08     0.80      0.528         0.009       ---           0.52
182  15.17     0.80      0.528         0.009       ---           0.52
183  15.25     0.80      0.528         0.009       ---           0.52
184  15.33     0.77      0.506         0.009       ---           0.50
185  15.42     0.77      0.506         0.009       ---           0.50
186  15.50     0.77      0.506         0.009       ---           0.50
187  15.58     0.63      0.418         0.009       ---           0.41
188  15.67     0.63      0.418         0.009       ---           0.41
189  15.75     0.63      0.418         0.009       ---           0.41
190  15.83     0.63      0.418         0.009       ---           0.41
191  15.92     0.63      0.418         0.009       ---           0.41
192  16.00     0.63      0.418         0.009       ---           0.41
193  16.08     0.13      0.088         0.009       ---           0.08
194  16.17     0.13      0.088         0.009       ---           0.08
195  16.25     0.13      0.088         0.009       ---           0.08
196  16.33     0.13      0.088         0.009       ---           0.08
197  16.42     0.13      0.088         0.008       ---           0.08
198  16.50     0.13      0.088         0.008       ---           0.08
199  16.58     0.10      0.066         0.008       ---           0.06
200  16.67     0.10      0.066         0.008       ---           0.06
201  16.75     0.10      0.066         0.008       ---           0.06
202  16.83     0.10      0.066         0.008       ---           0.06
203  16.92     0.10      0.066         0.008       ---           0.06
204  17.00     0.10      0.066         0.008       ---           0.06
205  17.08     0.17      0.110         0.008       ---           0.10
206  17.17     0.17      0.110         0.008       ---           0.10
207  17.25     0.17      0.110         0.008       ---           0.10
208  17.33     0.17      0.110         0.008       ---           0.10
209  17.42     0.17      0.110         0.008       ---           0.10
210  17.50     0.17      0.110         0.008       ---           0.10
211  17.58     0.17      0.110         0.008       ---           0.10
212  17.67     0.17      0.110         0.008       ---           0.10
213  17.75     0.17      0.110         0.008       ---           0.10
214  17.83     0.13      0.088         0.008       ---           0.08
215  17.92     0.13      0.088         0.008       ---           0.08
216  18.00     0.13      0.088         0.008       ---           0.08
217  18.08     0.13      0.088         0.008       ---           0.08
218  18.17     0.13      0.088         0.008       ---           0.08
219  18.25     0.13      0.088         0.008       ---           0.08
220  18.33     0.13      0.088         0.008       ---           0.08
221  18.42     0.13      0.088         0.008       ---           0.08
222  18.50     0.13      0.088         0.007       ---           0.08
223  18.58     0.10      0.066         0.007       ---           0.06
224  18.67     0.10      0.066         0.007       ---           0.06
225  18.75     0.10      0.066         0.007       ---           0.06
226  18.83     0.07      0.044         0.007       ---           0.04
227  18.92     0.07      0.044         0.007       ---           0.04
228  19.00     0.07      0.044         0.007       ---           0.04
229  19.08     0.10      0.066         0.007       ---           0.06
230  19.17     0.10      0.066         0.007       ---           0.06
231  19.25     0.10      0.066         0.007       ---           0.06
232  19.33     0.13      0.088         0.007       ---           0.08
233  19.42     0.13      0.088         0.007       ---           0.08
234  19.50     0.13      0.088         0.007       ---           0.08
235  19.58     0.10      0.066         0.007       ---           0.06
236  19.67     0.10      0.066         0.007       ---           0.06
237  19.75     0.10      0.066         0.007       ---           0.06
238  19.83     0.07      0.044         0.007       ---           0.04
239  19.92     0.07      0.044         0.007       ---           0.04
```

```
240  20.00     0.07      0.044         0.007      ---          0.04
241  20.08     0.10      0.066         0.007      ---          0.06
242  20.17     0.10      0.066         0.007      ---          0.06
243  20.25     0.10      0.066         0.007      ---          0.06
244  20.33     0.10      0.066         0.007      ---          0.06
245  20.42     0.10      0.066         0.007      ---          0.06
246  20.50     0.10      0.066         0.007      ---          0.06
247  20.58     0.10      0.066         0.007      ---          0.06
248  20.67     0.10      0.066         0.007      ---          0.06
249  20.75     0.10      0.066         0.007      ---          0.06
250  20.83     0.07      0.044         0.007      ---          0.04
251  20.92     0.07      0.044         0.007      ---          0.04
252  21.00     0.07      0.044         0.007      ---          0.04
253  21.08     0.10      0.066         0.007      ---          0.06
254  21.17     0.10      0.066         0.006      ---          0.06
255  21.25     0.10      0.066         0.006      ---          0.06
256  21.33     0.07      0.044         0.006      ---          0.04
257  21.42     0.07      0.044         0.006      ---          0.04
258  21.50     0.07      0.044         0.006      ---          0.04
259  21.58     0.10      0.066         0.006      ---          0.06
260  21.67     0.10      0.066         0.006      ---          0.06
261  21.75     0.10      0.066         0.006      ---          0.06
262  21.83     0.07      0.044         0.006      ---          0.04
263  21.92     0.07      0.044         0.006      ---          0.04
264  22.00     0.07      0.044         0.006      ---          0.04
265  22.08     0.10      0.066         0.006      ---          0.06
266  22.17     0.10      0.066         0.006      ---          0.06
267  22.25     0.10      0.066         0.006      ---          0.06
268  22.33     0.07      0.044         0.006      ---          0.04
269  22.42     0.07      0.044         0.006      ---          0.04
270  22.50     0.07      0.044         0.006      ---          0.04
271  22.58     0.07      0.044         0.006      ---          0.04
272  22.67     0.07      0.044         0.006      ---          0.04
273  22.75     0.07      0.044         0.006      ---          0.04
274  22.83     0.07      0.044         0.006      ---          0.04
275  22.92     0.07      0.044         0.006      ---          0.04
276  23.00     0.07      0.044         0.006      ---          0.04
277  23.08     0.07      0.044         0.006      ---          0.04
278  23.17     0.07      0.044         0.006      ---          0.04
279  23.25     0.07      0.044         0.006      ---          0.04
280  23.33     0.07      0.044         0.006      ---          0.04
281  23.42     0.07      0.044         0.006      ---          0.04
282  23.50     0.07      0.044         0.006      ---          0.04
283  23.58     0.07      0.044         0.006      ---          0.04
284  23.67     0.07      0.044         0.006      ---          0.04
285  23.75     0.07      0.044         0.006      ---          0.04
286  23.83     0.07      0.044         0.006      ---          0.04
287  23.92     0.07      0.044         0.006      ---          0.04
288  24.00     0.07      0.044         0.006      ---          0.04
    Sum =     100.0                                   Sum =    62.6
     Flood volume = Effective rainfall      5.22(In)
      times area      27.0(Ac.)/[(In)/(Ft.)] =      11.7(Ac.Ft)
     Total soil loss =      0.28(In)
     Total soil loss =     0.639(Ac.Ft)
     Total rainfall =      5.50(In)
     Flood volume =      511187.0 Cubic Feet
     Total soil loss =       27839.6 Cubic Feet
     ------------------------------------------------------------------
--
      Peak flow rate of this hydrograph =     20.055(CFS)
```

```
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0005      0.07  Q         |         |         |
|
    0+10       0.0033      0.41  Q         |         |         |
|
    0+15       0.0071      0.54  Q         |         |         |
|
    0+20       0.0117      0.67  Q         |         |         |
|
    0+25       0.0186      1.01  VQ        |         |         |
|
    0+30       0.0265      1.14  VQ        |         |         |
|
    0+35       0.0348      1.20  VQ        |         |         |
|
    0+40       0.0432      1.23  VQ        |         |         |
|
    0+45       0.0517      1.23  VQ        |         |         |
|
    0+50       0.0607      1.31  VQ        |         |         |
|
    0+55       0.0720      1.64  V Q       |         |         |
|
    1+ 0       0.0842      1.76  V Q       |         |         |
|
    1+ 5       0.0962      1.74  V Q       |         |         |
|
    1+10       0.1061      1.44  VQ        |         |         |
|
    1+15       0.1153      1.33  VQ        |         |         |
|
    1+20       0.1241      1.29  VQ        |         |         |
|
    1+25       0.1329      1.27  VQ        |         |         |
|
    1+30       0.1416      1.27  VQ        |         |         |
|
    1+35       0.1503      1.26  VQ        |         |         |
|
    1+40       0.1590      1.26  VQ        |         |         |
|
    1+45       0.1677      1.27  VQ        |         |         |
|
    1+50       0.1770      1.34  VQ        |         |         |
|
```

```
    1+55       0.1884      1.66  V Q       |         |         |
|
    2+ 0       0.2007      1.79  V Q       |         |         |
|
    2+ 5       0.2134      1.84  V Q       |         |         |
|
    2+10       0.2262      1.86  V Q       |         |         |
|
    2+15       0.2391      1.87  V Q       |         |         |
|
    2+20       0.2521      1.88  V Q       |         |         |
|
    2+25       0.2650      1.88  V Q       |         |         |
|
    2+30       0.2780      1.88  V Q       |         |         |
|
    2+35       0.2915      1.96  V Q       |         |         |
|
    2+40       0.3072      2.28  |V Q      |         |         |
|
    2+45       0.3237      2.41  |V Q      |         |         |
|
    2+50       0.3407      2.46  |V Q      |         |         |
|
    2+55       0.3578      2.48  |V Q      |         |         |
|
    3+ 0       0.3749      2.49  |V Q      |         |         |
|
    3+ 5       0.3921      2.50  |V Q      |         |         |
|
    3+10       0.4093      2.50  |V Q      |         |         |
|
    3+15       0.4265      2.50  |V Q      |         |         |
|
    3+20       0.4438      2.50  |V Q      |         |         |
|
    3+25       0.4610      2.51  |V Q      |         |         |
|
    3+30       0.4783      2.51  |V Q      |         |         |
|
    3+35       0.4956      2.51  |V Q      |         |         |
|
    3+40       0.5129      2.51  |V Q      |         |         |
|
    3+45       0.5302      2.51  |V Q      |         |         |
|
    3+50       0.5480      2.59  |V Q      |         |         |
|
    3+55       0.5681      2.91  |V Q      |         |         |
|
    4+ 0       0.5890      3.04  | V Q     |         |         |
|
    4+ 5       0.6102      3.09  | V Q     |         |         |
|
    4+10       0.6316      3.11  | V Q     |         |         |
|
    4+15       0.6531      3.12  | V Q     |         |         |
|
    4+20       0.6751      3.19  | V Q     |         |         |
|
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```
    4+25       0.6994      3.52  | V Q      |         |         |
|
    4+30       0.7245      3.65  | V Q      |         |         |
|
    4+35       0.7500      3.70  | V Q      |         |         |
|
    4+40       0.7756      3.72  | V Q      |         |         |
|
    4+45       0.8013      3.73  | V Q      |         |         |
|
    4+50       0.8275      3.81  | V  Q     |         |         |
|
    4+55       0.8559      4.13  | V  Q     |         |         |
|
    5+ 0       0.8853      4.26  |  V Q     |         |         |
|
    5+ 5       0.9140      4.17  |  V Q     |         |         |
|
    5+10       0.9384      3.54  |  VQ      |         |         |
|
    5+15       0.9612      3.31  |  VQ      |         |         |
|
    5+20       0.9838      3.28  |  VQ      |         |         |
|
    5+25       1.0084      3.57  |  VQ      |         |         |
|
    5+30       1.0337      3.68  |  VQ      |         |         |
|
    5+35       1.0599      3.80  |  V Q     |         |         |
|
    5+40       1.0884      4.14  |  V Q     |         |         |
|
    5+45       1.1178      4.27  |  V Q     |         |         |
|
    5+50       1.1476      4.32  |  V Q     |         |         |
|
    5+55       1.1775      4.35  |   VQ     |         |         |
|
    6+ 0       1.2075      4.36  |   VQ     |         |         |
|
    6+ 5       1.2381      4.43  |   VQ     |         |         |
|
    6+10       1.2709      4.76  |   V Q    |         |         |
|
    6+15       1.3045      4.88  |   V Q    |         |         |
|
    6+20       1.3385      4.94  |   V Q    |         |         |
|
    6+25       1.3726      4.96  |   V Q    |         |         |
|
    6+30       1.4069      4.97  |   V Q    |         |         |
|
    6+35       1.4416      5.04  |   V Q    |         |         |
|
    6+40       1.4786      5.37  |    V Q   |         |         |
|
    6+45       1.5164      5.49  |    V Q   |         |         |
|
    6+50       1.5546      5.55  |    V Q   |         |         |
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```
    6+55       1.5930       5.57  |    V Q  |         |         |
|
    7+ 0       1.6314       5.58  |    V Q  |         |         |
|
    7+ 5       1.6699       5.58  |    V Q  |         |         |
|
    7+10       1.7083       5.59  |    V Q  |         |         |
|
    7+15       1.7468       5.59  |    V Q  |         |         |
|
    7+20       1.7858       5.66  |     VQ  |         |         |
|
    7+25       1.8270       5.99  |     VQ  |         |         |
|
    7+30       1.8691       6.11  |     V Q |         |         |
|
    7+35       1.9120       6.23  |     V Q |         |         |
|
    7+40       1.9574       6.58  |     V Q |         |         |
|
    7+45       2.0036       6.71  |     V Q |         |         |
|
    7+50       2.0506       6.83  |     V  Q|         |         |
|
    7+55       2.1001       7.18  |      V Q|         |         |
|
    8+ 0       2.1505       7.31  |      V Q|         |         |
|
    8+ 5       2.2022       7.51  |      V  Q         |         |
|
    8+10       2.2585       8.18  |      V  Q         |         |
|
    8+15       2.3166       8.43  |      V  |Q        |         |
|
    8+20       2.3754       8.54  |       V |Q        |         |
|
    8+25       2.4345       8.58  |       V |Q        |         |
|
    8+30       2.4937       8.60  |       V |Q        |         |
|
    8+35       2.5535       8.68  |       V |Q        |         |
|
    8+40       2.6155       9.01  |       V | Q       |         |
|
    8+45       2.6784       9.13  |        V| Q       |         |
|
    8+50       2.7421       9.25  |        V| Q       |         |
|
    8+55       2.8083       9.60  |        V| Q       |         |
|
    9+ 0       2.8753       9.73  |        V| Q       |         |
|
    9+ 5       2.9436       9.93  |         V  Q      |         |
|
    9+10       3.0166      10.60  |         V   Q     |         |
|
    9+15       3.0913      10.85  |         V   Q     |         |
|
    9+20       3.1672      11.03  |         V   Q     |         |
|
```

```
    9+25       3.2457     11.39  |         |V   Q    |         |
|
    9+30       3.3251     11.53  |         |V   Q    |         |
|
    9+35       3.4054     11.66  |         |V   Q    |         |
|
    9+40       3.4881     12.01  |         |V    Q   |         |
|
    9+45       3.5718     12.14  |         | V   Q   |         |
|
    9+50       3.6562     12.27  |         | V   Q   |         |
|
    9+55       3.7431     12.61  |         | V   Q   |         |
|
   10+ 0       3.8309     12.74  |         |  V  Q   |         |
|
   10+ 5       3.9157     12.31  |         |  V  Q   |         |
|
   10+10       3.9850     10.07  |         |  Q      |         |
|
   10+15       4.0485      9.22  |         | QV      |         |
|
   10+20       4.1097      8.88  |         |Q  V     |         |
|
   10+25       4.1698      8.74  |         |Q  V     |         |
|
   10+30       4.2297      8.69  |         |Q  V     |         |
|
   10+35       4.2918      9.02  |         | Q V     |         |
|
   10+40       4.3650     10.62  |         |   Q     |         |
|
   10+45       4.4423     11.23  |         |   QV    |         |
|
   10+50       4.5215     11.49  |         |    Q    |         |
|
   10+55       4.6013     11.59  |         |    Q    |         |
|
   11+ 0       4.6814     11.62  |         |    Q    |         |
|
   11+ 5       4.7611     11.58  |         |    QV   |         |
|
   11+10       4.8387     11.26  |         |    QV   |         |
|
   11+15       4.9154     11.14  |         |   Q V   |         |
|
   11+20       4.9918     11.10  |         |   Q  V  |         |
|
   11+25       5.0681     11.08  |         |   Q  V  |         |
|
   11+30       5.1444     11.07  |         |   Q  V  |         |
|
   11+35       5.2196     10.93  |         |   Q  V  |         |
|
   11+40       5.2904     10.28  |         |  Q    V |         |
|
   11+45       5.3596     10.04  |         |  Q    V |         |
|
   11+50       5.4285     10.01  |         |  Q    V |         |
|
```

```
   11+55       5.4994     10.29  |         |  Q    V |         |
|
   12+ 0       5.5711     10.41  |         |  Q    V |         |
|
   12+ 5       5.6464     10.94  |         |   Q    V|         |
|
   12+10       5.7375     13.22  |         |      Q V|         |
|
   12+15       5.8345     14.08  |         |       QV|         |
|
   12+20       5.9344     14.51  |         |        QV         |
|
   12+25       6.0376     14.98  |         |        QV         |
|
   12+30       6.1419     15.15  |         |         Q         |
|
   12+35       6.2478     15.37  |         |         QV        |
|
   12+40       6.3584     16.05  |         |         |Q        |
|
   12+45       6.4707     16.31  |         |         |QV       |
|
   12+50       6.5842     16.48  |         |         |QV       |
|
   12+55       6.7002     16.85  |         |         | Q       |
|
   13+ 0       6.8172     16.99  |         |         | QV      |
|
   13+ 5       6.9370     17.40  |         |         |  Q      |
|
   13+10       7.0682     19.04  |         |         |   VQ    |
|
   13+15       7.2035     19.66  |         |         |   V Q   |
|
   13+20       7.3407     19.91  |         |         |    VQ   |
|
   13+25       7.4786     20.02  |         |         |    VQ   |
|
   13+30       7.6167     20.05  |         |         |    VQ   |
|
   13+35       7.7497     19.31  |         |         |    QV   |
|
   13+40       7.8582     15.76  |         |         |Q    V   |
|
   13+45       7.9575     14.42  |         |        Q|      V  |
|
   13+50       8.0530     13.87  |         |       Q |      V  |
|
   13+55       8.1469     13.64  |         |       Q |      V  |
|
   14+ 0       8.2404     13.57  |         |       Q |       V |
|
   14+ 5       8.3355     13.81  |         |       Q |       V |
|
   14+10       8.4394     15.08  |         |         Q       V |
|
   14+15       8.5467     15.57  |         |         Q        V|
|
   14+20       8.6548     15.70  |         |         Q        V|
|
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   14+25       8.7613     15.46  |         |         Q        V|
|
   14+30       8.8672     15.37  |         |         Q         V
|
   14+35       8.9728     15.34  |         |         Q         V
|
   14+40       9.0783     15.33  |         |         Q         V
|
   14+45       9.1838     15.32  |         |         Q         |V
|
   14+50       9.2889     15.25  |         |         Q         |V
|
   14+55       9.3916     14.92  |         |        Q|         | V
|
   15+ 0       9.4936     14.80  |         |        Q|         | V
|
   15+ 5       9.5947     14.68  |         |        Q|         | V
|
   15+10       9.6935     14.34  |         |        Q|         |  V
|
   15+15       9.7914     14.21  |         |       Q |         |  V
|
   15+20       9.8884     14.09  |         |       Q |         |  V
|
   15+25       9.9831     13.75  |         |       Q |         |   V
|
   15+30      10.0769     13.62  |         |       Q |         |   V
|
   15+35      10.1684     13.29  |         |      Q  |         |   V
|
   15+40      10.2508     11.97  |         |    Q    |         |   V
|
   15+45      10.3299     11.48  |         |    Q    |         |    V
|
   15+50      10.4075     11.27  |         |    Q    |         |    V
|
   15+55      10.4846     11.19  |         |   Q     |         |    V
|
   16+ 0      10.5615     11.17  |         |   Q     |         |    V
|
   16+ 5      10.6310     10.10  |         |  Q      |         |     V
|
   16+10      10.6671      5.24  |     Q   |         |         |     V
|
   16+15      10.6906      3.41  |   Q     |         |         |     V
|
   16+20      10.7089      2.66  |  Q      |         |         |     V
|
   16+25      10.7251      2.35  |  Q      |         |         |     V
|
   16+30      10.7406      2.26  |  Q      |         |         |     V
|
   16+35      10.7553      2.13  | Q       |         |         |     V
|
   16+40      10.7675      1.77  | Q       |         |         |     V
|
   16+45      10.7789      1.65  | Q       |         |         |     V
|
   16+50      10.7899      1.60  | Q       |         |         |     V
|
```

```
   16+55      10.8009      1.58  | Q       |         |         |     V
|
   17+ 0      10.8117      1.58  | Q       |         |         |     V
|
   17+ 5      10.8235      1.72  | Q       |         |         |     V
|
   17+10      10.8398      2.36  |  Q      |         |         |     V
|
   17+15      10.8578      2.61  |  Q      |         |         |      V
|
   17+20      10.8764      2.71  |  Q      |         |         |      V
|
   17+25      10.8954      2.75  |  Q      |         |         |      V
|
   17+30      10.9144      2.76  |  Q      |         |         |      V
|
   17+35      10.9335      2.77  |  Q      |         |         |      V
|
   17+40      10.9527      2.78  |  Q      |         |         |      V
|
   17+45      10.9718      2.78  |  Q      |         |         |      V
|
   17+50      10.9905      2.71  |  Q      |         |         |      V
|
   17+55      11.0069      2.39  |  Q      |         |         |      V
|
   18+ 0      11.0226      2.27  |  Q      |         |         |      V
|
   18+ 5      11.0378      2.22  | Q       |         |         |      V
|
   18+10      11.0530      2.20  | Q       |         |         |      V
|
   18+15      11.0681      2.19  | Q       |         |         |      V
|
   18+20      11.0832      2.19  | Q       |         |         |      V
|
   18+25      11.0983      2.19  | Q       |         |         |      V
|
   18+30      11.1134      2.19  | Q       |         |         |      V
|
   18+35      11.1280      2.12  | Q       |         |         |      V
|
   18+40      11.1404      1.80  | Q       |         |         |      V
|
   18+45      11.1519      1.68  | Q       |         |         |       V
|
   18+50      11.1627      1.56  | Q       |         |         |       V
|
   18+55      11.1710      1.22  |Q        |         |         |       V
|
   19+ 0      11.1785      1.09  |Q        |         |         |       V
|
   19+ 5      11.1861      1.10  |Q        |         |         |       V
|
   19+10      11.1958      1.41  |Q        |         |         |       V
|
   19+15      11.2063      1.52  | Q       |         |         |       V
|
   19+20      11.2176      1.64  | Q       |         |         |       V
|
```

```
      19+25       11.2313       1.98  | Q         |         |         |       V
|
      19+30       11.2458       2.11  | Q         |         |         |       V
|
      19+35       11.2603       2.10  | Q         |         |         |       V
|
      19+40       11.2726       1.80  | Q         |         |         |       V
|
      19+45       11.2842       1.68  | Q         |         |         |       V
|
      19+50       11.2950       1.57  | Q         |         |         |       V
|
      19+55       11.3035       1.23  |Q          |         |         |       V
|
      20+ 0       11.3111       1.10  |Q          |         |         |       V
|
      20+ 5       11.3187       1.12  |Q          |         |         |       V
|
      20+10       11.3285       1.42  |Q          |         |         |       V
|
      20+15       11.3391       1.53  | Q         |         |         |       V
|
      20+20       11.3499       1.58  | Q         |         |         |       V
|
      20+25       11.3610       1.60  | Q         |         |         |       V
|
      20+30       11.3720       1.61  | Q         |         |         |       V
|
      20+35       11.3831       1.61  | Q         |         |         |       V
|
      20+40       11.3943       1.61  | Q         |         |         |       V
|
      20+45       11.4054       1.62  | Q         |         |         |       V
|
      20+50       11.4160       1.55  | Q         |         |         |       V
|
      20+55       11.4245       1.22  |Q          |         |         |       V
|
      21+ 0       11.4321       1.10  |Q          |         |         |       V
|
      21+ 5       11.4398       1.12  |Q          |         |         |       V
|
      21+10       11.4496       1.43  |Q          |         |         |
V|
      21+15       11.4602       1.54  | Q         |         |         |
V|
      21+20       11.4707       1.52  | Q         |         |         |
V|
      21+25       11.4791       1.22  |Q          |         |         |
V|
      21+30       11.4867       1.10  |Q          |         |         |
V|
      21+35       11.4944       1.12  |Q          |         |         |
V|
      21+40       11.5043       1.43  |Q          |         |         |
V|
      21+45       11.5149       1.55  | Q         |         |         |
V|
      21+50       11.5254       1.52  | Q         |         |         |
V|
```

```
     21+55       11.5338       1.22  |Q         |         |         |
   V|
     22+ 0       11.5414       1.10  |Q         |         |         |
   V|
     22+ 5       11.5492       1.13  |Q         |         |         |
   V|
     22+10       11.5591       1.43  |Q         |         |         |
   V|
     22+15       11.5697       1.55  | Q        |         |         |
   V|
     22+20       11.5803       1.53  | Q        |         |         |
   V|
     22+25       11.5887       1.22  |Q         |         |         |
   V|
     22+30       11.5963       1.11  |Q         |         |         |
   V|
     22+35       11.6036       1.06  |Q         |         |         |
   V|
     22+40       11.6108       1.04  |Q         |         |         |
   V|
     22+45       11.6179       1.04  |Q         |         |         |
   V|
     22+50       11.6251       1.03  |Q         |         |         |
   V|
     22+55       11.6322       1.03  |Q         |         |         |
   V|
     23+ 0       11.6393       1.03  |Q         |         |         |
   V|
     23+ 5       11.6464       1.03  |Q         |         |         |
   V|
     23+10       11.6535       1.03  |Q         |         |         |
   V|
     23+15       11.6607       1.03  |Q         |         |         |
   V|
     23+20       11.6678       1.03  |Q         |         |         |
   V|
     23+25       11.6749       1.03  |Q         |         |         |
   V|
     23+30       11.6820       1.04  |Q         |         |         |
   V|
     23+35       11.6892       1.04  |Q         |         |         |
   V|
     23+40       11.6963       1.04  |Q         |         |         |
   V|
     23+45       11.7034       1.04  |Q         |         |         |
   V|
     23+50       11.7106       1.04  |Q         |         |         |
   V|
     23+55       11.7177       1.04  |Q         |         |         |
   V|
     24+ 0       11.7248       1.04  |Q         |         |         |
   V|
     24+ 5       11.7312       0.92  |Q         |         |         |
   V|
     24+10       11.7336       0.36  Q          |         |         |
   V|
     24+15       11.7346       0.14  Q          |         |         |
   V|
     24+20       11.7350       0.06  Q          |         |         |
   V|
```

```
    24+25      11.7351      0.02  Q          |          |          |
V|
    24+30      11.7352      0.01  Q          |          |          |
V|
    24+35      11.7352      0.00  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t    H y d r o g r a p h    A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: ironwoodpre24100.out

      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Ironwood area
      24 hour 100 year storm event

      ------------------------------------------------------------------
--
      Drainage Area =       2.70(Ac.)  =      0.004 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =       2.70(Ac.)  =
0.004 Sq. Mi.
      Length along longest watercourse =     548.00(Ft.)
      Length along longest watercourse measured to centroid =     212.00
(Ft.)
      Length along longest watercourse =      0.104 Mi.
      Length along longest watercourse measured to centroid =      0.040
Mi.
      Difference in elevation =      60.00(Ft.)
      Slope along watercourse =    578.1022 Ft./Mi.
      Average Manning's 'N' = 0.025
      Lag time =    0.022 Hr.
      Lag time =     1.34 Min.
      25% of lag time =     0.33 Min.
      40% of lag time =     0.54 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
              2.70              2.00                    5.40

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
              2.70              5.50                   14.85

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =  100.00 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
           2.700           93.00         0.500
       Total Area Entered =      2.70(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.500        0.020       1.000
0.020
                                                          Sum (F) =
0.020
      Area averaged mean soil loss (F) (In/Hr) =  0.020
      Minimum soil loss rate ((In/Hr)) =  0.010
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.500
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %            (CFS)
      ------------------------------------------------------------------
---
          1   0.083        373.169         65.112             1.772
          2   0.167        746.339         34.888             0.949
                                    Sum = 100.000   Sum=       2.721
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.035      ---          0.01
   2   0.17     0.07      0.044         0.035      ---          0.01
   3   0.25     0.07      0.044         0.035      ---          0.01
   4   0.33     0.10      0.066         0.035      ---          0.03
   5   0.42     0.10      0.066         0.035      ---          0.03
```

```
 6   0.50     0.10     0.066         0.035      ---         0.03
 7   0.58     0.10     0.066         0.035      ---         0.03
 8   0.67     0.10     0.066         0.035      ---         0.03
 9   0.75     0.10     0.066         0.034      ---         0.03
10   0.83     0.13     0.088         0.034      ---         0.05
11   0.92     0.13     0.088         0.034      ---         0.05
12   1.00     0.13     0.088         0.034      ---         0.05
13   1.08     0.10     0.066         0.034      ---         0.03
14   1.17     0.10     0.066         0.034      ---         0.03
15   1.25     0.10     0.066         0.034      ---         0.03
16   1.33     0.10     0.066         0.033      ---         0.03
17   1.42     0.10     0.066         0.033      ---         0.03
18   1.50     0.10     0.066         0.033      ---         0.03
19   1.58     0.10     0.066         0.033      ---         0.03
20   1.67     0.10     0.066         0.033      ---         0.03
21   1.75     0.10     0.066         0.033      ---         0.03
22   1.83     0.13     0.088         0.033      ---         0.06
23   1.92     0.13     0.088         0.033      ---         0.06
24   2.00     0.13     0.088         0.032      ---         0.06
25   2.08     0.13     0.088         0.032      ---         0.06
26   2.17     0.13     0.088         0.032      ---         0.06
27   2.25     0.13     0.088         0.032      ---         0.06
28   2.33     0.13     0.088         0.032      ---         0.06
29   2.42     0.13     0.088         0.032      ---         0.06
30   2.50     0.13     0.088         0.032      ---         0.06
31   2.58     0.17     0.110         0.031      ---         0.08
32   2.67     0.17     0.110         0.031      ---         0.08
33   2.75     0.17     0.110         0.031      ---         0.08
34   2.83     0.17     0.110         0.031      ---         0.08
35   2.92     0.17     0.110         0.031      ---         0.08
36   3.00     0.17     0.110         0.031      ---         0.08
37   3.08     0.17     0.110         0.031      ---         0.08
38   3.17     0.17     0.110         0.031      ---         0.08
39   3.25     0.17     0.110         0.030      ---         0.08
40   3.33     0.17     0.110         0.030      ---         0.08
41   3.42     0.17     0.110         0.030      ---         0.08
42   3.50     0.17     0.110         0.030      ---         0.08
43   3.58     0.17     0.110         0.030      ---         0.08
44   3.67     0.17     0.110         0.030      ---         0.08
45   3.75     0.17     0.110         0.030      ---         0.08
46   3.83     0.20     0.132         0.030      ---         0.10
47   3.92     0.20     0.132         0.029      ---         0.10
48   4.00     0.20     0.132         0.029      ---         0.10
49   4.08     0.20     0.132         0.029      ---         0.10
50   4.17     0.20     0.132         0.029      ---         0.10
51   4.25     0.20     0.132         0.029      ---         0.10
52   4.33     0.23     0.154         0.029      ---         0.13
53   4.42     0.23     0.154         0.029      ---         0.13
54   4.50     0.23     0.154         0.029      ---         0.13
55   4.58     0.23     0.154         0.028      ---         0.13
56   4.67     0.23     0.154         0.028      ---         0.13
57   4.75     0.23     0.154         0.028      ---         0.13
58   4.83     0.27     0.176         0.028      ---         0.15
59   4.92     0.27     0.176         0.028      ---         0.15
60   5.00     0.27     0.176         0.028      ---         0.15
61   5.08     0.20     0.132         0.028      ---         0.10
62   5.17     0.20     0.132         0.028      ---         0.10
63   5.25     0.20     0.132         0.027      ---         0.10
64   5.33     0.23     0.154         0.027      ---         0.13
65   5.42     0.23     0.154         0.027      ---         0.13
```

66	5.50	0.23	0.154	0.027	---	0.13
67	5.58	0.27	0.176	0.027	---	0.15
68	5.67	0.27	0.176	0.027	---	0.15
69	5.75	0.27	0.176	0.027	---	0.15
70	5.83	0.27	0.176	0.027	---	0.15
71	5.92	0.27	0.176	0.027	---	0.15
72	6.00	0.27	0.176	0.026	---	0.15
73	6.08	0.30	0.198	0.026	---	0.17
74	6.17	0.30	0.198	0.026	---	0.17
75	6.25	0.30	0.198	0.026	---	0.17
76	6.33	0.30	0.198	0.026	---	0.17
77	6.42	0.30	0.198	0.026	---	0.17
78	6.50	0.30	0.198	0.026	---	0.17
79	6.58	0.33	0.220	0.026	---	0.19
80	6.67	0.33	0.220	0.025	---	0.19
81	6.75	0.33	0.220	0.025	---	0.19
82	6.83	0.33	0.220	0.025	---	0.19
83	6.92	0.33	0.220	0.025	---	0.19
84	7.00	0.33	0.220	0.025	---	0.19
85	7.08	0.33	0.220	0.025	---	0.20
86	7.17	0.33	0.220	0.025	---	0.20
87	7.25	0.33	0.220	0.025	---	0.20
88	7.33	0.37	0.242	0.025	---	0.22
89	7.42	0.37	0.242	0.024	---	0.22
90	7.50	0.37	0.242	0.024	---	0.22
91	7.58	0.40	0.264	0.024	---	0.24
92	7.67	0.40	0.264	0.024	---	0.24
93	7.75	0.40	0.264	0.024	---	0.24
94	7.83	0.43	0.286	0.024	---	0.26
95	7.92	0.43	0.286	0.024	---	0.26
96	8.00	0.43	0.286	0.024	---	0.26
97	8.08	0.50	0.330	0.024	---	0.31
98	8.17	0.50	0.330	0.023	---	0.31
99	8.25	0.50	0.330	0.023	---	0.31
100	8.33	0.50	0.330	0.023	---	0.31
101	8.42	0.50	0.330	0.023	---	0.31
102	8.50	0.50	0.330	0.023	---	0.31
103	8.58	0.53	0.352	0.023	---	0.33
104	8.67	0.53	0.352	0.023	---	0.33
105	8.75	0.53	0.352	0.023	---	0.33
106	8.83	0.57	0.374	0.023	---	0.35
107	8.92	0.57	0.374	0.023	---	0.35
108	9.00	0.57	0.374	0.022	---	0.35
109	9.08	0.63	0.418	0.022	---	0.40
110	9.17	0.63	0.418	0.022	---	0.40
111	9.25	0.63	0.418	0.022	---	0.40
112	9.33	0.67	0.440	0.022	---	0.42
113	9.42	0.67	0.440	0.022	---	0.42
114	9.50	0.67	0.440	0.022	---	0.42
115	9.58	0.70	0.462	0.022	---	0.44
116	9.67	0.70	0.462	0.022	---	0.44
117	9.75	0.70	0.462	0.021	---	0.44
118	9.83	0.73	0.484	0.021	---	0.46
119	9.92	0.73	0.484	0.021	---	0.46
120	10.00	0.73	0.484	0.021	---	0.46
121	10.08	0.50	0.330	0.021	---	0.31
122	10.17	0.50	0.330	0.021	---	0.31
123	10.25	0.50	0.330	0.021	---	0.31
124	10.33	0.50	0.330	0.021	---	0.31
125	10.42	0.50	0.330	0.021	---	0.31

```
126  10.50     0.50      0.330          0.021       ---          0.31
127  10.58     0.67      0.440          0.020       ---          0.42
128  10.67     0.67      0.440          0.020       ---          0.42
129  10.75     0.67      0.440          0.020       ---          0.42
130  10.83     0.67      0.440          0.020       ---          0.42
131  10.92     0.67      0.440          0.020       ---          0.42
132  11.00     0.67      0.440          0.020       ---          0.42
133  11.08     0.63      0.418          0.020       ---          0.40
134  11.17     0.63      0.418          0.020       ---          0.40
135  11.25     0.63      0.418          0.020       ---          0.40
136  11.33     0.63      0.418          0.020       ---          0.40
137  11.42     0.63      0.418          0.019       ---          0.40
138  11.50     0.63      0.418          0.019       ---          0.40
139  11.58     0.57      0.374          0.019       ---          0.35
140  11.67     0.57      0.374          0.019       ---          0.35
141  11.75     0.57      0.374          0.019       ---          0.35
142  11.83     0.60      0.396          0.019       ---          0.38
143  11.92     0.60      0.396          0.019       ---          0.38
144  12.00     0.60      0.396          0.019       ---          0.38
145  12.08     0.83      0.550          0.019       ---          0.53
146  12.17     0.83      0.550          0.019       ---          0.53
147  12.25     0.83      0.550          0.019       ---          0.53
148  12.33     0.87      0.572          0.018       ---          0.55
149  12.42     0.87      0.572          0.018       ---          0.55
150  12.50     0.87      0.572          0.018       ---          0.55
151  12.58     0.93      0.616          0.018       ---          0.60
152  12.67     0.93      0.616          0.018       ---          0.60
153  12.75     0.93      0.616          0.018       ---          0.60
154  12.83     0.97      0.638          0.018       ---          0.62
155  12.92     0.97      0.638          0.018       ---          0.62
156  13.00     0.97      0.638          0.018       ---          0.62
157  13.08     1.13      0.748          0.018       ---          0.73
158  13.17     1.13      0.748          0.018       ---          0.73
159  13.25     1.13      0.748          0.017       ---          0.73
160  13.33     1.13      0.748          0.017       ---          0.73
161  13.42     1.13      0.748          0.017       ---          0.73
162  13.50     1.13      0.748          0.017       ---          0.73
163  13.58     0.77      0.506          0.017       ---          0.49
164  13.67     0.77      0.506          0.017       ---          0.49
165  13.75     0.77      0.506          0.017       ---          0.49
166  13.83     0.77      0.506          0.017       ---          0.49
167  13.92     0.77      0.506          0.017       ---          0.49
168  14.00     0.77      0.506          0.017       ---          0.49
169  14.08     0.90      0.594          0.017       ---          0.58
170  14.17     0.90      0.594          0.016       ---          0.58
171  14.25     0.90      0.594          0.016       ---          0.58
172  14.33     0.87      0.572          0.016       ---          0.56
173  14.42     0.87      0.572          0.016       ---          0.56
174  14.50     0.87      0.572          0.016       ---          0.56
175  14.58     0.87      0.572          0.016       ---          0.56
176  14.67     0.87      0.572          0.016       ---          0.56
177  14.75     0.87      0.572          0.016       ---          0.56
178  14.83     0.83      0.550          0.016       ---          0.53
179  14.92     0.83      0.550          0.016       ---          0.53
180  15.00     0.83      0.550          0.016       ---          0.53
181  15.08     0.80      0.528          0.016       ---          0.51
182  15.17     0.80      0.528          0.015       ---          0.51
183  15.25     0.80      0.528          0.015       ---          0.51
184  15.33     0.77      0.506          0.015       ---          0.49
185  15.42     0.77      0.506          0.015       ---          0.49
```

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186  15.50     0.77      0.506         0.015      ---          0.49
187  15.58     0.63      0.418         0.015      ---          0.40
188  15.67     0.63      0.418         0.015      ---          0.40
189  15.75     0.63      0.418         0.015      ---          0.40
190  15.83     0.63      0.418         0.015      ---          0.40
191  15.92     0.63      0.418         0.015      ---          0.40
192  16.00     0.63      0.418         0.015      ---          0.40
193  16.08     0.13      0.088         0.015      ---          0.07
194  16.17     0.13      0.088         0.015      ---          0.07
195  16.25     0.13      0.088         0.014      ---          0.07
196  16.33     0.13      0.088         0.014      ---          0.07
197  16.42     0.13      0.088         0.014      ---          0.07
198  16.50     0.13      0.088         0.014      ---          0.07
199  16.58     0.10      0.066         0.014      ---          0.05
200  16.67     0.10      0.066         0.014      ---          0.05
201  16.75     0.10      0.066         0.014      ---          0.05
202  16.83     0.10      0.066         0.014      ---          0.05
203  16.92     0.10      0.066         0.014      ---          0.05
204  17.00     0.10      0.066         0.014      ---          0.05
205  17.08     0.17      0.110         0.014      ---          0.10
206  17.17     0.17      0.110         0.014      ---          0.10
207  17.25     0.17      0.110         0.014      ---          0.10
208  17.33     0.17      0.110         0.014      ---          0.10
209  17.42     0.17      0.110         0.013      ---          0.10
210  17.50     0.17      0.110         0.013      ---          0.10
211  17.58     0.17      0.110         0.013      ---          0.10
212  17.67     0.17      0.110         0.013      ---          0.10
213  17.75     0.17      0.110         0.013      ---          0.10
214  17.83     0.13      0.088         0.013      ---          0.07
215  17.92     0.13      0.088         0.013      ---          0.07
216  18.00     0.13      0.088         0.013      ---          0.07
217  18.08     0.13      0.088         0.013      ---          0.08
218  18.17     0.13      0.088         0.013      ---          0.08
219  18.25     0.13      0.088         0.013      ---          0.08
220  18.33     0.13      0.088         0.013      ---          0.08
221  18.42     0.13      0.088         0.013      ---          0.08
222  18.50     0.13      0.088         0.013      ---          0.08
223  18.58     0.10      0.066         0.013      ---          0.05
224  18.67     0.10      0.066         0.013      ---          0.05
225  18.75     0.10      0.066         0.012      ---          0.05
226  18.83     0.07      0.044         0.012      ---          0.03
227  18.92     0.07      0.044         0.012      ---          0.03
228  19.00     0.07      0.044         0.012      ---          0.03
229  19.08     0.10      0.066         0.012      ---          0.05
230  19.17     0.10      0.066         0.012      ---          0.05
231  19.25     0.10      0.066         0.012      ---          0.05
232  19.33     0.13      0.088         0.012      ---          0.08
233  19.42     0.13      0.088         0.012      ---          0.08
234  19.50     0.13      0.088         0.012      ---          0.08
235  19.58     0.10      0.066         0.012      ---          0.05
236  19.67     0.10      0.066         0.012      ---          0.05
237  19.75     0.10      0.066         0.012      ---          0.05
238  19.83     0.07      0.044         0.012      ---          0.03
239  19.92     0.07      0.044         0.012      ---          0.03
240  20.00     0.07      0.044         0.012      ---          0.03
241  20.08     0.10      0.066         0.012      ---          0.05
242  20.17     0.10      0.066         0.012      ---          0.05
243  20.25     0.10      0.066         0.011      ---          0.05
244  20.33     0.10      0.066         0.011      ---          0.05
245  20.42     0.10      0.066         0.011      ---          0.05
```

```
 246  20.50     0.10      0.066         0.011      ---          0.05
 247  20.58     0.10      0.066         0.011      ---          0.05
 248  20.67     0.10      0.066         0.011      ---          0.05
 249  20.75     0.10      0.066         0.011      ---          0.05
 250  20.83     0.07      0.044         0.011      ---          0.03
 251  20.92     0.07      0.044         0.011      ---          0.03
 252  21.00     0.07      0.044         0.011      ---          0.03
 253  21.08     0.10      0.066         0.011      ---          0.05
 254  21.17     0.10      0.066         0.011      ---          0.06
 255  21.25     0.10      0.066         0.011      ---          0.06
 256  21.33     0.07      0.044         0.011      ---          0.03
 257  21.42     0.07      0.044         0.011      ---          0.03
 258  21.50     0.07      0.044         0.011      ---          0.03
 259  21.58     0.10      0.066         0.011      ---          0.06
 260  21.67     0.10      0.066         0.011      ---          0.06
 261  21.75     0.10      0.066         0.011      ---          0.06
 262  21.83     0.07      0.044         0.011      ---          0.03
 263  21.92     0.07      0.044         0.011      ---          0.03
 264  22.00     0.07      0.044         0.011      ---          0.03
 265  22.08     0.10      0.066         0.011      ---          0.06
 266  22.17     0.10      0.066         0.011      ---          0.06
 267  22.25     0.10      0.066         0.010      ---          0.06
 268  22.33     0.07      0.044         0.010      ---          0.03
 269  22.42     0.07      0.044         0.010      ---          0.03
 270  22.50     0.07      0.044         0.010      ---          0.03
 271  22.58     0.07      0.044         0.010      ---          0.03
 272  22.67     0.07      0.044         0.010      ---          0.03
 273  22.75     0.07      0.044         0.010      ---          0.03
 274  22.83     0.07      0.044         0.010      ---          0.03
 275  22.92     0.07      0.044         0.010      ---          0.03
 276  23.00     0.07      0.044         0.010      ---          0.03
 277  23.08     0.07      0.044         0.010      ---          0.03
 278  23.17     0.07      0.044         0.010      ---          0.03
 279  23.25     0.07      0.044         0.010      ---          0.03
 280  23.33     0.07      0.044         0.010      ---          0.03
 281  23.42     0.07      0.044         0.010      ---          0.03
 282  23.50     0.07      0.044         0.010      ---          0.03
 283  23.58     0.07      0.044         0.010      ---          0.03
 284  23.67     0.07      0.044         0.010      ---          0.03
 285  23.75     0.07      0.044         0.010      ---          0.03
 286  23.83     0.07      0.044         0.010      ---          0.03
 287  23.92     0.07      0.044         0.010      ---          0.03
 288  24.00     0.07      0.044         0.010      ---          0.03
     Sum =     100.0                                   Sum =    60.2
      Flood volume = Effective rainfall      5.02(In)
       times area       2.7(Ac.)/[(In)/(Ft.)] =       1.1(Ac.Ft)
      Total soil loss =      0.48(In)
      Total soil loss =     0.108(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =       49193.9 Cubic Feet
      Total soil loss =        4711.3 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =      1.990(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
```

```
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        2.5       5.0       7.5
10.0

-----------------------------------------------------------------------
    0+ 5       0.0001      0.02  Q         |         |         |
|
    0+10       0.0003      0.02  Q         |         |         |
|
    0+15       0.0004      0.02  Q         |         |         |
|
    0+20       0.0009      0.06  Q         |         |         |
|
    0+25       0.0014      0.08  Q         |         |         |
|
    0+30       0.0020      0.08  Q         |         |         |
|
    0+35       0.0026      0.09  Q         |         |         |
|
    0+40       0.0032      0.09  Q         |         |         |
|
    0+45       0.0038      0.09  Q         |         |         |
|
    0+50       0.0047      0.13  Q         |         |         |
|
    0+55       0.0057      0.15  Q         |         |         |
|
    1+ 0       0.0067      0.15  Q         |         |         |
|
    1+ 5       0.0074      0.11  Q         |         |         |
|
    1+10       0.0080      0.09  Q         |         |         |
|
    1+15       0.0086      0.09  Q         |         |         |
|
    1+20       0.0092      0.09  Q         |         |         |
|
    1+25       0.0099      0.09  Q         |         |         |
|
    1+30       0.0105      0.09  Q         |         |         |
|
    1+35       0.0111      0.09  Q         |         |         |
|
    1+40       0.0117      0.09  Q         |         |         |
|
    1+45       0.0123      0.09  Q         |         |         |
|
    1+50       0.0132      0.13  Q         |         |         |
|
    1+55       0.0143      0.15  Q         |         |         |
|
    2+ 0       0.0153      0.15  Q         |         |         |
|
    2+ 5       0.0163      0.15  Q         |         |         |
|
```

```
    2+10       0.0174      0.15  Q         |         |         |
|
    2+15       0.0184      0.15  Q         |         |         |
|
    2+20       0.0195      0.15  Q         |         |         |
|
    2+25       0.0205      0.15  Q         |         |         |
|
    2+30       0.0216      0.15  Q         |         |         |
|
    2+35       0.0229      0.19  Q         |         |         |
|
    2+40       0.0244      0.21  Q         |         |         |
|
    2+45       0.0259      0.21  Q         |         |         |
|
    2+50       0.0274      0.21  Q         |         |         |
|
    2+55       0.0288      0.22  QV        |         |         |
|
    3+ 0       0.0303      0.22  QV        |         |         |
|
    3+ 5       0.0318      0.22  QV        |         |         |
|
    3+10       0.0333      0.22  QV        |         |         |
|
    3+15       0.0348      0.22  QV        |         |         |
|
    3+20       0.0363      0.22  QV        |         |         |
|
    3+25       0.0378      0.22  QV        |         |         |
|
    3+30       0.0393      0.22  QV        |         |         |
|
    3+35       0.0408      0.22  QV        |         |         |
|
    3+40       0.0423      0.22  QV        |         |         |
|
    3+45       0.0438      0.22  QV        |         |         |
|
    3+50       0.0456      0.26  |Q        |         |         |
|
    3+55       0.0475      0.28  |Q        |         |         |
|
    4+ 0       0.0494      0.28  |Q        |         |         |
|
    4+ 5       0.0513      0.28  |Q        |         |         |
|
    4+10       0.0533      0.28  |Q        |         |         |
|
    4+15       0.0552      0.28  |Q        |         |         |
|
    4+20       0.0574      0.32  |QV       |         |         |
|
    4+25       0.0597      0.34  |QV       |         |         |
|
    4+30       0.0621      0.34  |QV       |         |         |
|
    4+35       0.0644      0.34  |QV       |         |         |
|
```

```
    4+40       0.0668      0.34  |QV        |         |         |
|
    4+45       0.0692      0.34  |QV        |         |         |
|
    4+50       0.0718      0.38  |QV        |         |         |
|
    4+55       0.0746      0.40  |QV        |         |         |
|
    5+ 0       0.0773      0.40  |QV        |         |         |
|
    5+ 5       0.0796      0.33  |QV        |         |         |
|
    5+10       0.0815      0.28  |QV        |         |         |
|
    5+15       0.0835      0.28  |QV        |         |         |
|
    5+20       0.0857      0.32  |Q V       |         |         |
|
    5+25       0.0881      0.34  |Q V       |         |         |
|
    5+30       0.0905      0.35  |Q V       |         |         |
|
    5+35       0.0931      0.38  |Q V       |         |         |
|
    5+40       0.0959      0.41  |Q V       |         |         |
|
    5+45       0.0987      0.41  |Q V       |         |         |
|
    5+50       0.1015      0.41  |Q V       |         |         |
|
    5+55       0.1043      0.41  |Q V       |         |         |
|
    6+ 0       0.1071      0.41  |Q V       |         |         |
|
    6+ 5       0.1102      0.45  |Q V       |         |         |
|
    6+10       0.1134      0.47  |Q  V      |         |         |
|
    6+15       0.1166      0.47  |Q  V      |         |         |
|
    6+20       0.1199      0.47  |Q  V      |         |         |
|
    6+25       0.1231      0.47  |Q  V      |         |         |
|
    6+30       0.1263      0.47  |Q  V      |         |         |
|
    6+35       0.1298      0.51  | Q V      |         |         |
|
    6+40       0.1335      0.53  | Q V      |         |         |
|
    6+45       0.1371      0.53  | Q V      |         |         |
|
    6+50       0.1408      0.53  | Q V      |         |         |
|
    6+55       0.1444      0.53  | Q  V     |         |         |
|
    7+ 0       0.1481      0.53  | Q  V     |         |         |
|
    7+ 5       0.1517      0.53  | Q  V     |         |         |
|
```

```
    7+10       0.1554      0.53  | Q  V    |         |         |
|
    7+15       0.1591      0.53  | Q  V    |         |         |
|
    7+20       0.1630      0.57  | Q  V    |         |         |
|
    7+25       0.1671      0.59  | Q  V    |         |         |
|
    7+30       0.1711      0.59  | Q   V   |         |         |
|
    7+35       0.1755      0.63  | Q   V   |         |         |
|
    7+40       0.1800      0.65  | Q   V   |         |         |
|
    7+45       0.1845      0.65  | Q   V   |         |         |
|
    7+50       0.1893      0.69  | Q   V   |         |         |
|
    7+55       0.1942      0.71  | Q   V   |         |         |
|
    8+ 0       0.1991      0.71  | Q    V  |         |         |
|
    8+ 5       0.2045      0.79  |  Q   V  |         |         |
|
    8+10       0.2103      0.83  |  Q   V  |         |         |
|
    8+15       0.2160      0.83  |  Q   V  |         |         |
|
    8+20       0.2218      0.84  |  Q   V  |         |         |
|
    8+25       0.2275      0.84  |  Q    V |         |         |
|
    8+30       0.2333      0.84  |  Q    V |         |         |
|
    8+35       0.2393      0.87  |  Q    V |         |         |
|
    8+40       0.2455      0.90  |  Q    V |         |         |
|
    8+45       0.2517      0.90  |  Q    V |         |         |
|
    8+50       0.2581      0.94  |  Q     V|         |         |
|
    8+55       0.2647      0.96  |  Q     V|         |         |
|
    9+ 0       0.2713      0.96  |  Q     V|         |         |
|
    9+ 5       0.2784      1.04  |   Q    V|         |         |
|
    9+10       0.2858      1.08  |   Q     V         |         |
|
    9+15       0.2933      1.08  |   Q     V         |         |
|
    9+20       0.3010      1.12  |   Q     V         |         |
|
    9+25       0.3088      1.14  |   Q     V         |         |
|
    9+30       0.3166      1.14  |   Q     |V        |         |
|
    9+35       0.3248      1.18  |   Q     |V        |         |
|
```

```
    9+40       0.3330      1.20  |   Q     |V        |         |
|
    9+45       0.3413      1.20  |   Q     | V       |         |
|
    9+50       0.3498      1.24  |   Q     | V       |         |
|
    9+55       0.3585      1.26  |    Q    | V       |         |
|
   10+ 0       0.3672      1.26  |    Q    |  V      |         |
|
   10+ 5       0.3740      0.99  |  Q      |  V      |         |
|
   10+10       0.3798      0.84  |  Q      |  V      |         |
|
   10+15       0.3855      0.84  |  Q      |  V      |         |
|
   10+20       0.3913      0.84  |  Q      |  V      |         |
|
   10+25       0.3971      0.84  |  Q      |   V     |         |
|
   10+30       0.4029      0.84  |  Q      |   V     |         |
|
   10+35       0.4101      1.04  |   Q     |   V     |         |
|
   10+40       0.4180      1.14  |   Q     |   V     |         |
|
   10+45       0.4258      1.14  |   Q     |    V    |         |
|
   10+50       0.4337      1.14  |   Q     |    V    |         |
|
   10+55       0.4416      1.14  |   Q     |    V    |         |
|
   11+ 0       0.4495      1.14  |   Q     |    V    |         |
|
   11+ 5       0.4571      1.10  |   Q     |     V   |         |
|
   11+10       0.4645      1.08  |   Q     |     V   |         |
|
   11+15       0.4720      1.08  |   Q     |     V   |         |
|
   11+20       0.4795      1.08  |   Q     |     V   |         |
|
   11+25       0.4869      1.08  |   Q     |      V  |         |
|
   11+30       0.4944      1.09  |   Q     |      V  |         |
|
   11+35       0.5014      1.01  |   Q     |      V  |         |
|
   11+40       0.5080      0.97  |  Q      |      V  |         |
|
   11+45       0.5147      0.97  |  Q      |       V |         |
|
   11+50       0.5216      1.01  |   Q     |       V |         |
|
   11+55       0.5287      1.03  |   Q     |       V |         |
|
   12+ 0       0.5357      1.03  |   Q     |       V |         |
|
   12+ 5       0.5447      1.30  |    Q    |        V|         |
|
```

```
   12+10       0.5546      1.45  |    Q    |        V|         |
|
   12+15       0.5646      1.45  |    Q    |        V|         |
|
   12+20       0.5748      1.49  |    Q    |         V         |
|
   12+25       0.5852      1.51  |     Q   |         V         |
|
   12+30       0.5956      1.51  |     Q   |         |V        |
|
   12+35       0.6065      1.59  |     Q   |         |V        |
|
   12+40       0.6177      1.63  |     Q   |         |V        |
|
   12+45       0.6290      1.63  |     Q   |         | V       |
|
   12+50       0.6404      1.67  |     Q   |         | V       |
|
   12+55       0.6521      1.69  |     Q   |         |  V      |
|
   13+ 0       0.6637      1.69  |     Q   |         |  V      |
|
   13+ 5       0.6767      1.88  |      Q  |         |  V      |
|
   13+10       0.6904      1.99  |      Q  |         |   V     |
|
   13+15       0.7041      1.99  |      Q  |         |   V     |
|
   13+20       0.7178      1.99  |      Q  |         |    V    |
|
   13+25       0.7315      1.99  |      Q  |         |    V    |
|
   13+30       0.7452      1.99  |      Q  |         |     V   |
|
   13+35       0.7559      1.56  |     Q   |         |     V   |
|
   13+40       0.7651      1.33  |    Q    |         |      V  |
|
   13+45       0.7743      1.33  |    Q    |         |      V  |
|
   13+50       0.7834      1.33  |    Q    |         |      V  |
|
   13+55       0.7926      1.33  |    Q    |         |       V |
|
   14+ 0       0.8018      1.33  |    Q    |         |       V |
|
   14+ 5       0.8120      1.49  |    Q    |         |       V |
|
   14+10       0.8229      1.57  |     Q   |         |        V|
|
   14+15       0.8337      1.57  |     Q   |         |        V|
|
   14+20       0.8442      1.53  |     Q   |         |        V|
|
   14+25       0.8547      1.51  |     Q   |         |         V
|
   14+30       0.8651      1.51  |     Q   |         |         V
|
   14+35       0.8755      1.51  |     Q   |         |         |V
|
```

```
   14+40       0.8859      1.51  |     Q   |          |         |V
|
   14+45       0.8964      1.51  |     Q   |          |         |V
|
   14+50       0.9065      1.48  |    Q    |          |         | V
|
   14+55       0.9165      1.45  |    Q    |          |         | V
|
   15+ 0       0.9266      1.45  |    Q    |          |         | V
|
   15+ 5       0.9363      1.42  |    Q    |          |         |  V
|
   15+10       0.9459      1.40  |    Q    |          |         |  V
|
   15+15       0.9555      1.40  |    Q    |          |         |  V
|
   15+20       0.9649      1.36  |    Q    |          |         |   V
|
   15+25       0.9741      1.34  |    Q    |          |         |   V
|
   15+30       0.9833      1.34  |    Q    |          |         |   V
|
   15+35       0.9914      1.18  |   Q     |          |         |    V
|
   15+40       0.9990      1.10  |   Q     |          |         |    V
|
   15+45       1.0065      1.10  |   Q     |          |         |    V
|
   15+50       1.0141      1.10  |   Q     |          |         |    V
|
   15+55       1.0216      1.10  |   Q     |          |         |     V
|
   16+ 0       1.0292      1.10  |   Q     |          |         |     V
|
   16+ 5       1.0327      0.51  | Q       |          |         |     V
|
   16+10       1.0341      0.20  Q         |          |         |     V
|
   16+15       1.0355      0.20  Q         |          |         |     V
|
   16+20       1.0369      0.20  Q         |          |         |     V
|
   16+25       1.0383      0.20  Q         |          |         |     V
|
   16+30       1.0396      0.20  Q         |          |         |     V
|
   16+35       1.0407      0.16  Q         |          |         |     V
|
   16+40       1.0417      0.14  Q         |          |         |     V
|
   16+45       1.0427      0.14  Q         |          |         |     V
|
   16+50       1.0437      0.14  Q         |          |         |     V
|
   16+55       1.0446      0.14  Q         |          |         |      V
|
   17+ 0       1.0456      0.14  Q         |          |         |      V
|
   17+ 5       1.0471      0.22  Q         |          |         |      V
|
```

```
   17+10       1.0489       0.26  |Q        |         |         |      V
|
   17+15       1.0508       0.26  |Q        |         |         |      V
|
   17+20       1.0526       0.26  |Q        |         |         |      V
|
   17+25       1.0544       0.26  |Q        |         |         |      V
|
   17+30       1.0562       0.26  |Q        |         |         |      V
|
   17+35       1.0580       0.26  |Q        |         |         |      V
|
   17+40       1.0598       0.26  |Q        |         |         |      V
|
   17+45       1.0616       0.26  |Q        |         |         |      V
|
   17+50       1.0632       0.22  Q         |         |         |      V
|
   17+55       1.0646       0.20  Q         |         |         |      V
|
   18+ 0       1.0660       0.20  Q         |         |         |      V
|
   18+ 5       1.0674       0.20  Q         |         |         |      V
|
   18+10       1.0688       0.20  Q         |         |         |      V
|
   18+15       1.0702       0.20  Q         |         |         |      V
|
   18+20       1.0716       0.20  Q         |         |         |      V
|
   18+25       1.0730       0.20  Q         |         |         |       V
|
   18+30       1.0744       0.21  Q         |         |         |       V
|
   18+35       1.0756       0.17  Q         |         |         |       V
|
   18+40       1.0766       0.15  Q         |         |         |       V
|
   18+45       1.0776       0.15  Q         |         |         |       V
|
   18+50       1.0783       0.11  Q         |         |         |       V
|
   18+55       1.0789       0.09  Q         |         |         |       V
|
   19+ 0       1.0795       0.09  Q         |         |         |       V
|
   19+ 5       1.0804       0.13  Q         |         |         |       V
|
   19+10       1.0814       0.15  Q         |         |         |       V
|
   19+15       1.0824       0.15  Q         |         |         |       V
|
   19+20       1.0837       0.19  Q         |         |         |       V
|
   19+25       1.0851       0.21  Q         |         |         |       V
|
   19+30       1.0865       0.21  Q         |         |         |       V
|
   19+35       1.0877       0.17  Q         |         |         |       V
|
```

```
   19+40       1.0887      0.15  Q         |         |         |       V
|
   19+45       1.0897      0.15  Q         |         |         |       V
|
   19+50       1.0905      0.11  Q         |         |         |       V
|
   19+55       1.0911      0.09  Q         |         |         |       V
|
   20+ 0       1.0917      0.09  Q         |         |         |       V
|
   20+ 5       1.0925      0.13  Q         |         |         |       V
|
   20+10       1.0936      0.15  Q         |         |         |       V
|
   20+15       1.0946      0.15  Q         |         |         |       V
|
   20+20       1.0956      0.15  Q         |         |         |       V
|
   20+25       1.0966      0.15  Q         |         |         |       V
|
   20+30       1.0977      0.15  Q         |         |         |       V
|
   20+35       1.0987      0.15  Q         |         |         |       V
|
   20+40       1.0997      0.15  Q         |         |         |       V
|
   20+45       1.1007      0.15  Q         |         |         |       V
|
   20+50       1.1015      0.11  Q         |         |         |
V|
   20+55       1.1021      0.09  Q         |         |         |
V|
   21+ 0       1.1027      0.09  Q         |         |         |
V|
   21+ 5       1.1036      0.13  Q         |         |         |
V|
   21+10       1.1047      0.15  Q         |         |         |
V|
   21+15       1.1057      0.15  Q         |         |         |
V|
   21+20       1.1065      0.11  Q         |         |         |
V|
   21+25       1.1071      0.09  Q         |         |         |
V|
   21+30       1.1077      0.09  Q         |         |         |
V|
   21+35       1.1086      0.13  Q         |         |         |
V|
   21+40       1.1096      0.15  Q         |         |         |
V|
   21+45       1.1107      0.15  Q         |         |         |
V|
   21+50       1.1114      0.11  Q         |         |         |
V|
   21+55       1.1121      0.09  Q         |         |         |
V|
   22+ 0       1.1127      0.09  Q         |         |         |
V|
   22+ 5       1.1136      0.13  Q         |         |         |
V|
```

```
   22+10       1.1146      0.15  Q         |         |         |
V|
   22+15       1.1157      0.15  Q         |         |         |
V|
   22+20       1.1164      0.11  Q         |         |         |
V|
   22+25       1.1171      0.09  Q         |         |         |
V|
   22+30       1.1177      0.09  Q         |         |         |
V|
   22+35       1.1183      0.09  Q         |         |         |
V|
   22+40       1.1190      0.09  Q         |         |         |
V|
   22+45       1.1196      0.09  Q         |         |         |
V|
   22+50       1.1202      0.09  Q         |         |         |
V|
   22+55       1.1209      0.09  Q         |         |         |
V|
   23+ 0       1.1215      0.09  Q         |         |         |
V|
   23+ 5       1.1221      0.09  Q         |         |         |
V|
   23+10       1.1228      0.09  Q         |         |         |
V|
   23+15       1.1234      0.09  Q         |         |         |
V|
   23+20       1.1240      0.09  Q         |         |         |
V|
   23+25       1.1247      0.09  Q         |         |         |
V|
   23+30       1.1253      0.09  Q         |         |         |
V|
   23+35       1.1259      0.09  Q         |         |         |
V|
   23+40       1.1266      0.09  Q         |         |         |
V|
   23+45       1.1272      0.09  Q         |         |         |
V|
   23+50       1.1278      0.09  Q         |         |         |
V|
   23+55       1.1285      0.09  Q         |         |         |
V|
   24+ 0       1.1291      0.09  Q         |         |         |
V|
   24+ 5       1.1293      0.03  Q         |         |         |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: swcanyonpre24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      BAdlands Landfill
      Southwestern Canyon
      24 hour 100 year storm event

      ------------------------------------------------------------------
--
      Drainage Area =      30.30(Ac.)  =      0.047 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      30.30(Ac.)  =
0.047 Sq. Mi.
      Length along longest watercourse =    2585.00(Ft.)
      Length along longest watercourse measured to centroid =    1084.00
(Ft.)
      Length along longest watercourse =      0.490 Mi.
      Length along longest watercourse measured to centroid =      0.205
Mi.
      Difference in elevation =     270.00(Ft.)
      Slope along watercourse =    551.4894 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.121 Hr.
      Lag time =     7.25 Min.
      25% of lag time =     1.81 Min.
      40% of lag time =     2.90 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             30.30              2.00                  60.60

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             30.30              5.50                 166.65

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          30.300           93.00         0.000
       Total Area Entered =     30.30(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083         68.960        13.542              4.135
          2   0.167        137.919        36.272             11.076
          3   0.250        206.879        15.345              4.686
          4   0.333        275.839         8.627              2.634
          5   0.417        344.798         5.842              1.784
          6   0.500        413.758         4.079              1.246
          7   0.583        482.718         3.103              0.948
          8   0.667        551.677         2.622              0.801
          9   0.750        620.637         2.139              0.653
         10   0.833        689.597         1.838              0.561
         11   0.917        758.556         1.567              0.479
         12   1.000        827.516         1.297              0.396
         13   1.083        896.476         1.241              0.379
```

```
         14    1.167        965.435          1.241                0.379
         15    1.250       1034.395          1.243                0.380
                                    Sum = 100.000   Sum=      30.537
-----------------------------------------------------------------------


  Unit Time    Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
  28   2.33     0.13      0.088         0.058      ---          0.03
  29   2.42     0.13      0.088         0.058      ---          0.03
  30   2.50     0.13      0.088         0.057      ---          0.03
  31   2.58     0.17      0.110         0.057      ---          0.05
  32   2.67     0.17      0.110         0.057      ---          0.05
  33   2.75     0.17      0.110         0.057      ---          0.05
  34   2.83     0.17      0.110         0.057      ---          0.05
  35   2.92     0.17      0.110         0.056      ---          0.05
  36   3.00     0.17      0.110         0.056      ---          0.05
  37   3.08     0.17      0.110         0.056      ---          0.05
  38   3.17     0.17      0.110         0.056      ---          0.05
  39   3.25     0.17      0.110         0.055      ---          0.05
  40   3.33     0.17      0.110         0.055      ---          0.05
  41   3.42     0.17      0.110         0.055      ---          0.06
  42   3.50     0.17      0.110         0.055      ---          0.06
  43   3.58     0.17      0.110         0.054      ---          0.06
  44   3.67     0.17      0.110         0.054      ---          0.06
  45   3.75     0.17      0.110         0.054      ---          0.06
  46   3.83     0.20      0.132         0.054      ---          0.08
  47   3.92     0.20      0.132         0.054      ---          0.08
  48   4.00     0.20      0.132         0.053      ---          0.08
  49   4.08     0.20      0.132         0.053      ---          0.08
  50   4.17     0.20      0.132         0.053      ---          0.08
  51   4.25     0.20      0.132         0.053      ---          0.08
  52   4.33     0.23      0.154         0.052      ---          0.10
```

```
 53   4.42      0.23      0.154         0.052       ---          0.10
 54   4.50      0.23      0.154         0.052       ---          0.10
 55   4.58      0.23      0.154         0.052       ---          0.10
 56   4.67      0.23      0.154         0.052       ---          0.10
 57   4.75      0.23      0.154         0.051       ---          0.10
 58   4.83      0.27      0.176         0.051       ---          0.12
 59   4.92      0.27      0.176         0.051       ---          0.13
 60   5.00      0.27      0.176         0.051       ---          0.13
 61   5.08      0.20      0.132         0.050       ---          0.08
 62   5.17      0.20      0.132         0.050       ---          0.08
 63   5.25      0.20      0.132         0.050       ---          0.08
 64   5.33      0.23      0.154         0.050       ---          0.10
 65   5.42      0.23      0.154         0.050       ---          0.10
 66   5.50      0.23      0.154         0.049       ---          0.10
 67   5.58      0.27      0.176         0.049       ---          0.13
 68   5.67      0.27      0.176         0.049       ---          0.13
 69   5.75      0.27      0.176         0.049       ---          0.13
 70   5.83      0.27      0.176         0.048       ---          0.13
 71   5.92      0.27      0.176         0.048       ---          0.13
 72   6.00      0.27      0.176         0.048       ---          0.13
 73   6.08      0.30      0.198         0.048       ---          0.15
 74   6.17      0.30      0.198         0.048       ---          0.15
 75   6.25      0.30      0.198         0.047       ---          0.15
 76   6.33      0.30      0.198         0.047       ---          0.15
 77   6.42      0.30      0.198         0.047       ---          0.15
 78   6.50      0.30      0.198         0.047       ---          0.15
 79   6.58      0.33      0.220         0.047       ---          0.17
 80   6.67      0.33      0.220         0.046       ---          0.17
 81   6.75      0.33      0.220         0.046       ---          0.17
 82   6.83      0.33      0.220         0.046       ---          0.17
 83   6.92      0.33      0.220         0.046       ---          0.17
 84   7.00      0.33      0.220         0.046       ---          0.17
 85   7.08      0.33      0.220         0.045       ---          0.17
 86   7.17      0.33      0.220         0.045       ---          0.17
 87   7.25      0.33      0.220         0.045       ---          0.18
 88   7.33      0.37      0.242         0.045       ---          0.20
 89   7.42      0.37      0.242         0.044       ---          0.20
 90   7.50      0.37      0.242         0.044       ---          0.20
 91   7.58      0.40      0.264         0.044       ---          0.22
 92   7.67      0.40      0.264         0.044       ---          0.22
 93   7.75      0.40      0.264         0.044       ---          0.22
 94   7.83      0.43      0.286         0.043       ---          0.24
 95   7.92      0.43      0.286         0.043       ---          0.24
 96   8.00      0.43      0.286         0.043       ---          0.24
 97   8.08      0.50      0.330         0.043       ---          0.29
 98   8.17      0.50      0.330         0.043       ---          0.29
 99   8.25      0.50      0.330         0.042       ---          0.29
100   8.33      0.50      0.330         0.042       ---          0.29
101   8.42      0.50      0.330         0.042       ---          0.29
102   8.50      0.50      0.330         0.042       ---          0.29
103   8.58      0.53      0.352         0.042       ---          0.31
104   8.67      0.53      0.352         0.041       ---          0.31
105   8.75      0.53      0.352         0.041       ---          0.31
106   8.83      0.57      0.374         0.041       ---          0.33
107   8.92      0.57      0.374         0.041       ---          0.33
108   9.00      0.57      0.374         0.041       ---          0.33
109   9.08      0.63      0.418         0.041       ---          0.38
110   9.17      0.63      0.418         0.040       ---          0.38
111   9.25      0.63      0.418         0.040       ---          0.38
112   9.33      0.67      0.440         0.040       ---          0.40
```

```
113   9.42     0.67     0.440         0.040      ---          0.40
114   9.50     0.67     0.440         0.040      ---          0.40
115   9.58     0.70     0.462         0.039      ---          0.42
116   9.67     0.70     0.462         0.039      ---          0.42
117   9.75     0.70     0.462         0.039      ---          0.42
118   9.83     0.73     0.484         0.039      ---          0.45
119   9.92     0.73     0.484         0.039      ---          0.45
120  10.00     0.73     0.484         0.038      ---          0.45
121  10.08     0.50     0.330         0.038      ---          0.29
122  10.17     0.50     0.330         0.038      ---          0.29
123  10.25     0.50     0.330         0.038      ---          0.29
124  10.33     0.50     0.330         0.038      ---          0.29
125  10.42     0.50     0.330         0.038      ---          0.29
126  10.50     0.50     0.330         0.037      ---          0.29
127  10.58     0.67     0.440         0.037      ---          0.40
128  10.67     0.67     0.440         0.037      ---          0.40
129  10.75     0.67     0.440         0.037      ---          0.40
130  10.83     0.67     0.440         0.037      ---          0.40
131  10.92     0.67     0.440         0.036      ---          0.40
132  11.00     0.67     0.440         0.036      ---          0.40
133  11.08     0.63     0.418         0.036      ---          0.38
134  11.17     0.63     0.418         0.036      ---          0.38
135  11.25     0.63     0.418         0.036      ---          0.38
136  11.33     0.63     0.418         0.036      ---          0.38
137  11.42     0.63     0.418         0.035      ---          0.38
138  11.50     0.63     0.418         0.035      ---          0.38
139  11.58     0.57     0.374         0.035      ---          0.34
140  11.67     0.57     0.374         0.035      ---          0.34
141  11.75     0.57     0.374         0.035      ---          0.34
142  11.83     0.60     0.396         0.034      ---          0.36
143  11.92     0.60     0.396         0.034      ---          0.36
144  12.00     0.60     0.396         0.034      ---          0.36
145  12.08     0.83     0.550         0.034      ---          0.52
146  12.17     0.83     0.550         0.034      ---          0.52
147  12.25     0.83     0.550         0.034      ---          0.52
148  12.33     0.87     0.572         0.033      ---          0.54
149  12.42     0.87     0.572         0.033      ---          0.54
150  12.50     0.87     0.572         0.033      ---          0.54
151  12.58     0.93     0.616         0.033      ---          0.58
152  12.67     0.93     0.616         0.033      ---          0.58
153  12.75     0.93     0.616         0.033      ---          0.58
154  12.83     0.97     0.638         0.032      ---          0.61
155  12.92     0.97     0.638         0.032      ---          0.61
156  13.00     0.97     0.638         0.032      ---          0.61
157  13.08     1.13     0.748         0.032      ---          0.72
158  13.17     1.13     0.748         0.032      ---          0.72
159  13.25     1.13     0.748         0.032      ---          0.72
160  13.33     1.13     0.748         0.031      ---          0.72
161  13.42     1.13     0.748         0.031      ---          0.72
162  13.50     1.13     0.748         0.031      ---          0.72
163  13.58     0.77     0.506         0.031      ---          0.47
164  13.67     0.77     0.506         0.031      ---          0.48
165  13.75     0.77     0.506         0.031      ---          0.48
166  13.83     0.77     0.506         0.031      ---          0.48
167  13.92     0.77     0.506         0.030      ---          0.48
168  14.00     0.77     0.506         0.030      ---          0.48
169  14.08     0.90     0.594         0.030      ---          0.56
170  14.17     0.90     0.594         0.030      ---          0.56
171  14.25     0.90     0.594         0.030      ---          0.56
172  14.33     0.87     0.572         0.030      ---          0.54
```

173	14.42	0.87	0.572	0.029	---	0.54
174	14.50	0.87	0.572	0.029	---	0.54
175	14.58	0.87	0.572	0.029	---	0.54
176	14.67	0.87	0.572	0.029	---	0.54
177	14.75	0.87	0.572	0.029	---	0.54
178	14.83	0.83	0.550	0.029	---	0.52
179	14.92	0.83	0.550	0.029	---	0.52
180	15.00	0.83	0.550	0.028	---	0.52
181	15.08	0.80	0.528	0.028	---	0.50
182	15.17	0.80	0.528	0.028	---	0.50
183	15.25	0.80	0.528	0.028	---	0.50
184	15.33	0.77	0.506	0.028	---	0.48
185	15.42	0.77	0.506	0.028	---	0.48
186	15.50	0.77	0.506	0.028	---	0.48
187	15.58	0.63	0.418	0.027	---	0.39
188	15.67	0.63	0.418	0.027	---	0.39
189	15.75	0.63	0.418	0.027	---	0.39
190	15.83	0.63	0.418	0.027	---	0.39
191	15.92	0.63	0.418	0.027	---	0.39
192	16.00	0.63	0.418	0.027	---	0.39
193	16.08	0.13	0.088	0.027	---	0.06
194	16.17	0.13	0.088	0.026	---	0.06
195	16.25	0.13	0.088	0.026	---	0.06
196	16.33	0.13	0.088	0.026	---	0.06
197	16.42	0.13	0.088	0.026	---	0.06
198	16.50	0.13	0.088	0.026	---	0.06
199	16.58	0.10	0.066	0.026	---	0.04
200	16.67	0.10	0.066	0.026	---	0.04
201	16.75	0.10	0.066	0.026	---	0.04
202	16.83	0.10	0.066	0.025	---	0.04
203	16.92	0.10	0.066	0.025	---	0.04
204	17.00	0.10	0.066	0.025	---	0.04
205	17.08	0.17	0.110	0.025	---	0.08
206	17.17	0.17	0.110	0.025	---	0.09
207	17.25	0.17	0.110	0.025	---	0.09
208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.07
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07

```
233  19.42     0.13      0.088         0.022      ---          0.07
234  19.50     0.13      0.088         0.022      ---          0.07
235  19.58     0.10      0.066         0.022      ---          0.04
236  19.67     0.10      0.066         0.022      ---          0.04
237  19.75     0.10      0.066         0.021      ---          0.04
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      30.3(Ac.)/[(In)/(Ft.)] =      11.7(Ac.Ft)
     Total soil loss =      0.87(In)
```

```
      Total soil loss =     2.191(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      509452.5 Cubic Feet
      Total soil loss =       95451.2 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     21.231(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0001      0.02  Q         |         |         |
|
    0+10       0.0006      0.07  Q         |         |         |
|
    0+15       0.0012      0.09  Q         |         |         |
|
    0+20       0.0018      0.09  Q         |         |         |
|
    0+25       0.0023      0.07  Q         |         |         |
|
    0+30       0.0028      0.07  Q         |         |         |
|
    0+35       0.0034      0.08  Q         |         |         |
|
    0+40       0.0039      0.08  Q         |         |         |
|
    0+45       0.0045      0.09  Q         |         |         |
|
    0+50       0.0058      0.19  Q         |         |         |
|
    0+55       0.0088      0.44  Q         |         |         |
|
    1+ 0       0.0126      0.55  Q         |         |         |
|
    1+ 5       0.0162      0.52  Q         |         |         |
|
    1+10       0.0184      0.32  Q         |         |         |
|
    1+15       0.0202      0.26  Q         |         |         |
|
    1+20       0.0218      0.23  Q         |         |         |
|
    1+25       0.0232      0.21  Q         |         |         |
|
    1+30       0.0246      0.20  Q         |         |         |
|
    1+35       0.0260      0.20  Q         |         |         |
```

```
|
    1+40       0.0274      0.20  Q         |         |         |
|
    1+45       0.0288      0.21  Q         |         |         |
|
    1+50       0.0309      0.30  Q         |         |         |
|
    1+55       0.0347      0.55  Q         |         |         |
|
    2+ 0       0.0392      0.66  Q         |         |         |
|
    2+ 5       0.0441      0.72  Q         |         |         |
|
    2+10       0.0493      0.75  VQ        |         |         |
|
    2+15       0.0547      0.78  VQ        |         |         |
|
    2+20       0.0603      0.81  VQ        |         |         |
|
    2+25       0.0660      0.83  VQ        |         |         |
|
    2+30       0.0719      0.85  VQ        |         |         |
|
    2+35       0.0785      0.97  VQ        |         |         |
|
    2+40       0.0870      1.23  VQ        |         |         |
|
    2+45       0.0962      1.35  VQ        |         |         |
|
    2+50       0.1060      1.42  VQ        |         |         |
|
    2+55       0.1162      1.47  VQ        |         |         |
|
    3+ 0       0.1266      1.52  V Q       |         |         |
|
    3+ 5       0.1373      1.55  V Q       |         |         |
|
    3+10       0.1481      1.57  V Q       |         |         |
|
    3+15       0.1590      1.59  V Q       |         |         |
|
    3+20       0.1701      1.61  V Q       |         |         |
|
    3+25       0.1813      1.63  V Q       |         |         |
|
    3+30       0.1927      1.64  V Q       |         |         |
|
    3+35       0.2041      1.66  V Q       |         |         |
|
    3+40       0.2156      1.67  V Q       |         |         |
|
    3+45       0.2273      1.69  V Q       |         |         |
|
    3+50       0.2396      1.79  V Q       |         |         |
|
    3+55       0.2536      2.04  V Q       |         |         |
|
    4+ 0       0.2684      2.15  V Q       |         |         |
|
    4+ 5       0.2837      2.21  V Q       |         |         |
```

```
|
    4+10       0.2993      2.26  |V Q      |         |         |
|
    4+15       0.3151      2.29  |V Q      |         |         |
|
    4+20       0.3317      2.41  |V Q      |         |         |
|
    4+25       0.3501      2.68  |V Q      |         |         |
|
    4+30       0.3695      2.81  |V Q      |         |         |
|
    4+35       0.3893      2.88  |V Q      |         |         |
|
    4+40       0.4096      2.94  |V Q      |         |         |
|
    4+45       0.4301      2.98  |V Q      |         |         |
|
    4+50       0.4515      3.11  |V  Q     |         |         |
|
    4+55       0.4749      3.39  |V  Q     |         |         |
|
    5+ 0       0.4991      3.52  |V  Q     |         |         |
|
    5+ 5       0.5226      3.41  |V  Q     |         |         |
|
    5+10       0.5432      2.98  |V Q      |         |         |
|
    5+15       0.5626      2.82  |V Q      |         |         |
|
    5+20       0.5821      2.83  |V Q      |         |         |
|
    5+25       0.6029      3.03  | V Q     |         |         |
|
    5+30       0.6243      3.11  | V Q     |         |         |
|
    5+35       0.6466      3.23  | V Q     |         |         |
|
    5+40       0.6707      3.50  | V Q     |         |         |
|
    5+45       0.6956      3.61  | V Q     |         |         |
|
    5+50       0.7210      3.68  | V Q     |         |         |
|
    5+55       0.7467      3.73  | V Q     |         |         |
|
    6+ 0       0.7727      3.77  | V  Q    |         |         |
|
    6+ 5       0.7995      3.89  | V  Q    |         |         |
|
    6+10       0.8280      4.15  | V  Q    |         |         |
|
    6+15       0.8574      4.27  | V  Q    |         |         |
|
    6+20       0.8874      4.35  |  V Q    |         |         |
|
    6+25       0.9178      4.42  |  V Q    |         |         |
|
    6+30       0.9486      4.47  |  V Q    |         |         |
|
    6+35       0.9802      4.59  |  V  Q   |         |         |
```

```
|
    6+40       1.0137      4.87  |  V  Q   |         |         |
|
    6+45       1.0482      5.00  |  V  Q   |         |         |
|
    6+50       1.0832      5.08  |  V  Q   |         |         |
|
    6+55       1.1185      5.14  |  V  Q   |         |         |
|
    7+ 0       1.1542      5.18  |  V  Q   |         |         |
|
    7+ 5       1.1901      5.21  |   V Q   |         |         |
|
    7+10       1.2262      5.25  |   V Q   |         |         |
|
    7+15       1.2625      5.27  |   V  Q  |         |         |
|
    7+20       1.2996      5.38  |   V  Q  |         |         |
|
    7+25       1.3385      5.64  |   V  Q  |         |         |
|
    7+30       1.3782      5.76  |   V  Q  |         |         |
|
    7+35       1.4190      5.93  |   V  Q  |         |         |
|
    7+40       1.4619      6.22  |   V   Q |         |         |
|
    7+45       1.5057      6.37  |    V  Q |         |         |
|
    7+50       1.5508      6.55  |    V  Q |         |         |
|
    7+55       1.5980      6.85  |    V   Q|         |         |
|
    8+ 0       1.6462      7.00  |    V   Q|         |         |
|
    8+ 5       1.6964      7.28  |    V   Q|         |         |
|
    8+10       1.7504      7.84  |    V    Q         |         |
|
    8+15       1.8062      8.11  |     V   Q         |         |
|
    8+20       1.8632      8.27  |     V   |Q        |         |
|
    8+25       1.9210      8.39  |     V   |Q        |         |
|
    8+30       1.9794      8.48  |     V   |Q        |         |
|
    8+35       2.0390      8.64  |     V   |Q        |         |
|
    8+40       2.1006      8.95  |      V  |Q        |         |
|
    8+45       2.1633      9.10  |      V  | Q       |         |
|
    8+50       2.2273      9.29  |      V  | Q       |         |
|
    8+55       2.2934      9.61  |      V  | Q       |         |
|
    9+ 0       2.3607      9.77  |       V |  Q      |         |
|
    9+ 5       2.4300     10.05  |       V |  Q      |         |
```

```
|
    9+10       2.5031     10.62  |       V |   Q     |         |
|
    9+15       2.5781     10.89  |       V |   Q     |         |
|
    9+20       2.6549     11.14  |        V|   Q     |         |
|
    9+25       2.7340     11.49  |        V|    Q    |         |
|
    9+30       2.8145     11.68  |        V|    Q    |         |
|
    9+35       2.8964     11.90  |        V|    Q    |         |
|
    9+40       2.9807     12.24  |         V     Q   |         |
|
    9+45       3.0663     12.42  |         V     Q   |         |
|
    9+50       3.1533     12.63  |         V     Q   |         |
|
    9+55       3.2426     12.97  |         |V     Q  |         |
|
   10+ 0       3.3332     13.15  |         |V     Q  |         |
|
   10+ 5       3.4201     12.62  |         |V    Q   |         |
|
   10+10       3.4959     11.01  |         |V  Q     |         |
|
   10+15       3.5672     10.36  |         | VQ      |         |
|
   10+20       3.6360     10.00  |         | VQ      |         |
|
   10+25       3.7033      9.76  |         | VQ      |         |
|
   10+30       3.7695      9.61  |         | Q       |         |
|
   10+35       3.8380      9.95  |         |  Q      |         |
|
   10+40       3.9142     11.07  |         |  VQ     |         |
|
   10+45       3.9934     11.50  |         |  V Q    |         |
|
   10+50       4.0741     11.72  |         |  V Q    |         |
|
   10+55       4.1558     11.86  |         |   VQ    |         |
|
   11+ 0       4.2381     11.95  |         |   VQ    |         |
|
   11+ 5       4.3201     11.91  |         |   VQ    |         |
|
   11+10       4.4006     11.70  |         |    Q    |         |
|
   11+15       4.4806     11.61  |         |    Q    |         |
|
   11+20       4.5607     11.62  |         |    Q    |         |
|
   11+25       4.6409     11.64  |         |    Q    |         |
|
   11+30       4.7212     11.66  |         |    QV   |         |
|
   11+35       4.8004     11.51  |         |    QV   |         |
```

```
|
   11+40       4.8765     11.05  |         |   Q V   |         |
|
   11+45       4.9515     10.88  |         |   Q V   |         |
|
   11+50       5.0261     10.84  |         |   Q  V  |         |
|
   11+55       5.1019     11.00  |         |   Q  V  |         |
|
   12+ 0       5.1780     11.05  |         |   Q  V  |         |
|
   12+ 5       5.2586     11.70  |         |    Q V  |         |
|
   12+10       5.3509     13.41  |         |      QV |         |
|
   12+15       5.4482     14.12  |         |       Q |         |
|
   12+20       5.5489     14.62  |         |       VQ|         |
|
   12+25       5.6532     15.14  |         |        VQ         |
|
   12+30       5.7596     15.44  |         |        VQ         |
|
   12+35       5.8686     15.83  |         |         VQ        |
|
   12+40       5.9820     16.48  |         |         VQ        |
|
   12+45       6.0978     16.81  |         |         V Q       |
|
   12+50       6.2158     17.14  |         |         |VQ       |
|
   12+55       6.3368     17.56  |         |         |V Q      |
|
   13+ 0       6.4594     17.81  |         |         | VQ      |
|
   13+ 5       6.5864     18.44  |         |         | V Q     |
|
   13+10       6.7229     19.81  |         |         | V   Q   |
|
   13+15       6.8637     20.45  |         |         |  V   Q  |
|
   13+20       7.0070     20.80  |         |         |  V   Q  |
|
   13+25       7.1519     21.05  |         |         |   V   Q |
|
   13+30       7.2981     21.23  |         |         |   V   Q |
|
   13+35       7.4384     20.37  |         |         |    V Q  |
|
   13+40       7.5611     17.81  |         |         |  Q V    |
|
   13+45       7.6766     16.77  |         |         | Q   V   |
|
   13+50       7.7882     16.21  |         |         |Q    V   |
|
   13+55       7.8974     15.85  |         |         |Q     V  |
|
   14+ 0       8.0048     15.60  |         |         Q      V  |
|
   14+ 5       8.1135     15.78  |         |         |Q     V  |
```

```
|
  14+10       8.2279     16.61  |         |         | Q     V |
|
  14+15       8.3443     16.91  |         |         | Q     V |
|
  14+20       8.4609     16.92  |         |         | Q     V |
|
  14+25       8.5760     16.72  |         |         | Q      V|
|
  14+30       8.6906     16.64  |         |         | Q      V|
|
  14+35       8.8048     16.58  |         |         | Q       V
|
  14+40       8.9185     16.52  |         |         | Q       V
|
  14+45       9.0319     16.46  |         |         |Q        V
|
  14+50       9.1449     16.40  |         |         |Q        |V
|
  14+55       9.2564     16.19  |         |         |Q        |V
|
  15+ 0       9.3674     16.11  |         |         |Q        | V
|
  15+ 5       9.4775     15.99  |         |         |Q        | V
|
  15+10       9.5858     15.73  |         |         Q         | V
|
  15+15       9.6935     15.63  |         |         Q         |  V
|
  15+20       9.8000     15.46  |         |         Q         |  V
|
  15+25       9.9043     15.15  |         |         Q         |  V
|
  15+30      10.0076     15.00  |         |         Q         |   V
|
  15+35      10.1079     14.55  |         |        Q|         |   V
|
  15+40      10.2010     13.52  |         |       Q |         |   V
|
  15+45      10.2909     13.06  |         |      Q  |         |    V
|
  15+50      10.3789     12.79  |         |      Q  |         |    V
|
  15+55      10.4657     12.60  |         |     Q   |         |    V
|
  16+ 0      10.5515     12.46  |         |     Q   |         |     V
|
  16+ 5      10.6273     11.00  |         |   Q     |         |     V
|
  16+10      10.6772      7.25  |        Q|         |         |     V
|
  16+15      10.7160      5.64  |      Q  |         |         |     V
|
  16+20      10.7485      4.71  |     Q   |         |         |     V
|
  16+25      10.7766      4.08  |    Q    |         |         |     V
|
  16+30      10.8016      3.63  |   Q     |         |         |     V
|
  16+35      10.8236      3.19  |   Q     |         |         |      V
```

```
|
   16+40      10.8419      2.66  |  Q      |         |         |      V
|
   16+45      10.8578      2.31  |  Q      |         |         |      V
|
   16+50      10.8720      2.07  | Q       |         |         |      V
|
   16+55      10.8849      1.88  | Q       |         |         |      V
|
   17+ 0      10.8968      1.72  | Q       |         |         |      V
|
   17+ 5      10.9089      1.76  | Q       |         |         |      V
|
   17+10      10.9235      2.11  | Q       |         |         |      V
|
   17+15      10.9385      2.18  | Q       |         |         |      V
|
   17+20      10.9542      2.29  |  Q      |         |         |      V
|
   17+25      10.9705      2.36  |  Q      |         |         |      V
|
   17+30      10.9871      2.41  |  Q      |         |         |      V
|
   17+35      11.0040      2.45  |  Q      |         |         |      V
|
   17+40      11.0210      2.48  |  Q      |         |         |      V
|
   17+45      11.0383      2.50  |  Q      |         |         |      V
|
   17+50      11.0551      2.44  |  Q      |         |         |      V
|
   17+55      11.0704      2.22  | Q       |         |         |      V
|
   18+ 0      11.0851      2.14  | Q       |         |         |      V
|
   18+ 5      11.0995      2.10  | Q       |         |         |      V
|
   18+10      11.1139      2.08  | Q       |         |         |       V
|
   18+15      11.1282      2.07  | Q       |         |         |       V
|
   18+20      11.1424      2.06  | Q       |         |         |       V
|
   18+25      11.1564      2.04  | Q       |         |         |       V
|
   18+30      11.1704      2.03  | Q       |         |         |       V
|
   18+35      11.1837      1.93  | Q       |         |         |       V
|
   18+40      11.1953      1.68  | Q       |         |         |       V
|
   18+45      11.2062      1.57  | Q       |         |         |       V
|
   18+50      11.2159      1.42  |Q        |         |         |       V
|
   18+55      11.2237      1.13  |Q        |         |         |       V
|
   19+ 0      11.2306      1.00  |Q        |         |         |       V
|
   19+ 5      11.2376      1.01  |Q        |         |         |       V
```

```
|
   19+10       11.2458       1.20  |Q         |         |         |       V
|
   19+15       11.2545       1.27  |Q         |         |         |       V
|
   19+20       11.2641       1.39  |Q         |         |         |       V
|
   19+25       11.2754       1.64  | Q        |         |         |       V
|
   19+30       11.2875       1.75  | Q        |         |         |       V
|
   19+35       11.2994       1.72  | Q        |         |         |       V
|
   19+40       11.3098       1.52  | Q        |         |         |       V
|
   19+45       11.3198       1.45  |Q         |         |         |       V
|
   19+50       11.3289       1.33  |Q         |         |         |       V
|
   19+55       11.3363       1.06  |Q         |         |         |       V
|
   20+ 0       11.3428       0.95  |Q         |         |         |       V
|
   20+ 5       11.3496       0.99  |Q         |         |         |       V
|
   20+10       11.3579       1.20  |Q         |         |         |       V
|
   20+15       11.3667       1.28  |Q         |         |         |       V
|
   20+20       11.3757       1.31  |Q         |         |         |       V
|
   20+25       11.3849       1.34  |Q         |         |         |       V
|
   20+30       11.3942       1.35  |Q         |         |         |       V
|
   20+35       11.4035       1.35  |Q         |         |         |
V|
   20+40       11.4129       1.36  |Q         |         |         |
V|
   20+45       11.4222       1.36  |Q         |         |         |
V|
   20+50       11.4310       1.27  |Q         |         |         |
V|
   20+55       11.4381       1.03  |Q         |         |         |
V|
   21+ 0       11.4445       0.93  |Q         |         |         |
V|
   21+ 5       11.4512       0.98  |Q         |         |         |
V|
   21+10       11.4594       1.19  |Q         |         |         |
V|
   21+15       11.4682       1.28  |Q         |         |         |
V|
   21+20       11.4767       1.23  |Q         |         |         |
V|
   21+25       11.4836       1.01  |Q         |         |         |
V|
   21+30       11.4899       0.92  |Q         |         |         |
V|
   21+35       11.4966       0.96  |Q         |         |         |
```

```
V|
    21+40       11.5047      1.18  |Q          |          |          |
V|
    21+45       11.5134      1.26  |Q          |          |          |
V|
    21+50       11.5217      1.21  |Q          |          |          |
V|
    21+55       11.5286      0.99  |Q          |          |          |
V|
    22+ 0       11.5348      0.91  |Q          |          |          |
V|
    22+ 5       11.5414      0.96  |Q          |          |          |
V|
    22+10       11.5496      1.18  |Q          |          |          |
V|
    22+15       11.5583      1.27  |Q          |          |          |
V|
    22+20       11.5668      1.23  |Q          |          |          |
V|
    22+25       11.5737      1.01  |Q          |          |          |
V|
    22+30       11.5800      0.92  |Q          |          |          |
V|
    22+35       11.5861      0.88  |Q          |          |          |
V|
    22+40       11.5920      0.86  |Q          |          |          |
V|
    22+45       11.5978      0.85  |Q          |          |          |
V|
    22+50       11.6035      0.83  |Q          |          |          |
V|
    22+55       11.6092      0.82  |Q          |          |          |
V|
    23+ 0       11.6147      0.80  |Q          |          |          |
V|
    23+ 5       11.6202      0.80  |Q          |          |          |
V|
    23+10       11.6257      0.80  |Q          |          |          |
V|
    23+15       11.6313      0.80  |Q          |          |          |
V|
    23+20       11.6367      0.80  |Q          |          |          |
V|
    23+25       11.6422      0.79  |Q          |          |          |
V|
    23+30       11.6475      0.78  |Q          |          |          |
V|
    23+35       11.6529      0.78  |Q          |          |          |
V|
    23+40       11.6583      0.78  |Q          |          |          |
V|
    23+45       11.6637      0.78  |Q          |          |          |
V|
    23+50       11.6691      0.78  |Q          |          |          |
V|
    23+55       11.6745      0.79  |Q          |          |          |
V|
    24+ 0       11.6800      0.79  |Q          |          |          |
V|
    24+ 5       11.6846      0.68   Q          |          |          |
```

```
V|
   24+10      11.6874      0.39  Q          |          |          |
V|
   24+15      11.6892      0.27  Q          |          |          |
V|
   24+20      11.6907      0.21  Q          |          |          |
V|
   24+25      11.6918      0.16  Q          |          |          |
V|
   24+30      11.6926      0.13  Q          |          |          |
V|
   24+35      11.6934      0.10  Q          |          |          |
V|
   24+40      11.6939      0.08  Q          |          |          |
V|
   24+45      11.6944      0.07  Q          |          |          |
V|
   24+50      11.6947      0.05  Q          |          |          |
V|
   24+55      11.6950      0.04  Q          |          |          |
V|
   25+ 0      11.6952      0.03  Q          |          |          |
V|
   25+ 5      11.6954      0.02  Q          |          |          |
V|
   25+10      11.6954      0.01  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: canyon4pre24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Canyon 4 Pre Expansion
      24 hr 100 yr storm event

      ------------------------------------------------------------------
--
      Drainage Area =     173.00(Ac.)  =      0.270 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =     173.00(Ac.)  =
0.270 Sq. Mi.
      Length along longest watercourse =    6327.00(Ft.)
      Length along longest watercourse measured to centroid =    3189.00
(Ft.)
      Length along longest watercourse =      1.198 Mi.
      Length along longest watercourse measured to centroid =      0.604
Mi.
      Difference in elevation =     427.00(Ft.)
      Slope along watercourse =    356.3395 Ft./Mi.
      Average Manning's 'N' = 0.025
      Lag time =    0.174 Hr.
      Lag time =    10.43 Min.
      25% of lag time =     2.61 Min.
      40% of lag time =     4.17 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
            173.00              2.00                  346.00

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
            173.00              5.50                  951.50

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.97 %
      Adjusted average point rain =    5.498(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
         173.000           93.00         0.300
       Total Area Entered =    173.00(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.300        0.027       1.000
0.027
                                                          Sum (F) =
0.027
      Area averaged mean soil loss (F) (In/Hr) =  0.027
      Minimum soil loss rate ((In/Hr)) =  0.013
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.660
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %            (CFS)
      ------------------------------------------------------------------
---
           1   0.083         47.960          4.036              7.037
           2   0.167         95.920         17.968             31.327
           3   0.250        143.880         38.432             67.006
           4   0.333        191.840         15.504             27.032
           5   0.417        239.800          8.655             15.091
           6   0.500        287.760          5.674              9.893
           7   0.583        335.720          3.838              6.691
           8   0.667        383.680          2.454              4.279
           9   0.750        431.640          1.386              2.416
          10   0.833        479.600          0.602              1.049
          11   0.917        527.560          0.455              0.793
          12   1.000        575.520          0.319              0.556
          13   1.083        623.481          0.350              0.611
```

```
         14   1.167        671.441          0.207              0.361
         15   1.250        719.401          0.120              0.209
                                    Sum = 100.000   Sum=     174.352
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max    |  Low        (In/Hr)
   1   0.08     0.07      0.044         0.047     0.029         0.01
   2   0.17     0.07      0.044         0.047     0.029         0.01
   3   0.25     0.07      0.044         0.047     0.029         0.01
   4   0.33     0.10      0.066         0.047      ---          0.02
   5   0.42     0.10      0.066         0.046      ---          0.02
   6   0.50     0.10      0.066         0.046      ---          0.02
   7   0.58     0.10      0.066         0.046      ---          0.02
   8   0.67     0.10      0.066         0.046      ---          0.02
   9   0.75     0.10      0.066         0.046      ---          0.02
  10   0.83     0.13      0.088         0.045      ---          0.04
  11   0.92     0.13      0.088         0.045      ---          0.04
  12   1.00     0.13      0.088         0.045      ---          0.04
  13   1.08     0.10      0.066         0.045      ---          0.02
  14   1.17     0.10      0.066         0.045      ---          0.02
  15   1.25     0.10      0.066         0.045      ---          0.02
  16   1.33     0.10      0.066         0.044      ---          0.02
  17   1.42     0.10      0.066         0.044      ---          0.02
  18   1.50     0.10      0.066         0.044      ---          0.02
  19   1.58     0.10      0.066         0.044      ---          0.02
  20   1.67     0.10      0.066         0.044      ---          0.02
  21   1.75     0.10      0.066         0.044      ---          0.02
  22   1.83     0.13      0.088         0.043      ---          0.04
  23   1.92     0.13      0.088         0.043      ---          0.04
  24   2.00     0.13      0.088         0.043      ---          0.04
  25   2.08     0.13      0.088         0.043      ---          0.05
  26   2.17     0.13      0.088         0.043      ---          0.05
  27   2.25     0.13      0.088         0.042      ---          0.05
  28   2.33     0.13      0.088         0.042      ---          0.05
  29   2.42     0.13      0.088         0.042      ---          0.05
  30   2.50     0.13      0.088         0.042      ---          0.05
  31   2.58     0.17      0.110         0.042      ---          0.07
  32   2.67     0.17      0.110         0.042      ---          0.07
  33   2.75     0.17      0.110         0.041      ---          0.07
  34   2.83     0.17      0.110         0.041      ---          0.07
  35   2.92     0.17      0.110         0.041      ---          0.07
  36   3.00     0.17      0.110         0.041      ---          0.07
  37   3.08     0.17      0.110         0.041      ---          0.07
  38   3.17     0.17      0.110         0.041      ---          0.07
  39   3.25     0.17      0.110         0.040      ---          0.07
  40   3.33     0.17      0.110         0.040      ---          0.07
  41   3.42     0.17      0.110         0.040      ---          0.07
  42   3.50     0.17      0.110         0.040      ---          0.07
  43   3.58     0.17      0.110         0.040      ---          0.07
  44   3.67     0.17      0.110         0.040      ---          0.07
  45   3.75     0.17      0.110         0.039      ---          0.07
  46   3.83     0.20      0.132         0.039      ---          0.09
  47   3.92     0.20      0.132         0.039      ---          0.09
  48   4.00     0.20      0.132         0.039      ---          0.09
  49   4.08     0.20      0.132         0.039      ---          0.09
  50   4.17     0.20      0.132         0.039      ---          0.09
  51   4.25     0.20      0.132         0.038      ---          0.09
  52   4.33     0.23      0.154         0.038      ---          0.12
```

53	4.42	0.23	0.154	0.038	---	0.12
54	4.50	0.23	0.154	0.038	---	0.12
55	4.58	0.23	0.154	0.038	---	0.12
56	4.67	0.23	0.154	0.038	---	0.12
57	4.75	0.23	0.154	0.037	---	0.12
58	4.83	0.27	0.176	0.037	---	0.14
59	4.92	0.27	0.176	0.037	---	0.14
60	5.00	0.27	0.176	0.037	---	0.14
61	5.08	0.20	0.132	0.037	---	0.10
62	5.17	0.20	0.132	0.037	---	0.10
63	5.25	0.20	0.132	0.036	---	0.10
64	5.33	0.23	0.154	0.036	---	0.12
65	5.42	0.23	0.154	0.036	---	0.12
66	5.50	0.23	0.154	0.036	---	0.12
67	5.58	0.27	0.176	0.036	---	0.14
68	5.67	0.27	0.176	0.036	---	0.14
69	5.75	0.27	0.176	0.036	---	0.14
70	5.83	0.27	0.176	0.035	---	0.14
71	5.92	0.27	0.176	0.035	---	0.14
72	6.00	0.27	0.176	0.035	---	0.14
73	6.08	0.30	0.198	0.035	---	0.16
74	6.17	0.30	0.198	0.035	---	0.16
75	6.25	0.30	0.198	0.035	---	0.16
76	6.33	0.30	0.198	0.034	---	0.16
77	6.42	0.30	0.198	0.034	---	0.16
78	6.50	0.30	0.198	0.034	---	0.16
79	6.58	0.33	0.220	0.034	---	0.19
80	6.67	0.33	0.220	0.034	---	0.19
81	6.75	0.33	0.220	0.034	---	0.19
82	6.83	0.33	0.220	0.034	---	0.19
83	6.92	0.33	0.220	0.033	---	0.19
84	7.00	0.33	0.220	0.033	---	0.19
85	7.08	0.33	0.220	0.033	---	0.19
86	7.17	0.33	0.220	0.033	---	0.19
87	7.25	0.33	0.220	0.033	---	0.19
88	7.33	0.37	0.242	0.033	---	0.21
89	7.42	0.37	0.242	0.032	---	0.21
90	7.50	0.37	0.242	0.032	---	0.21
91	7.58	0.40	0.264	0.032	---	0.23
92	7.67	0.40	0.264	0.032	---	0.23
93	7.75	0.40	0.264	0.032	---	0.23
94	7.83	0.43	0.286	0.032	---	0.25
95	7.92	0.43	0.286	0.032	---	0.25
96	8.00	0.43	0.286	0.031	---	0.25
97	8.08	0.50	0.330	0.031	---	0.30
98	8.17	0.50	0.330	0.031	---	0.30
99	8.25	0.50	0.330	0.031	---	0.30
100	8.33	0.50	0.330	0.031	---	0.30
101	8.42	0.50	0.330	0.031	---	0.30
102	8.50	0.50	0.330	0.031	---	0.30
103	8.58	0.53	0.352	0.030	---	0.32
104	8.67	0.53	0.352	0.030	---	0.32
105	8.75	0.53	0.352	0.030	---	0.32
106	8.83	0.57	0.374	0.030	---	0.34
107	8.92	0.57	0.374	0.030	---	0.34
108	9.00	0.57	0.374	0.030	---	0.34
109	9.08	0.63	0.418	0.030	---	0.39
110	9.17	0.63	0.418	0.029	---	0.39
111	9.25	0.63	0.418	0.029	---	0.39
112	9.33	0.67	0.440	0.029	---	0.41

113	9.42	0.67	0.440	0.029	---	0.41
114	9.50	0.67	0.440	0.029	---	0.41
115	9.58	0.70	0.462	0.029	---	0.43
116	9.67	0.70	0.462	0.029	---	0.43
117	9.75	0.70	0.462	0.028	---	0.43
118	9.83	0.73	0.484	0.028	---	0.46
119	9.92	0.73	0.484	0.028	---	0.46
120	10.00	0.73	0.484	0.028	---	0.46
121	10.08	0.50	0.330	0.028	---	0.30
122	10.17	0.50	0.330	0.028	---	0.30
123	10.25	0.50	0.330	0.028	---	0.30
124	10.33	0.50	0.330	0.028	---	0.30
125	10.42	0.50	0.330	0.027	---	0.30
126	10.50	0.50	0.330	0.027	---	0.30
127	10.58	0.67	0.440	0.027	---	0.41
128	10.67	0.67	0.440	0.027	---	0.41
129	10.75	0.67	0.440	0.027	---	0.41
130	10.83	0.67	0.440	0.027	---	0.41
131	10.92	0.67	0.440	0.027	---	0.41
132	11.00	0.67	0.440	0.026	---	0.41
133	11.08	0.63	0.418	0.026	---	0.39
134	11.17	0.63	0.418	0.026	---	0.39
135	11.25	0.63	0.418	0.026	---	0.39
136	11.33	0.63	0.418	0.026	---	0.39
137	11.42	0.63	0.418	0.026	---	0.39
138	11.50	0.63	0.418	0.026	---	0.39
139	11.58	0.57	0.374	0.026	---	0.35
140	11.67	0.57	0.374	0.025	---	0.35
141	11.75	0.57	0.374	0.025	---	0.35
142	11.83	0.60	0.396	0.025	---	0.37
143	11.92	0.60	0.396	0.025	---	0.37
144	12.00	0.60	0.396	0.025	---	0.37
145	12.08	0.83	0.550	0.025	---	0.53
146	12.17	0.83	0.550	0.025	---	0.53
147	12.25	0.83	0.550	0.025	---	0.53
148	12.33	0.87	0.572	0.024	---	0.55
149	12.42	0.87	0.572	0.024	---	0.55
150	12.50	0.87	0.572	0.024	---	0.55
151	12.58	0.93	0.616	0.024	---	0.59
152	12.67	0.93	0.616	0.024	---	0.59
153	12.75	0.93	0.616	0.024	---	0.59
154	12.83	0.97	0.638	0.024	---	0.61
155	12.92	0.97	0.638	0.024	---	0.61
156	13.00	0.97	0.638	0.023	---	0.61
157	13.08	1.13	0.748	0.023	---	0.72
158	13.17	1.13	0.748	0.023	---	0.72
159	13.25	1.13	0.748	0.023	---	0.72
160	13.33	1.13	0.748	0.023	---	0.72
161	13.42	1.13	0.748	0.023	---	0.72
162	13.50	1.13	0.748	0.023	---	0.72
163	13.58	0.77	0.506	0.023	---	0.48
164	13.67	0.77	0.506	0.023	---	0.48
165	13.75	0.77	0.506	0.022	---	0.48
166	13.83	0.77	0.506	0.022	---	0.48
167	13.92	0.77	0.506	0.022	---	0.48
168	14.00	0.77	0.506	0.022	---	0.48
169	14.08	0.90	0.594	0.022	---	0.57
170	14.17	0.90	0.594	0.022	---	0.57
171	14.25	0.90	0.594	0.022	---	0.57
172	14.33	0.87	0.572	0.022	---	0.55

```
173  14.42      0.87      0.572          0.022      ---          0.55
174  14.50      0.87      0.572          0.021      ---          0.55
175  14.58      0.87      0.572          0.021      ---          0.55
176  14.67      0.87      0.572          0.021      ---          0.55
177  14.75      0.87      0.572          0.021      ---          0.55
178  14.83      0.83      0.550          0.021      ---          0.53
179  14.92      0.83      0.550          0.021      ---          0.53
180  15.00      0.83      0.550          0.021      ---          0.53
181  15.08      0.80      0.528          0.021      ---          0.51
182  15.17      0.80      0.528          0.021      ---          0.51
183  15.25      0.80      0.528          0.020      ---          0.51
184  15.33      0.77      0.506          0.020      ---          0.49
185  15.42      0.77      0.506          0.020      ---          0.49
186  15.50      0.77      0.506          0.020      ---          0.49
187  15.58      0.63      0.418          0.020      ---          0.40
188  15.67      0.63      0.418          0.020      ---          0.40
189  15.75      0.63      0.418          0.020      ---          0.40
190  15.83      0.63      0.418          0.020      ---          0.40
191  15.92      0.63      0.418          0.020      ---          0.40
192  16.00      0.63      0.418          0.020      ---          0.40
193  16.08      0.13      0.088          0.019      ---          0.07
194  16.17      0.13      0.088          0.019      ---          0.07
195  16.25      0.13      0.088          0.019      ---          0.07
196  16.33      0.13      0.088          0.019      ---          0.07
197  16.42      0.13      0.088          0.019      ---          0.07
198  16.50      0.13      0.088          0.019      ---          0.07
199  16.58      0.10      0.066          0.019      ---          0.05
200  16.67      0.10      0.066          0.019      ---          0.05
201  16.75      0.10      0.066          0.019      ---          0.05
202  16.83      0.10      0.066          0.019      ---          0.05
203  16.92      0.10      0.066          0.018      ---          0.05
204  17.00      0.10      0.066          0.018      ---          0.05
205  17.08      0.17      0.110          0.018      ---          0.09
206  17.17      0.17      0.110          0.018      ---          0.09
207  17.25      0.17      0.110          0.018      ---          0.09
208  17.33      0.17      0.110          0.018      ---          0.09
209  17.42      0.17      0.110          0.018      ---          0.09
210  17.50      0.17      0.110          0.018      ---          0.09
211  17.58      0.17      0.110          0.018      ---          0.09
212  17.67      0.17      0.110          0.018      ---          0.09
213  17.75      0.17      0.110          0.018      ---          0.09
214  17.83      0.13      0.088          0.017      ---          0.07
215  17.92      0.13      0.088          0.017      ---          0.07
216  18.00      0.13      0.088          0.017      ---          0.07
217  18.08      0.13      0.088          0.017      ---          0.07
218  18.17      0.13      0.088          0.017      ---          0.07
219  18.25      0.13      0.088          0.017      ---          0.07
220  18.33      0.13      0.088          0.017      ---          0.07
221  18.42      0.13      0.088          0.017      ---          0.07
222  18.50      0.13      0.088          0.017      ---          0.07
223  18.58      0.10      0.066          0.017      ---          0.05
224  18.67      0.10      0.066          0.017      ---          0.05
225  18.75      0.10      0.066          0.017      ---          0.05
226  18.83      0.07      0.044          0.016      ---          0.03
227  18.92      0.07      0.044          0.016      ---          0.03
228  19.00      0.07      0.044          0.016      ---          0.03
229  19.08      0.10      0.066          0.016      ---          0.05
230  19.17      0.10      0.066          0.016      ---          0.05
231  19.25      0.10      0.066          0.016      ---          0.05
232  19.33      0.13      0.088          0.016      ---          0.07
```

```
233  19.42     0.13      0.088         0.016      ---          0.07
234  19.50     0.13      0.088         0.016      ---          0.07
235  19.58     0.10      0.066         0.016      ---          0.05
236  19.67     0.10      0.066         0.016      ---          0.05
237  19.75     0.10      0.066         0.016      ---          0.05
238  19.83     0.07      0.044         0.016      ---          0.03
239  19.92     0.07      0.044         0.015      ---          0.03
240  20.00     0.07      0.044         0.015      ---          0.03
241  20.08     0.10      0.066         0.015      ---          0.05
242  20.17     0.10      0.066         0.015      ---          0.05
243  20.25     0.10      0.066         0.015      ---          0.05
244  20.33     0.10      0.066         0.015      ---          0.05
245  20.42     0.10      0.066         0.015      ---          0.05
246  20.50     0.10      0.066         0.015      ---          0.05
247  20.58     0.10      0.066         0.015      ---          0.05
248  20.67     0.10      0.066         0.015      ---          0.05
249  20.75     0.10      0.066         0.015      ---          0.05
250  20.83     0.07      0.044         0.015      ---          0.03
251  20.92     0.07      0.044         0.015      ---          0.03
252  21.00     0.07      0.044         0.015      ---          0.03
253  21.08     0.10      0.066         0.015      ---          0.05
254  21.17     0.10      0.066         0.015      ---          0.05
255  21.25     0.10      0.066         0.014      ---          0.05
256  21.33     0.07      0.044         0.014      ---          0.03
257  21.42     0.07      0.044         0.014      ---          0.03
258  21.50     0.07      0.044         0.014      ---          0.03
259  21.58     0.10      0.066         0.014      ---          0.05
260  21.67     0.10      0.066         0.014      ---          0.05
261  21.75     0.10      0.066         0.014      ---          0.05
262  21.83     0.07      0.044         0.014      ---          0.03
263  21.92     0.07      0.044         0.014      ---          0.03
264  22.00     0.07      0.044         0.014      ---          0.03
265  22.08     0.10      0.066         0.014      ---          0.05
266  22.17     0.10      0.066         0.014      ---          0.05
267  22.25     0.10      0.066         0.014      ---          0.05
268  22.33     0.07      0.044         0.014      ---          0.03
269  22.42     0.07      0.044         0.014      ---          0.03
270  22.50     0.07      0.044         0.014      ---          0.03
271  22.58     0.07      0.044         0.014      ---          0.03
272  22.67     0.07      0.044         0.014      ---          0.03
273  22.75     0.07      0.044         0.014      ---          0.03
274  22.83     0.07      0.044         0.014      ---          0.03
275  22.92     0.07      0.044         0.014      ---          0.03
276  23.00     0.07      0.044         0.014      ---          0.03
277  23.08     0.07      0.044         0.014      ---          0.03
278  23.17     0.07      0.044         0.013      ---          0.03
279  23.25     0.07      0.044         0.013      ---          0.03
280  23.33     0.07      0.044         0.013      ---          0.03
281  23.42     0.07      0.044         0.013      ---          0.03
282  23.50     0.07      0.044         0.013      ---          0.03
283  23.58     0.07      0.044         0.013      ---          0.03
284  23.67     0.07      0.044         0.013      ---          0.03
285  23.75     0.07      0.044         0.013      ---          0.03
286  23.83     0.07      0.044         0.013      ---          0.03
287  23.92     0.07      0.044         0.013      ---          0.03
288  24.00     0.07      0.044         0.013      ---          0.03
    Sum =     100.0                                   Sum =    58.4
     Flood volume = Effective rainfall      4.86(In)
      times area     173.0(Ac.)/[(In)/(Ft.)] =      70.1(Ac.Ft)
     Total soil loss =      0.63(In)
```

```
      Total soil loss =     9.134(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     3054919.1 Cubic Feet
      Total soil loss =      397858.8 Cubic Feet
      -----------------------------------------------------------------
--
       Peak flow rate of this hydrograph =    124.414(CFS)
      -----------------------------------------------------------------
--
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      -----------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      -----------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0
200.0

-----------------------------------------------------------------------
    0+ 5       0.0007      0.11  Q         |         |         |
|
    0+10       0.0047      0.57  Q         |         |         |
|
    0+15       0.0155      1.58  Q         |         |         |
|
    0+20       0.0294      2.01  Q         |         |         |
|
    0+25       0.0458      2.38  Q         |         |         |
|
    0+30       0.0653      2.83  Q         |         |         |
|
    0+35       0.0865      3.07  Q         |         |         |
|
    0+40       0.1087      3.23  Q         |         |         |
|
    0+45       0.1317      3.34  Q         |         |         |
|
    0+50       0.1562      3.56  Q         |         |         |
|
    0+55       0.1859      4.31  Q         |         |         |
|
    1+ 0       0.2262      5.84  VQ        |         |         |
|
    1+ 5       0.2697      6.32  VQ        |         |         |
|
    1+10       0.3111      6.01  VQ        |         |         |
|
    1+15       0.3440      4.78  Q         |         |         |
|
    1+20       0.3741      4.37  Q         |         |         |
|
    1+25       0.4028      4.17  Q         |         |         |
|
    1+30       0.4306      4.03  Q         |         |         |
|
    1+35       0.4577      3.94  Q         |         |         |
```

```
|
   1+40       0.4845      3.89  Q         |         |         |
|
   1+45       0.5113      3.88  Q         |         |         |
|
   1+50       0.5392      4.06  Q         |         |         |
|
   1+55       0.5721      4.77  Q         |         |         |
|
   2+ 0       0.6152      6.27  VQ        |         |         |
|
   2+ 5       0.6626      6.88  VQ        |         |         |
|
   2+10       0.7124      7.23  VQ        |         |         |
|
   2+15       0.7639      7.48  VQ        |         |         |
|
   2+20       0.8167      7.65  VQ        |         |         |
|
   2+25       0.8702      7.78  VQ        |         |         |
|
   2+30       0.9244      7.86  VQ        |         |         |
|
   2+35       0.9800      8.07  VQ        |         |         |
|
   2+40       1.0406      8.81  VQ        |         |         |
|
   2+45       1.1117     10.32  V Q       |         |         |
|
   2+50       1.1872     10.96  V Q       |         |         |
|
   2+55       1.2653     11.33  V Q       |         |         |
|
   3+ 0       1.3450     11.58  V Q       |         |         |
|
   3+ 5       1.4261     11.76  V Q       |         |         |
|
   3+10       1.5079     11.89  V Q       |         |         |
|
   3+15       1.5903     11.97  V Q       |         |         |
|
   3+20       1.6731     12.02  V Q       |         |         |
|
   3+25       1.7562     12.07  |VQ       |         |         |
|
   3+30       1.8396     12.11  |VQ       |         |         |
|
   3+35       1.9233     12.15  |VQ       |         |         |
|
   3+40       2.0073     12.19  |VQ       |         |         |
|
   3+45       2.0914     12.22  |VQ       |         |         |
|
   3+50       2.1769     12.41  |VQ       |         |         |
|
   3+55       2.2673     13.13  |VQ       |         |         |
|
   4+ 0       2.3680     14.63  |VQ       |         |         |
|
   4+ 5       2.4731     15.25  |V Q      |         |         |
```

```
|
    4+10       2.5806      15.61  |V Q       |         |         |
|
    4+15       2.6899      15.86  |V Q       |         |         |
|
    4+20       2.8014      16.19  |V Q       |         |         |
|
    4+25       2.9185      17.00  |V Q       |         |         |
|
    4+30       3.0463      18.56  |V Q       |         |         |
|
    4+35       3.1786      19.21  |V Q       |         |         |
|
    4+40       3.3134      19.58  |V Q       |         |         |
|
    4+45       3.4501      19.84  |V Q       |         |         |
|
    4+50       3.5891      20.19  | V Q      |         |         |
|
    4+55       3.7338      21.01  | V Q      |         |         |
|
    5+ 0       3.8892      22.57  | V Q      |         |         |
|
    5+ 5       4.0469      22.90  | V Q      |         |         |
|
    5+10       4.1978      21.90  | V Q      |         |         |
|
    5+15       4.3301      19.21  | VQ       |         |         |
|
    5+20       4.4566      18.36  | VQ       |         |         |
|
    5+25       4.5841      18.52  | VQ       |         |         |
|
    5+30       4.7194      19.64  | VQ       |         |         |
|
    5+35       4.8582      20.15  | V Q      |         |         |
|
    5+40       5.0030      21.03  | V Q      |         |         |
|
    5+45       5.1591      22.65  | V Q      |         |         |
|
    5+50       5.3202      23.39  |  VQ      |         |         |
|
    5+55       5.4842      23.82  |  VQ      |         |         |
|
    6+ 0       5.6501      24.10  |  VQ      |         |         |
|
    6+ 5       5.8183      24.42  |  VQ      |         |         |
|
    6+10       5.9921      25.23  |  V Q     |         |         |
|
    6+15       6.1767      26.79  |  V Q     |         |         |
|
    6+20       6.3657      27.45  |  V Q     |         |         |
|
    6+25       6.5574      27.84  |  V Q     |         |         |
|
    6+30       6.7509      28.10  |  V Q     |         |         |
|
    6+35       6.9468      28.44  |  V Q     |         |         |
```

```
|
    6+40       7.1483     29.26  |   VQ    |         |         |
|
    6+45       7.3605     30.82  |   V Q   |         |         |
|
    6+50       7.5772     31.46  |   V Q   |         |         |
|
    6+55       7.7965     31.84  |   V Q   |         |         |
|
    7+ 0       8.0175     32.09  |   V Q   |         |         |
|
    7+ 5       8.2398     32.28  |   V Q   |         |         |
|
    7+10       8.4631     32.41  |   V Q   |         |         |
|
    7+15       8.6868     32.49  |   V Q   |         |         |
|
    7+20       8.9120     32.70  |    VQ   |         |         |
|
    7+25       9.1423     33.43  |    VQ   |         |         |
|
    7+30       9.3829     34.94  |    VQ   |         |         |
|
    7+35       9.6290     35.73  |    V Q  |         |         |
|
    7+40       9.8824     36.79  |    V Q  |         |         |
|
    7+45      10.1476     38.51  |    V Q  |         |         |
|
    7+50      10.4192     39.43  |    V Q  |         |         |
|
    7+55      10.6987     40.58  |     V Q |         |         |
|
    8+ 0      10.9903     42.35  |     V Q |         |         |
|
    8+ 5      11.2895     43.45  |     V Q |         |         |
|
    8+10      11.6015     45.30  |     V  Q|         |         |
|
    8+15      11.9359     48.55  |     V  Q|         |         |
|
    8+20      12.2799     49.95  |      V Q|         |         |
|
    8+25      12.6295     50.76  |      V  Q         |         |
|
    8+30      12.9827     51.29  |      V  Q         |         |
|
    8+35      13.3395     51.80  |      V  Q         |         |
|
    8+40      13.7026     52.73  |      V  Q         |         |
|
    8+45      14.0770     54.35  |       V Q         |         |
|
    8+50      14.4571     55.19  |       V |Q        |         |
|
    8+55      14.8446     56.28  |       V |Q        |         |
|
    9+ 0      15.2442     58.02  |       V |Q        |         |
|
    9+ 5      15.6514     59.13  |       V |Q        |         |
```

```
|
    9+10      16.0714     60.97  |        V| Q       |         |
|
    9+15      16.5137     64.22  |        V| Q       |         |
|
    9+20      16.9666     65.76  |        V|  Q      |         |
|
    9+25      17.4298     67.25  |        V|  Q      |         |
|
    9+30      17.9067     69.25  |         V  Q      |         |
|
    9+35      18.3913     70.36  |         V   Q     |         |
|
    9+40      18.8845     71.62  |         V   Q     |         |
|
    9+45      19.3904     73.46  |         |V  Q     |         |
|
    9+50      19.9031     74.44  |         |V  Q     |         |
|
    9+55      20.4239     75.62  |         |V   Q    |         |
|
   10+ 0      20.9571     77.42  |         |V   Q    |         |
|
   10+ 5      21.4884     77.15  |         | V  Q    |         |
|
   10+10      21.9898     72.81  |         | V Q     |         |
|
   10+15      22.4224     62.80  |         | Q       |         |
|
   10+20      22.8276     58.85  |         |Q V      |         |
|
   10+25      23.2179     56.67  |         |Q V      |         |
|
   10+30      23.5983     55.24  |         |Q V      |         |
|
   10+35      23.9774     55.04  |         |Q V      |         |
|
   10+40      24.3760     57.88  |         |Q V      |         |
|
   10+45      24.8230     64.92  |         | Q V     |         |
|
   10+50      25.2897     67.76  |         |  QV     |         |
|
   10+55      25.7672     69.33  |         |  QV     |         |
|
   11+ 0      26.2518     70.36  |         |   Q     |         |
|
   11+ 5      26.7400     70.87  |         |   QV    |         |
|
   11+10      27.2263     70.62  |         |   QV    |         |
|
   11+15      27.7043     69.41  |         |  Q V    |         |
|
   11+20      28.1792     68.95  |         |  Q  V   |         |
|
   11+25      28.6525     68.73  |         |  Q  V   |         |
|
   11+30      29.1249     68.59  |         |  Q  V   |         |
|
   11+35      29.5948     68.22  |         |  Q  V   |         |
```

```
|
   11+40      30.0549     66.81  |         |  Q   V  |         |
|
   11+45      30.4947     63.86  |         | Q    V  |         |
|
   11+50      30.9274     62.82  |         | Q    V  |         |
|
   11+55      31.3602     62.85  |         | Q    V  |         |
|
   12+ 0      31.8003     63.90  |         | Q     V |         |
|
   12+ 5      32.2500     65.29  |         |  Q    V |         |
|
   12+10      32.7340     70.28  |         |   Q   V |         |
|
   12+15      33.2900     80.73  |         |     Q V |         |
|
   12+20      33.8765     85.17  |         |      Q V|         |
|
   12+25      34.4844     88.26  |         |      Q V|         |
|
   12+30      35.1132     91.31  |         |       Q V         |
|
   12+35      35.7555     93.26  |         |       Q V         |
|
   12+40      36.4143     95.66  |         |        QV         |
|
   12+45      37.0977     99.22  |         |        Q|V        |
|
   12+50      37.7926    100.91  |         |         QV        |
|
   12+55      38.4986    102.51  |         |         QV        |
|
   13+ 0      39.2188    104.58  |         |         Q V       |
|
   13+ 5      39.9515    106.38  |         |         |QV       |
|
   13+10      40.7121    110.44  |         |         | QV      |
|
   13+15      41.5262    118.20  |         |         |  Q      |
|
   13+20      42.3623    121.41  |         |         |   Q     |
|
   13+25      43.2109    123.22  |         |         |   Q     |
|
   13+30      44.0678    124.41  |         |         |   QV    |
|
   13+35      44.9184    123.52  |         |         |   QV    |
|
   13+40      45.7205    116.46  |         |         |  Q  V   |
|
   13+45      46.4130    100.55  |         |         Q     V   |
|
   13+50      47.0614     94.15  |         |       Q |     V   |
|
   13+55      47.6855     90.62  |         |       Q |      V  |
|
   14+ 0      48.2937     88.31  |         |      Q  |      V  |
|
   14+ 5      48.8956     87.40  |         |      Q  |      V  |
```

```
|
   14+10      49.5098     89.18  |         |      Q  |       V |
|
   14+15      50.1608     94.53  |         |       Q |       V |
|
   14+20      50.8256     96.52  |         |        Q|       V |
|
   14+25      51.4935     96.99  |         |        Q|        V|
|
   14+30      52.1566     96.27  |         |        Q|        V|
|
   14+35      52.8186     96.14  |         |        Q|         V
|
   14+40      53.4806     96.11  |         |        Q|         V
|
   14+45      54.1422     96.08  |         |        Q|         V
|
   14+50      54.8026     95.89  |         |        Q|         |V
|
   14+55      55.4582     95.19  |         |        Q|         |V
|
   15+ 0      56.1037     93.73  |         |       Q |         |V
|
   15+ 5      56.7444     93.03  |         |       Q |         | V
|
   15+10      57.3783     92.04  |         |       Q |         | V
|
   15+15      58.0007     90.37  |         |       Q |         |  V
|
   15+20      58.6170     89.48  |         |      Q  |         |  V
|
   15+25      59.2257     88.38  |         |      Q  |         |  V
|
   15+30      59.8224     86.65  |         |      Q  |         |   V
|
   15+35      60.4098     85.28  |         |      Q  |         |   V
|
   15+40      60.9752     82.10  |         |     Q   |         |   V
|
   15+45      61.4981     75.93  |         |    Q    |         |    V
|
   15+50      62.0036     73.39  |         |   Q     |         |    V
|
   15+55      62.4992     71.96  |         |   Q     |         |    V
|
   16+ 0      62.9884     71.04  |         |   Q     |         |    V
|
   16+ 5      63.4574     68.11  |         |  Q      |         |     V
|
   16+10      63.8526     57.38  |         |Q        |         |     V
|
   16+15      64.0941     35.05  |      Q  |         |         |     V
|
   16+20      64.2734     26.04  |    Q    |         |         |     V
|
   16+25      64.4181     21.00  |   Q     |         |         |     V
|
   16+30      64.5400     17.70  |  Q      |         |         |     V
|
   16+35      64.6454     15.30  |  Q      |         |         |     V
```

```
|
   16+40      64.7362     13.18  | Q       |         |         |     V
|
   16+45      64.8113     10.91  | Q       |         |         |     V
|
   16+50      64.8801      9.99  |Q        |         |         |      V
|
   16+55      64.9449      9.41  |Q        |         |         |      V
|
   17+ 0      65.0070      9.02  |Q        |         |         |      V
|
   17+ 5      65.0690      9.00  |Q        |         |         |      V
|
   17+10      65.1392     10.18  | Q       |         |         |      V
|
   17+15      65.2289     13.03  | Q       |         |         |      V
|
   17+20      65.3267     14.21  | Q       |         |         |      V
|
   17+25      65.4292     14.87  | Q       |         |         |      V
|
   17+30      65.5346     15.31  |  Q      |         |         |      V
|
   17+35      65.6421     15.61  |  Q      |         |         |      V
|
   17+40      65.7509     15.80  |  Q      |         |         |      V
|
   17+45      65.8606     15.92  |  Q      |         |         |      V
|
   17+50      65.9696     15.83  |  Q      |         |         |      V
|
   17+55      66.0742     15.19  |  Q      |         |         |      V
|
   18+ 0      66.1689     13.75  | Q       |         |         |      V
|
   18+ 5      66.2599     13.20  | Q       |         |         |      V
|
   18+10      66.3487     12.90  | Q       |         |         |      V
|
   18+15      66.4362     12.71  | Q       |         |         |      V
|
   18+20      66.5228     12.57  | Q       |         |         |      V
|
   18+25      66.6089     12.50  | Q       |         |         |      V
|
   18+30      66.6947     12.46  | Q       |         |         |       V
|
   18+35      66.7793     12.29  | Q       |         |         |       V
|
   18+40      66.8592     11.60  | Q       |         |         |       V
|
   18+45      66.9290     10.13  | Q       |         |         |       V
|
   18+50      66.9936      9.38  |Q        |         |         |       V
|
   18+55      67.0512      8.36  |Q        |         |         |       V
|
   19+ 0      67.0972      6.68  |Q        |         |         |       V
|
   19+ 5      67.1393      6.11  |Q        |         |         |       V
```

```
|
   19+10      67.1832       6.38  |Q         |         |         |       V
|
   19+15      67.2356       7.60  |Q         |         |         |       V
|
   19+20      67.2920       8.19  |Q         |         |         |       V
|
   19+25      67.3548       9.12  |Q         |         |         |       V
|
   19+30      67.4289      10.76  | Q        |         |         |       V
|
   19+35      67.5069      11.32  | Q        |         |         |       V
|
   19+40      67.5830      11.05  | Q        |         |         |       V
|
   19+45      67.6507       9.84  |Q         |         |         |       V
|
   19+50      67.7145       9.26  |Q         |         |         |       V
|
   19+55      67.7720       8.35  |Q         |         |         |       V
|
   20+ 0      67.8184       6.73  |Q         |         |         |       V
|
   20+ 5      67.8610       6.20  |Q         |         |         |       V
|
   20+10      67.9058       6.50  |Q         |         |         |       V
|
   20+15      67.9590       7.73  |Q         |         |         |       V
|
   20+20      68.0153       8.18  |Q         |         |         |       V
|
   20+25      68.0733       8.42  |Q         |         |         |       V
|
   20+30      68.1324       8.59  |Q         |         |         |       V
|
   20+35      68.1924       8.71  |Q         |         |         |       V
|
   20+40      68.2529       8.79  |Q         |         |         |       V
|
   20+45      68.3138       8.84  |Q         |         |         |       V
|
   20+50      68.3737       8.70  |Q         |         |         |       V
|
   20+55      68.4291       8.03  |Q         |         |         |
V|
   21+ 0      68.4744       6.58  |Q         |         |         |
V|
   21+ 5      68.5168       6.16  |Q         |         |         |
V|
   21+10      68.5618       6.54  |Q         |         |         |
V|
   21+15      68.6156       7.81  |Q         |         |         |
V|
   21+20      68.6714       8.11  |Q         |         |         |
V|
   21+25      68.7243       7.67  |Q         |         |         |
V|
   21+30      68.7681       6.37  |Q         |         |         |
V|
   21+35      68.8099       6.06  |Q         |         |         |
```

```
V|
    21+40       68.8547       6.51  |Q         |         |         |
V|
    21+45       68.9085       7.81  |Q         |         |         |
V|
    21+50       68.9645       8.13  |Q         |         |         |
V|
    21+55       69.0175       7.69  |Q         |         |         |
V|
    22+ 0       69.0615       6.40  |Q         |         |         |
V|
    22+ 5       69.1036       6.11  |Q         |         |         |
V|
    22+10       69.1487       6.56  |Q         |         |         |
V|
    22+15       69.2029       7.87  |Q         |         |         |
V|
    22+20       69.2592       8.18  |Q         |         |         |
V|
    22+25       69.3125       7.74  |Q         |         |         |
V|
    22+30       69.3569       6.45  |Q         |         |         |
V|
    22+35       69.3982       6.00  |Q         |         |         |
V|
    22+40       69.4379       5.76  |Q         |         |         |
V|
    22+45       69.4764       5.59  |Q         |         |         |
V|
    22+50       69.5140       5.46  |Q         |         |         |
V|
    22+55       69.5511       5.38  |Q         |         |         |
V|
    23+ 0       69.5879       5.35  |Q         |         |         |
V|
    23+ 5       69.6247       5.34  |Q         |         |         |
V|
    23+10       69.6615       5.34  |Q         |         |         |
V|
    23+15       69.6982       5.34  |Q         |         |         |
V|
    23+20       69.7349       5.33  |Q         |         |         |
V|
    23+25       69.7716       5.33  |Q         |         |         |
V|
    23+30       69.8083       5.33  |Q         |         |         |
V|
    23+35       69.8450       5.33  |Q         |         |         |
V|
    23+40       69.8817       5.33  |Q         |         |         |
V|
    23+45       69.9185       5.34  |Q         |         |         |
V|
    23+50       69.9553       5.34  |Q         |         |         |
V|
    23+55       69.9921       5.35  |Q         |         |         |
V|
    24+ 0       70.0290       5.35  |Q         |         |         |
V|
    24+ 5       70.0643       5.13  |Q         |         |         |
```

```
V|
   24+10      70.0931      4.17  Q          |          |          |
V|
   24+15      70.1077      2.12  Q          |          |          |
V|
   24+20      70.1165      1.29  Q          |          |          |
V|
   24+25      70.1222      0.82  Q          |          |          |
V|
   24+30      70.1258      0.52  Q          |          |          |
V|
   24+35      70.1280      0.32  Q          |          |          |
V|
   24+40      70.1292      0.18  Q          |          |          |
V|
   24+45      70.1300      0.11  Q          |          |          |
V|
   24+50      70.1305      0.08  Q          |          |          |
V|
   24+55      70.1309      0.05  Q          |          |          |
V|
   25+ 0      70.1311      0.04  Q          |          |          |
V|
   25+ 5      70.1312      0.02  Q          |          |          |
V|
   25+10      70.1313      0.01  Q          |          |          |
V|
-----------------------------------------------------------------------
```

```
            U n i t  H y d r o g r a p h    A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: belowcyn4pre24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Below Canyon 4 Pre Landfill
      24 hour 100 year storm event

      ------------------------------------------------------------------
--
      Drainage Area =      37.50(Ac.)  =      0.059 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      37.50(Ac.)  =
0.059 Sq. Mi.
      Length along longest watercourse =    3002.00(Ft.)
      Length along longest watercourse measured to centroid =    1079.00
(Ft.)
      Length along longest watercourse =      0.569 Mi.
      Length along longest watercourse measured to centroid =      0.204
Mi.
      Difference in elevation =     293.00(Ft.)
      Slope along watercourse =    515.3364 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.129 Hr.
      Lag time =     7.76 Min.
      25% of lag time =     1.94 Min.
      40% of lag time =     3.10 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             37.50              2.00                   75.00

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             37.50              5.50                  206.25

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          37.500           93.00         0.000
       Total Area Entered =     37.50(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %            (CFS)
      ------------------------------------------------------------------
---
          1   0.083         64.429         12.099            4.573
          2   0.167        128.858         35.395           13.377
          3   0.250        193.287         15.870            5.998
          4   0.333        257.717          8.750            3.307
          5   0.417        322.146          6.016            2.274
          6   0.500        386.575          4.248            1.605
          7   0.583        451.004          3.197            1.208
          8   0.667        515.433          2.639            0.997
          9   0.750        579.862          2.197            0.830
         10   0.833        644.291          1.891            0.714
         11   0.917        708.721          1.632            0.617
         12   1.000        773.150          1.377            0.520
         13   1.083        837.579          1.186            0.448
```

```
         14   1.167         902.008          1.160              0.438
         15   1.250         966.437          1.160              0.438
         16   1.333        1030.866          1.184              0.447
                                    Sum = 100.000   Sum=      37.793
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
  28   2.33     0.13      0.088         0.058      ---          0.03
  29   2.42     0.13      0.088         0.058      ---          0.03
  30   2.50     0.13      0.088         0.057      ---          0.03
  31   2.58     0.17      0.110         0.057      ---          0.05
  32   2.67     0.17      0.110         0.057      ---          0.05
  33   2.75     0.17      0.110         0.057      ---          0.05
  34   2.83     0.17      0.110         0.057      ---          0.05
  35   2.92     0.17      0.110         0.056      ---          0.05
  36   3.00     0.17      0.110         0.056      ---          0.05
  37   3.08     0.17      0.110         0.056      ---          0.05
  38   3.17     0.17      0.110         0.056      ---          0.05
  39   3.25     0.17      0.110         0.055      ---          0.05
  40   3.33     0.17      0.110         0.055      ---          0.05
  41   3.42     0.17      0.110         0.055      ---          0.06
  42   3.50     0.17      0.110         0.055      ---          0.06
  43   3.58     0.17      0.110         0.054      ---          0.06
  44   3.67     0.17      0.110         0.054      ---          0.06
  45   3.75     0.17      0.110         0.054      ---          0.06
  46   3.83     0.20      0.132         0.054      ---          0.08
  47   3.92     0.20      0.132         0.054      ---          0.08
  48   4.00     0.20      0.132         0.053      ---          0.08
  49   4.08     0.20      0.132         0.053      ---          0.08
  50   4.17     0.20      0.132         0.053      ---          0.08
  51   4.25     0.20      0.132         0.053      ---          0.08
```

```
  52   4.33     0.23      0.154         0.052      ---          0.10
  53   4.42     0.23      0.154         0.052      ---          0.10
  54   4.50     0.23      0.154         0.052      ---          0.10
  55   4.58     0.23      0.154         0.052      ---          0.10
  56   4.67     0.23      0.154         0.052      ---          0.10
  57   4.75     0.23      0.154         0.051      ---          0.10
  58   4.83     0.27      0.176         0.051      ---          0.12
  59   4.92     0.27      0.176         0.051      ---          0.13
  60   5.00     0.27      0.176         0.051      ---          0.13
  61   5.08     0.20      0.132         0.050      ---          0.08
  62   5.17     0.20      0.132         0.050      ---          0.08
  63   5.25     0.20      0.132         0.050      ---          0.08
  64   5.33     0.23      0.154         0.050      ---          0.10
  65   5.42     0.23      0.154         0.050      ---          0.10
  66   5.50     0.23      0.154         0.049      ---          0.10
  67   5.58     0.27      0.176         0.049      ---          0.13
  68   5.67     0.27      0.176         0.049      ---          0.13
  69   5.75     0.27      0.176         0.049      ---          0.13
  70   5.83     0.27      0.176         0.048      ---          0.13
  71   5.92     0.27      0.176         0.048      ---          0.13
  72   6.00     0.27      0.176         0.048      ---          0.13
  73   6.08     0.30      0.198         0.048      ---          0.15
  74   6.17     0.30      0.198         0.048      ---          0.15
  75   6.25     0.30      0.198         0.047      ---          0.15
  76   6.33     0.30      0.198         0.047      ---          0.15
  77   6.42     0.30      0.198         0.047      ---          0.15
  78   6.50     0.30      0.198         0.047      ---          0.15
  79   6.58     0.33      0.220         0.047      ---          0.17
  80   6.67     0.33      0.220         0.046      ---          0.17
  81   6.75     0.33      0.220         0.046      ---          0.17
  82   6.83     0.33      0.220         0.046      ---          0.17
  83   6.92     0.33      0.220         0.046      ---          0.17
  84   7.00     0.33      0.220         0.046      ---          0.17
  85   7.08     0.33      0.220         0.045      ---          0.17
  86   7.17     0.33      0.220         0.045      ---          0.17
  87   7.25     0.33      0.220         0.045      ---          0.18
  88   7.33     0.37      0.242         0.045      ---          0.20
  89   7.42     0.37      0.242         0.044      ---          0.20
  90   7.50     0.37      0.242         0.044      ---          0.20
  91   7.58     0.40      0.264         0.044      ---          0.22
  92   7.67     0.40      0.264         0.044      ---          0.22
  93   7.75     0.40      0.264         0.044      ---          0.22
  94   7.83     0.43      0.286         0.043      ---          0.24
  95   7.92     0.43      0.286         0.043      ---          0.24
  96   8.00     0.43      0.286         0.043      ---          0.24
  97   8.08     0.50      0.330         0.043      ---          0.29
  98   8.17     0.50      0.330         0.043      ---          0.29
  99   8.25     0.50      0.330         0.042      ---          0.29
 100   8.33     0.50      0.330         0.042      ---          0.29
 101   8.42     0.50      0.330         0.042      ---          0.29
 102   8.50     0.50      0.330         0.042      ---          0.29
 103   8.58     0.53      0.352         0.042      ---          0.31
 104   8.67     0.53      0.352         0.041      ---          0.31
 105   8.75     0.53      0.352         0.041      ---          0.31
 106   8.83     0.57      0.374         0.041      ---          0.33
 107   8.92     0.57      0.374         0.041      ---          0.33
 108   9.00     0.57      0.374         0.041      ---          0.33
 109   9.08     0.63      0.418         0.041      ---          0.38
 110   9.17     0.63      0.418         0.040      ---          0.38
 111   9.25     0.63      0.418         0.040      ---          0.38
```

```
112   9.33     0.67      0.440        0.040      ---        0.40
113   9.42     0.67      0.440        0.040      ---        0.40
114   9.50     0.67      0.440        0.040      ---        0.40
115   9.58     0.70      0.462        0.039      ---        0.42
116   9.67     0.70      0.462        0.039      ---        0.42
117   9.75     0.70      0.462        0.039      ---        0.42
118   9.83     0.73      0.484        0.039      ---        0.45
119   9.92     0.73      0.484        0.039      ---        0.45
120  10.00     0.73      0.484        0.038      ---        0.45
121  10.08     0.50      0.330        0.038      ---        0.29
122  10.17     0.50      0.330        0.038      ---        0.29
123  10.25     0.50      0.330        0.038      ---        0.29
124  10.33     0.50      0.330        0.038      ---        0.29
125  10.42     0.50      0.330        0.038      ---        0.29
126  10.50     0.50      0.330        0.037      ---        0.29
127  10.58     0.67      0.440        0.037      ---        0.40
128  10.67     0.67      0.440        0.037      ---        0.40
129  10.75     0.67      0.440        0.037      ---        0.40
130  10.83     0.67      0.440        0.037      ---        0.40
131  10.92     0.67      0.440        0.036      ---        0.40
132  11.00     0.67      0.440        0.036      ---        0.40
133  11.08     0.63      0.418        0.036      ---        0.38
134  11.17     0.63      0.418        0.036      ---        0.38
135  11.25     0.63      0.418        0.036      ---        0.38
136  11.33     0.63      0.418        0.036      ---        0.38
137  11.42     0.63      0.418        0.035      ---        0.38
138  11.50     0.63      0.418        0.035      ---        0.38
139  11.58     0.57      0.374        0.035      ---        0.34
140  11.67     0.57      0.374        0.035      ---        0.34
141  11.75     0.57      0.374        0.035      ---        0.34
142  11.83     0.60      0.396        0.034      ---        0.36
143  11.92     0.60      0.396        0.034      ---        0.36
144  12.00     0.60      0.396        0.034      ---        0.36
145  12.08     0.83      0.550        0.034      ---        0.52
146  12.17     0.83      0.550        0.034      ---        0.52
147  12.25     0.83      0.550        0.034      ---        0.52
148  12.33     0.87      0.572        0.033      ---        0.54
149  12.42     0.87      0.572        0.033      ---        0.54
150  12.50     0.87      0.572        0.033      ---        0.54
151  12.58     0.93      0.616        0.033      ---        0.58
152  12.67     0.93      0.616        0.033      ---        0.58
153  12.75     0.93      0.616        0.033      ---        0.58
154  12.83     0.97      0.638        0.032      ---        0.61
155  12.92     0.97      0.638        0.032      ---        0.61
156  13.00     0.97      0.638        0.032      ---        0.61
157  13.08     1.13      0.748        0.032      ---        0.72
158  13.17     1.13      0.748        0.032      ---        0.72
159  13.25     1.13      0.748        0.032      ---        0.72
160  13.33     1.13      0.748        0.031      ---        0.72
161  13.42     1.13      0.748        0.031      ---        0.72
162  13.50     1.13      0.748        0.031      ---        0.72
163  13.58     0.77      0.506        0.031      ---        0.47
164  13.67     0.77      0.506        0.031      ---        0.48
165  13.75     0.77      0.506        0.031      ---        0.48
166  13.83     0.77      0.506        0.031      ---        0.48
167  13.92     0.77      0.506        0.030      ---        0.48
168  14.00     0.77      0.506        0.030      ---        0.48
169  14.08     0.90      0.594        0.030      ---        0.56
170  14.17     0.90      0.594        0.030      ---        0.56
171  14.25     0.90      0.594        0.030      ---        0.56
```

```
172  14.33     0.87      0.572         0.030      ---          0.54
173  14.42     0.87      0.572         0.029      ---          0.54
174  14.50     0.87      0.572         0.029      ---          0.54
175  14.58     0.87      0.572         0.029      ---          0.54
176  14.67     0.87      0.572         0.029      ---          0.54
177  14.75     0.87      0.572         0.029      ---          0.54
178  14.83     0.83      0.550         0.029      ---          0.52
179  14.92     0.83      0.550         0.029      ---          0.52
180  15.00     0.83      0.550         0.028      ---          0.52
181  15.08     0.80      0.528         0.028      ---          0.50
182  15.17     0.80      0.528         0.028      ---          0.50
183  15.25     0.80      0.528         0.028      ---          0.50
184  15.33     0.77      0.506         0.028      ---          0.48
185  15.42     0.77      0.506         0.028      ---          0.48
186  15.50     0.77      0.506         0.028      ---          0.48
187  15.58     0.63      0.418         0.027      ---          0.39
188  15.67     0.63      0.418         0.027      ---          0.39
189  15.75     0.63      0.418         0.027      ---          0.39
190  15.83     0.63      0.418         0.027      ---          0.39
191  15.92     0.63      0.418         0.027      ---          0.39
192  16.00     0.63      0.418         0.027      ---          0.39
193  16.08     0.13      0.088         0.027      ---          0.06
194  16.17     0.13      0.088         0.026      ---          0.06
195  16.25     0.13      0.088         0.026      ---          0.06
196  16.33     0.13      0.088         0.026      ---          0.06
197  16.42     0.13      0.088         0.026      ---          0.06
198  16.50     0.13      0.088         0.026      ---          0.06
199  16.58     0.10      0.066         0.026      ---          0.04
200  16.67     0.10      0.066         0.026      ---          0.04
201  16.75     0.10      0.066         0.026      ---          0.04
202  16.83     0.10      0.066         0.025      ---          0.04
203  16.92     0.10      0.066         0.025      ---          0.04
204  17.00     0.10      0.066         0.025      ---          0.04
205  17.08     0.17      0.110         0.025      ---          0.08
206  17.17     0.17      0.110         0.025      ---          0.09
207  17.25     0.17      0.110         0.025      ---          0.09
208  17.33     0.17      0.110         0.025      ---          0.09
209  17.42     0.17      0.110         0.025      ---          0.09
210  17.50     0.17      0.110         0.024      ---          0.09
211  17.58     0.17      0.110         0.024      ---          0.09
212  17.67     0.17      0.110         0.024      ---          0.09
213  17.75     0.17      0.110         0.024      ---          0.09
214  17.83     0.13      0.088         0.024      ---          0.06
215  17.92     0.13      0.088         0.024      ---          0.06
216  18.00     0.13      0.088         0.024      ---          0.06
217  18.08     0.13      0.088         0.024      ---          0.06
218  18.17     0.13      0.088         0.023      ---          0.06
219  18.25     0.13      0.088         0.023      ---          0.06
220  18.33     0.13      0.088         0.023      ---          0.06
221  18.42     0.13      0.088         0.023      ---          0.06
222  18.50     0.13      0.088         0.023      ---          0.07
223  18.58     0.10      0.066         0.023      ---          0.04
224  18.67     0.10      0.066         0.023      ---          0.04
225  18.75     0.10      0.066         0.023      ---          0.04
226  18.83     0.07      0.044         0.023      ---          0.02
227  18.92     0.07      0.044         0.022      ---          0.02
228  19.00     0.07      0.044         0.022      ---          0.02
229  19.08     0.10      0.066         0.022      ---          0.04
230  19.17     0.10      0.066         0.022      ---          0.04
231  19.25     0.10      0.066         0.022      ---          0.04
```

```
232  19.33     0.13      0.088         0.022      ---          0.07
233  19.42     0.13      0.088         0.022      ---          0.07
234  19.50     0.13      0.088         0.022      ---          0.07
235  19.58     0.10      0.066         0.022      ---          0.04
236  19.67     0.10      0.066         0.022      ---          0.04
237  19.75     0.10      0.066         0.021      ---          0.04
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      37.5(Ac.)/[(In)/(Ft.)] =      14.5(Ac.Ft)
```

```
      Total soil loss =      0.87(In)
      Total soil loss =     2.712(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      630500.0 Cubic Feet
      Total soil loss =      118132.7 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     26.184(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0001      0.02  Q         |         |         |
|
    0+10       0.0007      0.08  Q         |         |         |
|
    0+15       0.0014      0.11  Q         |         |         |
|
    0+20       0.0022      0.11  Q         |         |         |
|
    0+25       0.0028      0.09  Q         |         |         |
|
    0+30       0.0034      0.09  Q         |         |         |
|
    0+35       0.0041      0.09  Q         |         |         |
|
    0+40       0.0048      0.10  Q         |         |         |
|
    0+45       0.0055      0.11  Q         |         |         |
|
    0+50       0.0070      0.22  Q         |         |         |
|
    0+55       0.0106      0.52  Q         |         |         |
|
    1+ 0       0.0151      0.66  Q         |         |         |
|
    1+ 5       0.0195      0.64  Q         |         |         |
|
    1+10       0.0223      0.41  Q         |         |         |
|
    1+15       0.0245      0.32  Q         |         |         |
|
    1+20       0.0265      0.28  Q         |         |         |
|
    1+25       0.0283      0.26  Q         |         |         |
|
    1+30       0.0300      0.25  Q         |         |         |
|
```

```
    1+35       0.0318      0.25  Q         |         |         |
|
    1+40       0.0335      0.25  Q         |         |         |
|
    1+45       0.0352      0.25  Q         |         |         |
|
    1+50       0.0377      0.36  Q         |         |         |
|
    1+55       0.0422      0.66  Q         |         |         |
|
    2+ 0       0.0477      0.80  VQ        |         |         |
|
    2+ 5       0.0538      0.88  VQ        |         |         |
|
    2+10       0.0601      0.93  VQ        |         |         |
|
    2+15       0.0668      0.96  VQ        |         |         |
|
    2+20       0.0736      0.99  VQ        |         |         |
|
    2+25       0.0806      1.02  VQ        |         |         |
|
    2+30       0.0878      1.05  VQ        |         |         |
|
    2+35       0.0959      1.17  VQ        |         |         |
|
    2+40       0.1061      1.49  VQ        |         |         |
|
    2+45       0.1174      1.64  V Q       |         |         |
|
    2+50       0.1293      1.73  V Q       |         |         |
|
    2+55       0.1418      1.80  V Q       |         |         |
|
    3+ 0       0.1545      1.85  V Q       |         |         |
|
    3+ 5       0.1676      1.90  V Q       |         |         |
|
    3+10       0.1809      1.93  V Q       |         |         |
|
    3+15       0.1944      1.96  V Q       |         |         |
|
    3+20       0.2081      1.98  V Q       |         |         |
|
    3+25       0.2219      2.00  V Q       |         |         |
|
    3+30       0.2358      2.03  V Q       |         |         |
|
    3+35       0.2499      2.04  V Q       |         |         |
|
    3+40       0.2641      2.06  V Q       |         |         |
|
    3+45       0.2784      2.08  V Q       |         |         |
|
    3+50       0.2936      2.20  V Q       |         |         |
|
    3+55       0.3108      2.50  V  Q      |         |         |
|
    4+ 0       0.3290      2.64  V  Q      |         |         |
|
```

```
       4+ 5        0.3478       2.72  V  Q       |         |         |
 |
       4+10        0.3669       2.78  |V Q       |         |         |
 |
       4+15        0.3864       2.83  |V Q       |         |         |
 |
       4+20        0.4068       2.96  |V Q       |         |         |
 |
       4+25        0.4295       3.29  |V  Q      |         |         |
 |
       4+30        0.4532       3.45  |V  Q      |         |         |
 |
       4+35        0.4776       3.54  |V  Q      |         |         |
 |
       4+40        0.5025       3.62  |V  Q      |         |         |
 |
       4+45        0.5278       3.67  |V  Q      |         |         |
 |
       4+50        0.5541       3.82  |V   Q     |         |         |
 |
       4+55        0.5827       4.15  |V   Q     |         |         |
 |
       5+ 0        0.6124       4.32  |V   Q     |         |         |
 |
       5+ 5        0.6415       4.22  |V   Q     |         |         |
 |
       5+10        0.6670       3.71  |V  Q      |         |         |
 |
       5+15        0.6911       3.50  |V  Q      |         |         |
 |
       5+20        0.7152       3.50  |V  Q      |         |         |
 |
       5+25        0.7409       3.73  | V Q      |         |         |
 |
       5+30        0.7673       3.83  | V  Q     |         |         |
 |
       5+35        0.7948       3.98  | V  Q     |         |         |
 |
       5+40        0.8244       4.31  | V  Q     |         |         |
 |
       5+45        0.8551       4.46  | V  Q     |         |         |
 |
       5+50        0.8864       4.54  | V   Q    |         |         |
 |
       5+55        0.9181       4.61  | V   Q    |         |         |
 |
       6+ 0        0.9502       4.65  | V   Q    |         |         |
 |
       6+ 5        0.9832       4.80  | V   Q    |         |         |
 |
       6+10        1.0184       5.11  | V   Q    |         |         |
 |
       6+15        1.0547       5.27  | V    Q   |         |         |
 |
       6+20        1.0916       5.35  |  V   Q   |         |         |
 |
       6+25        1.1290       5.43  |  V   Q   |         |         |
 |
       6+30        1.1668       5.50  |  V   Q   |         |         |
 |
```

```
    6+35       1.2058      5.65  |  V   Q  |         |         |
|
    6+40       1.2470      5.99  |  V   Q  |         |         |
|
    6+45       1.2894      6.15  |  V    Q |         |         |
|
    6+50       1.3325      6.26  |  V    Q |         |         |
|
    6+55       1.3761      6.33  |  V    Q |         |         |
|
    7+ 0       1.4201      6.39  |  V    Q |         |         |
|
    7+ 5       1.4644      6.43  |   V   Q |         |         |
|
    7+10       1.5090      6.47  |   V   Q |         |         |
|
    7+15       1.5538      6.51  |   V   Q |         |         |
|
    7+20       1.5995      6.64  |   V   Q |         |         |
|
    7+25       1.6474      6.96  |   V    Q|         |         |
|
    7+30       1.6964      7.11  |   V    Q|         |         |
|
    7+35       1.7466      7.30  |   V    Q|         |         |
|
    7+40       1.7994      7.66  |   V     Q         |         |
|
    7+45       1.8534      7.85  |    V    Q         |         |
|
    7+50       1.9090      8.06  |    V    Q         |         |
|
    7+55       1.9671      8.44  |    V    |Q        |         |
|
    8+ 0       2.0265      8.63  |    V    |Q        |         |
|
    8+ 5       2.0882      8.95  |    V    |Q        |         |
|
    8+10       2.1545      9.64  |    V    | Q       |         |
|
    8+15       2.2232      9.97  |     V   |  Q      |         |
|
    8+20       2.2933     10.18  |     V   |  Q      |         |
|
    8+25       2.3645     10.33  |     V   |  Q      |         |
|
    8+30       2.4364     10.45  |     V   |  Q      |         |
|
    8+35       2.5097     10.65  |     V   |   Q     |         |
|
    8+40       2.5856     11.01  |      V  |   Q     |         |
|
    8+45       2.6628     11.21  |      V  |   Q     |         |
|
    8+50       2.7416     11.44  |      V  |    Q    |         |
|
    8+55       2.8231     11.83  |      V  |    Q    |         |
|
    9+ 0       2.9060     12.04  |       V |     Q   |         |
|
```

```
    9+ 5       2.9913     12.38  |       V |     Q   |         |
|
    9+10       3.0813     13.06  |       V |      Q  |         |
|
    9+15       3.1736     13.41  |       V |      Q  |         |
|
    9+20       3.2681     13.72  |        V|       Q |         |
|
    9+25       3.3657     14.16  |        V|       Q |         |
|
    9+30       3.4648     14.40  |        V|        Q|         |
|
    9+35       3.5658     14.66  |        V|        Q|         |
|
    9+40       3.6697     15.08  |         V         Q         |
|
    9+45       3.7751     15.31  |         V         Q         |
|
    9+50       3.8823     15.57  |         V         Q         |
|
    9+55       3.9924     15.98  |         |V        |Q        |
|
   10+ 0       4.1040     16.21  |         |V        |Q        |
|
   10+ 5       4.2118     15.65  |         |V        Q         |
|
   10+10       4.3062     13.70  |         |V      Q |         |
|
   10+15       4.3948     12.87  |         | V    Q  |         |
|
   10+20       4.4805     12.44  |         | V   Q   |         |
|
   10+25       4.5642     12.14  |         | V   Q   |         |
|
   10+30       4.6464     11.94  |         | V  Q    |         |
|
   10+35       4.7311     12.30  |         |  V  Q   |         |
|
   10+40       4.8251     13.65  |         |  V    Q |         |
|
   10+45       4.9230     14.21  |         |  V    Q |         |
|
   10+50       5.0228     14.49  |         |  V     Q|         |
|
   10+55       5.1238     14.66  |         |   V    Q|         |
|
   11+ 0       5.2255     14.78  |         |   V    Q|         |
|
   11+ 5       5.3271     14.75  |         |   V    Q|         |
|
   11+10       5.4271     14.51  |         |   V    Q|         |
|
   11+15       5.5263     14.41  |         |    V   Q|         |
|
   11+20       5.6251     14.35  |         |    V   Q|         |
|
   11+25       5.7241     14.38  |         |    V   Q|         |
|
   11+30       5.8233     14.41  |         |     V  Q|         |
|
```

```
   11+35       5.9214     14.23  |         |     V Q |         |
|
   11+40       6.0156     13.68  |         |     V Q |         |
|
   11+45       6.1082     13.45  |         |     VQ  |         |
|
   11+50       6.2008     13.44  |         |      Q  |         |
|
   11+55       6.2947     13.63  |         |      VQ |         |
|
   12+ 0       6.3890     13.69  |         |      VQ |         |
|
   12+ 5       6.4882     14.41  |         |      V Q|         |
|
   12+10       6.6017     16.47  |         |       V |Q        |
|
   12+15       6.7214     17.39  |         |       V |  Q      |
|
   12+20       6.8454     18.00  |         |       V |  Q      |
|
   12+25       6.9738     18.64  |         |        V|   Q     |
|
   12+30       7.1048     19.02  |         |        V|    Q    |
|
   12+35       7.2390     19.48  |         |         V    Q    |
|
   12+40       7.3786     20.28  |         |         V      Q  |
|
   12+45       7.5212     20.70  |         |         V      Q  |
|
   12+50       7.6664     21.08  |         |         |V      Q |
|
   12+55       7.8152     21.61  |         |         |V      Q |
|
   13+ 0       7.9662     21.93  |         |         | V      Q|
|
   13+ 5       8.1223     22.66  |         |         | V       Q
|
   13+10       8.2897     24.31  |         |         | V       | Q
|
   13+15       8.4628     25.13  |         |         |  V      |  Q
|
   13+20       8.6393     25.63  |         |         |  V      |   Q
|
   13+25       8.8180     25.95  |         |         |   V     |   Q
|
   13+30       8.9984     26.18  |         |         |   V     |   Q
|
   13+35       9.1723     25.26  |         |         |    V    |  Q
|
   13+40       9.3250     22.17  |         |         |    V   Q|
|
   13+45       9.4686     20.85  |         |         |     VQ  |
|
   13+50       9.6075     20.16  |         |         |     Q   |
|
   13+55       9.7431     19.69  |         |         |     Q   |
|
   14+ 0       9.8765     19.38  |         |         |    Q V  |
|
```

```
   14+ 5      10.0112     19.55  |         |         |     QV  |
|
   14+10      10.1527     20.54  |         |         |      QV |
|
   14+15      10.2968     20.92  |         |         |      QV |
|
   14+20      10.4414     21.00  |         |         |      QV |
|
   14+25      10.5844     20.76  |         |         |      Q V|
|
   14+30      10.7266     20.65  |         |         |      Q V|
|
   14+35      10.8683     20.58  |         |         |      Q  V
|
   14+40      11.0096     20.52  |         |         |      Q  V
|
   14+45      11.1505     20.45  |         |         |      Q  V
|
   14+50      11.2902     20.29  |         |         |      Q  |V
|
   14+55      11.4281     20.03  |         |         |     Q   |V
|
   15+ 0      11.5654     19.93  |         |         |     Q   |V
|
   15+ 5      11.7017     19.79  |         |         |     Q   | V
|
   15+10      11.8358     19.47  |         |         |    Q    | V
|
   15+15      11.9690     19.34  |         |         |    Q    |  V
|
   15+20      12.1010     19.17  |         |         |    Q    |  V
|
   15+25      12.2305     18.80  |         |         |    Q    |  V
|
   15+30      12.3587     18.61  |         |         |   Q     |   V
|
   15+35      12.4833     18.09  |         |         |   Q     |   V
|
   15+40      12.5993     16.83  |         |         | Q       |   V
|
   15+45      12.7112     16.25  |         |         |Q        |    V
|
   15+50      12.8207     15.91  |         |         |Q        |    V
|
   15+55      12.9286     15.67  |         |         Q         |    V
|
   16+ 0      13.0353     15.49  |         |         Q         |     V
|
   16+ 5      13.1307     13.85  |         |       Q |         |     V
|
   16+10      13.1949      9.32  |         | Q       |         |     V
|
   16+15      13.2449      7.26  |        Q|         |         |     V
|
   16+20      13.2868      6.09  |       Q |         |         |     V
|
   16+25      13.3231      5.28  |      Q  |         |         |     V
|
   16+30      13.3555      4.70  |     Q   |         |         |     V
|
```

```
   16+35      13.3841      4.15  |    Q    |         |         |     V
|
   16+40      13.4081      3.50  |   Q     |         |         |      V
|
   16+45      13.4292      3.06  |   Q     |         |         |      V
|
   16+50      13.4478      2.71  |  Q      |         |         |      V
|
   16+55      13.4648      2.46  |  Q      |         |         |      V
|
   17+ 0      13.4804      2.26  |  Q      |         |         |      V
|
   17+ 5      13.4962      2.29  |  Q      |         |         |      V
|
   17+10      13.5149      2.72  |  Q      |         |         |      V
|
   17+15      13.5344      2.83  |  Q      |         |         |      V
|
   17+20      13.5537      2.81  |  Q      |         |         |      V
|
   17+25      13.5737      2.90  |  Q      |         |         |      V
|
   17+30      13.5942      2.97  |  Q      |         |         |      V
|
   17+35      13.6150      3.02  |   Q     |         |         |      V
|
   17+40      13.6360      3.05  |   Q     |         |         |      V
|
   17+45      13.6573      3.09  |   Q     |         |         |      V
|
   17+50      13.6780      3.01  |   Q     |         |         |      V
|
   17+55      13.6969      2.75  |  Q      |         |         |      V
|
   18+ 0      13.7152      2.64  |  Q      |         |         |      V
|
   18+ 5      13.7330      2.60  |  Q      |         |         |      V
|
   18+10      13.7507      2.57  |  Q      |         |         |       V
|
   18+15      13.7684      2.56  |  Q      |         |         |       V
|
   18+20      13.7860      2.56  |  Q      |         |         |       V
|
   18+25      13.8034      2.54  |  Q      |         |         |       V
|
   18+30      13.8208      2.52  |  Q      |         |         |       V
|
   18+35      13.8374      2.41  |  Q      |         |         |       V
|
   18+40      13.8520      2.11  | Q       |         |         |       V
|
   18+45      13.8655      1.97  | Q       |         |         |       V
|
   18+50      13.8779      1.79  | Q       |         |         |       V
|
   18+55      13.8878      1.44  |Q        |         |         |       V
|
   19+ 0      13.8965      1.27  |Q        |         |         |       V
|
```

```
   19+ 5      13.9052      1.26  |Q         |         |         |       V
|
   19+10      13.9155      1.49  |Q         |         |         |       V
|
   19+15      13.9263      1.57  | Q        |         |         |       V
|
   19+20      13.9380      1.71  | Q        |         |         |       V
|
   19+25      13.9520      2.02  | Q        |         |         |       V
|
   19+30      13.9668      2.16  | Q        |         |         |       V
|
   19+35      13.9816      2.14  | Q        |         |         |       V
|
   19+40      13.9946      1.90  | Q        |         |         |       V
|
   19+45      14.0070      1.80  | Q        |         |         |       V
|
   19+50      14.0184      1.65  | Q        |         |         |       V
|
   19+55      14.0277      1.34  |Q         |         |         |       V
|
   20+ 0      14.0359      1.20  |Q         |         |         |       V
|
   20+ 5      14.0443      1.22  |Q         |         |         |       V
|
   20+10      14.0544      1.47  |Q         |         |         |       V
|
   20+15      14.0652      1.57  | Q        |         |         |       V
|
   20+20      14.0763      1.62  | Q        |         |         |       V
|
   20+25      14.0877      1.65  | Q        |         |         |       V
|
   20+30      14.0992      1.67  | Q        |         |         |       V
|
   20+35      14.1108      1.68  | Q        |         |         |       V
|
   20+40      14.1224      1.68  | Q        |         |         |
V|
   20+45      14.1340      1.69  | Q        |         |         |
V|
   20+50      14.1449      1.58  | Q        |         |         |
V|
   20+55      14.1538      1.30  |Q         |         |         |
V|
   21+ 0      14.1619      1.17  |Q         |         |         |
V|
   21+ 5      14.1702      1.20  |Q         |         |         |
V|
   21+10      14.1802      1.46  |Q         |         |         |
V|
   21+15      14.1910      1.57  | Q        |         |         |
V|
   21+20      14.2015      1.53  | Q        |         |         |
V|
   21+25      14.2102      1.26  |Q         |         |         |
V|
   21+30      14.2181      1.15  |Q         |         |         |
V|
```

```
   21+35      14.2263      1.19  |Q        |         |         |
V|
   21+40      14.2363      1.45  |Q        |         |         |
V|
   21+45      14.2470      1.55  | Q       |         |         |
V|
   21+50      14.2574      1.51  | Q       |         |         |
V|
   21+55      14.2660      1.25  |Q        |         |         |
V|
   22+ 0      14.2738      1.14  |Q        |         |         |
V|
   22+ 5      14.2819      1.18  |Q        |         |         |
V|
   22+10      14.2919      1.44  |Q        |         |         |
V|
   22+15      14.3026      1.56  | Q       |         |         |
V|
   22+20      14.3131      1.52  | Q       |         |         |
V|
   22+25      14.3218      1.26  |Q        |         |         |
V|
   22+30      14.3297      1.15  |Q        |         |         |
V|
   22+35      14.3373      1.09  |Q        |         |         |
V|
   22+40      14.3446      1.06  |Q        |         |         |
V|
   22+45      14.3518      1.05  |Q        |         |         |
V|
   22+50      14.3589      1.04  |Q        |         |         |
V|
   22+55      14.3660      1.02  |Q        |         |         |
V|
   23+ 0      14.3729      1.01  |Q        |         |         |
V|
   23+ 5      14.3797      0.99  |Q        |         |         |
V|
   23+10      14.3866      0.99  |Q        |         |         |
V|
   23+15      14.3934      0.99  |Q        |         |         |
V|
   23+20      14.4002      0.99  |Q        |         |         |
V|
   23+25      14.4070      0.98  |Q        |         |         |
V|
   23+30      14.4137      0.98  |Q        |         |         |
V|
   23+35      14.4204      0.97  |Q        |         |         |
V|
   23+40      14.4270      0.97  |Q        |         |         |
V|
   23+45      14.4337      0.97  |Q        |         |         |
V|
   23+50      14.4404      0.97  |Q        |         |         |
V|
   23+55      14.4471      0.97  |Q        |         |         |
V|
   24+ 0      14.4538      0.97  |Q        |         |         |
V|
```

```
   24+ 5      14.4597      0.86  |Q         |         |         |
V|
   24+10      14.4632      0.51  Q          |         |         |
V|
   24+15      14.4657      0.36  Q          |         |         |
V|
   24+20      14.4675      0.27  Q          |         |         |
V|
   24+25      14.4690      0.21  Q          |         |         |
V|
   24+30      14.4702      0.17  Q          |         |         |
V|
   24+35      14.4711      0.14  Q          |         |         |
V|
   24+40      14.4719      0.11  Q          |         |         |
V|
   24+45      14.4726      0.09  Q          |         |         |
V|
   24+50      14.4731      0.07  Q          |         |         |
V|
   24+55      14.4735      0.06  Q          |         |         |
V|
   25+ 0      14.4738      0.05  Q          |         |         |
V|
   25+ 5      14.4741      0.03  Q          |         |         |
V|
   25+10      14.4742      0.02  Q          |         |         |
V|
   25+15      14.4743      0.01  Q          |         |         |
V|
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h    A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: cyn5pre24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format




      ------------------------------------------------------------------
---
      Canyon 5 Prelandfill
      Badlands Landfill
      100 year 24 Hour Storm Event

      ------------------------------------------------------------------
--
      Drainage Area =      63.00(Ac.)  =      0.098 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      63.00(Ac.)  =
0.098 Sq. Mi.
      Length along longest watercourse =    3357.00(Ft.)
      Length along longest watercourse measured to centroid =    1437.00
(Ft.)
      Length along longest watercourse =      0.636 Mi.
      Length along longest watercourse measured to centroid =      0.272
Mi.
      Difference in elevation =     430.00(Ft.)
      Slope along watercourse =    676.3181 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.143 Hr.
      Lag time =     8.57 Min.
      25% of lag time =     2.14 Min.
      40% of lag time =     3.43 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             63.00             2.00                 126.00

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             63.00             5.50                 346.50

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.499(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          63.000           93.00         0.000
       Total Area Entered =     63.00(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %            (CFS)
      ------------------------------------------------------------------
---
          1   0.083          58.315        10.212              6.484
          2   0.167         116.631        33.652             21.366
          3   0.250         174.946        16.823             10.681
          4   0.333         233.261         8.910              5.657
          5   0.417         291.577         6.239              3.961
          6   0.500         349.892         4.525              2.873
          7   0.583         408.207         3.345              2.124
          8   0.667         466.523         2.660              1.689
          9   0.750         524.838         2.320              1.473
         10   0.833         583.154         1.924              1.222
         11   0.917         641.469         1.701              1.080
         12   1.000         699.784         1.483              0.942
         13   1.083         758.100         1.284              0.815
```

```
         14   1.167       816.415         1.093             0.694
         15   1.250       874.730         1.050             0.666
         16   1.333       933.046         1.050             0.666
         17   1.417       991.361         1.050             0.666
         18   1.500      1049.676         0.680             0.432
                                    Sum = 100.000   Sum=      63.492
----------------------------------------------------------------------


  Unit Time   Pattern  Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent  (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
  28   2.33     0.13      0.088         0.058      ---          0.03
  29   2.42     0.13      0.088         0.058      ---          0.03
  30   2.50     0.13      0.088         0.057      ---          0.03
  31   2.58     0.17      0.110         0.057      ---          0.05
  32   2.67     0.17      0.110         0.057      ---          0.05
  33   2.75     0.17      0.110         0.057      ---          0.05
  34   2.83     0.17      0.110         0.057      ---          0.05
  35   2.92     0.17      0.110         0.056      ---          0.05
  36   3.00     0.17      0.110         0.056      ---          0.05
  37   3.08     0.17      0.110         0.056      ---          0.05
  38   3.17     0.17      0.110         0.056      ---          0.05
  39   3.25     0.17      0.110         0.055      ---          0.05
  40   3.33     0.17      0.110         0.055      ---          0.05
  41   3.42     0.17      0.110         0.055      ---          0.06
  42   3.50     0.17      0.110         0.055      ---          0.06
  43   3.58     0.17      0.110         0.054      ---          0.06
  44   3.67     0.17      0.110         0.054      ---          0.06
  45   3.75     0.17      0.110         0.054      ---          0.06
  46   3.83     0.20      0.132         0.054      ---          0.08
  47   3.92     0.20      0.132         0.054      ---          0.08
  48   4.00     0.20      0.132         0.053      ---          0.08
  49   4.08     0.20      0.132         0.053      ---          0.08
```

```
 50   4.17     0.20      0.132         0.053      ---          0.08
 51   4.25     0.20      0.132         0.053      ---          0.08
 52   4.33     0.23      0.154         0.052      ---          0.10
 53   4.42     0.23      0.154         0.052      ---          0.10
 54   4.50     0.23      0.154         0.052      ---          0.10
 55   4.58     0.23      0.154         0.052      ---          0.10
 56   4.67     0.23      0.154         0.052      ---          0.10
 57   4.75     0.23      0.154         0.051      ---          0.10
 58   4.83     0.27      0.176         0.051      ---          0.12
 59   4.92     0.27      0.176         0.051      ---          0.13
 60   5.00     0.27      0.176         0.051      ---          0.13
 61   5.08     0.20      0.132         0.050      ---          0.08
 62   5.17     0.20      0.132         0.050      ---          0.08
 63   5.25     0.20      0.132         0.050      ---          0.08
 64   5.33     0.23      0.154         0.050      ---          0.10
 65   5.42     0.23      0.154         0.050      ---          0.10
 66   5.50     0.23      0.154         0.049      ---          0.10
 67   5.58     0.27      0.176         0.049      ---          0.13
 68   5.67     0.27      0.176         0.049      ---          0.13
 69   5.75     0.27      0.176         0.049      ---          0.13
 70   5.83     0.27      0.176         0.048      ---          0.13
 71   5.92     0.27      0.176         0.048      ---          0.13
 72   6.00     0.27      0.176         0.048      ---          0.13
 73   6.08     0.30      0.198         0.048      ---          0.15
 74   6.17     0.30      0.198         0.048      ---          0.15
 75   6.25     0.30      0.198         0.047      ---          0.15
 76   6.33     0.30      0.198         0.047      ---          0.15
 77   6.42     0.30      0.198         0.047      ---          0.15
 78   6.50     0.30      0.198         0.047      ---          0.15
 79   6.58     0.33      0.220         0.047      ---          0.17
 80   6.67     0.33      0.220         0.046      ---          0.17
 81   6.75     0.33      0.220         0.046      ---          0.17
 82   6.83     0.33      0.220         0.046      ---          0.17
 83   6.92     0.33      0.220         0.046      ---          0.17
 84   7.00     0.33      0.220         0.046      ---          0.17
 85   7.08     0.33      0.220         0.045      ---          0.17
 86   7.17     0.33      0.220         0.045      ---          0.17
 87   7.25     0.33      0.220         0.045      ---          0.18
 88   7.33     0.37      0.242         0.045      ---          0.20
 89   7.42     0.37      0.242         0.044      ---          0.20
 90   7.50     0.37      0.242         0.044      ---          0.20
 91   7.58     0.40      0.264         0.044      ---          0.22
 92   7.67     0.40      0.264         0.044      ---          0.22
 93   7.75     0.40      0.264         0.044      ---          0.22
 94   7.83     0.43      0.286         0.043      ---          0.24
 95   7.92     0.43      0.286         0.043      ---          0.24
 96   8.00     0.43      0.286         0.043      ---          0.24
 97   8.08     0.50      0.330         0.043      ---          0.29
 98   8.17     0.50      0.330         0.043      ---          0.29
 99   8.25     0.50      0.330         0.042      ---          0.29
100   8.33     0.50      0.330         0.042      ---          0.29
101   8.42     0.50      0.330         0.042      ---          0.29
102   8.50     0.50      0.330         0.042      ---          0.29
103   8.58     0.53      0.352         0.042      ---          0.31
104   8.67     0.53      0.352         0.041      ---          0.31
105   8.75     0.53      0.352         0.041      ---          0.31
106   8.83     0.57      0.374         0.041      ---          0.33
107   8.92     0.57      0.374         0.041      ---          0.33
108   9.00     0.57      0.374         0.041      ---          0.33
109   9.08     0.63      0.418         0.041      ---          0.38
```

```
110   9.17     0.63     0.418        0.040       ---          0.38
111   9.25     0.63     0.418        0.040       ---          0.38
112   9.33     0.67     0.440        0.040       ---          0.40
113   9.42     0.67     0.440        0.040       ---          0.40
114   9.50     0.67     0.440        0.040       ---          0.40
115   9.58     0.70     0.462        0.039       ---          0.42
116   9.67     0.70     0.462        0.039       ---          0.42
117   9.75     0.70     0.462        0.039       ---          0.42
118   9.83     0.73     0.484        0.039       ---          0.45
119   9.92     0.73     0.484        0.039       ---          0.45
120  10.00     0.73     0.484        0.038       ---          0.45
121  10.08     0.50     0.330        0.038       ---          0.29
122  10.17     0.50     0.330        0.038       ---          0.29
123  10.25     0.50     0.330        0.038       ---          0.29
124  10.33     0.50     0.330        0.038       ---          0.29
125  10.42     0.50     0.330        0.038       ---          0.29
126  10.50     0.50     0.330        0.037       ---          0.29
127  10.58     0.67     0.440        0.037       ---          0.40
128  10.67     0.67     0.440        0.037       ---          0.40
129  10.75     0.67     0.440        0.037       ---          0.40
130  10.83     0.67     0.440        0.037       ---          0.40
131  10.92     0.67     0.440        0.036       ---          0.40
132  11.00     0.67     0.440        0.036       ---          0.40
133  11.08     0.63     0.418        0.036       ---          0.38
134  11.17     0.63     0.418        0.036       ---          0.38
135  11.25     0.63     0.418        0.036       ---          0.38
136  11.33     0.63     0.418        0.036       ---          0.38
137  11.42     0.63     0.418        0.035       ---          0.38
138  11.50     0.63     0.418        0.035       ---          0.38
139  11.58     0.57     0.374        0.035       ---          0.34
140  11.67     0.57     0.374        0.035       ---          0.34
141  11.75     0.57     0.374        0.035       ---          0.34
142  11.83     0.60     0.396        0.034       ---          0.36
143  11.92     0.60     0.396        0.034       ---          0.36
144  12.00     0.60     0.396        0.034       ---          0.36
145  12.08     0.83     0.550        0.034       ---          0.52
146  12.17     0.83     0.550        0.034       ---          0.52
147  12.25     0.83     0.550        0.034       ---          0.52
148  12.33     0.87     0.572        0.033       ---          0.54
149  12.42     0.87     0.572        0.033       ---          0.54
150  12.50     0.87     0.572        0.033       ---          0.54
151  12.58     0.93     0.616        0.033       ---          0.58
152  12.67     0.93     0.616        0.033       ---          0.58
153  12.75     0.93     0.616        0.033       ---          0.58
154  12.83     0.97     0.638        0.032       ---          0.61
155  12.92     0.97     0.638        0.032       ---          0.61
156  13.00     0.97     0.638        0.032       ---          0.61
157  13.08     1.13     0.748        0.032       ---          0.72
158  13.17     1.13     0.748        0.032       ---          0.72
159  13.25     1.13     0.748        0.032       ---          0.72
160  13.33     1.13     0.748        0.031       ---          0.72
161  13.42     1.13     0.748        0.031       ---          0.72
162  13.50     1.13     0.748        0.031       ---          0.72
163  13.58     0.77     0.506        0.031       ---          0.47
164  13.67     0.77     0.506        0.031       ---          0.48
165  13.75     0.77     0.506        0.031       ---          0.48
166  13.83     0.77     0.506        0.031       ---          0.48
167  13.92     0.77     0.506        0.030       ---          0.48
168  14.00     0.77     0.506        0.030       ---          0.48
169  14.08     0.90     0.594        0.030       ---          0.56
```

```
170  14.17     0.90      0.594         0.030      ---          0.56
171  14.25     0.90      0.594         0.030      ---          0.56
172  14.33     0.87      0.572         0.030      ---          0.54
173  14.42     0.87      0.572         0.029      ---          0.54
174  14.50     0.87      0.572         0.029      ---          0.54
175  14.58     0.87      0.572         0.029      ---          0.54
176  14.67     0.87      0.572         0.029      ---          0.54
177  14.75     0.87      0.572         0.029      ---          0.54
178  14.83     0.83      0.550         0.029      ---          0.52
179  14.92     0.83      0.550         0.029      ---          0.52
180  15.00     0.83      0.550         0.028      ---          0.52
181  15.08     0.80      0.528         0.028      ---          0.50
182  15.17     0.80      0.528         0.028      ---          0.50
183  15.25     0.80      0.528         0.028      ---          0.50
184  15.33     0.77      0.506         0.028      ---          0.48
185  15.42     0.77      0.506         0.028      ---          0.48
186  15.50     0.77      0.506         0.028      ---          0.48
187  15.58     0.63      0.418         0.027      ---          0.39
188  15.67     0.63      0.418         0.027      ---          0.39
189  15.75     0.63      0.418         0.027      ---          0.39
190  15.83     0.63      0.418         0.027      ---          0.39
191  15.92     0.63      0.418         0.027      ---          0.39
192  16.00     0.63      0.418         0.027      ---          0.39
193  16.08     0.13      0.088         0.027      ---          0.06
194  16.17     0.13      0.088         0.026      ---          0.06
195  16.25     0.13      0.088         0.026      ---          0.06
196  16.33     0.13      0.088         0.026      ---          0.06
197  16.42     0.13      0.088         0.026      ---          0.06
198  16.50     0.13      0.088         0.026      ---          0.06
199  16.58     0.10      0.066         0.026      ---          0.04
200  16.67     0.10      0.066         0.026      ---          0.04
201  16.75     0.10      0.066         0.026      ---          0.04
202  16.83     0.10      0.066         0.025      ---          0.04
203  16.92     0.10      0.066         0.025      ---          0.04
204  17.00     0.10      0.066         0.025      ---          0.04
205  17.08     0.17      0.110         0.025      ---          0.08
206  17.17     0.17      0.110         0.025      ---          0.09
207  17.25     0.17      0.110         0.025      ---          0.09
208  17.33     0.17      0.110         0.025      ---          0.09
209  17.42     0.17      0.110         0.025      ---          0.09
210  17.50     0.17      0.110         0.024      ---          0.09
211  17.58     0.17      0.110         0.024      ---          0.09
212  17.67     0.17      0.110         0.024      ---          0.09
213  17.75     0.17      0.110         0.024      ---          0.09
214  17.83     0.13      0.088         0.024      ---          0.06
215  17.92     0.13      0.088         0.024      ---          0.06
216  18.00     0.13      0.088         0.024      ---          0.06
217  18.08     0.13      0.088         0.024      ---          0.06
218  18.17     0.13      0.088         0.023      ---          0.06
219  18.25     0.13      0.088         0.023      ---          0.06
220  18.33     0.13      0.088         0.023      ---          0.06
221  18.42     0.13      0.088         0.023      ---          0.06
222  18.50     0.13      0.088         0.023      ---          0.06
223  18.58     0.10      0.066         0.023      ---          0.04
224  18.67     0.10      0.066         0.023      ---          0.04
225  18.75     0.10      0.066         0.023      ---          0.04
226  18.83     0.07      0.044         0.023      ---          0.02
227  18.92     0.07      0.044         0.022      ---          0.02
228  19.00     0.07      0.044         0.022      ---          0.02
229  19.08     0.10      0.066         0.022      ---          0.04
```

230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07
233	19.42	0.13	0.088	0.022	---	0.07
234	19.50	0.13	0.088	0.022	---	0.07
235	19.58	0.10	0.066	0.022	---	0.04
236	19.67	0.10	0.066	0.022	---	0.04
237	19.75	0.10	0.066	0.021	---	0.04
238	19.83	0.07	0.044	0.021	---	0.02
239	19.92	0.07	0.044	0.021	---	0.02
240	20.00	0.07	0.044	0.021	---	0.02
241	20.08	0.10	0.066	0.021	---	0.04
242	20.17	0.10	0.066	0.021	---	0.05
243	20.25	0.10	0.066	0.021	---	0.05
244	20.33	0.10	0.066	0.021	---	0.05
245	20.42	0.10	0.066	0.021	---	0.05
246	20.50	0.10	0.066	0.021	---	0.05
247	20.58	0.10	0.066	0.021	---	0.05
248	20.67	0.10	0.066	0.020	---	0.05
249	20.75	0.10	0.066	0.020	---	0.05
250	20.83	0.07	0.044	0.020	---	0.02
251	20.92	0.07	0.044	0.020	---	0.02
252	21.00	0.07	0.044	0.020	---	0.02
253	21.08	0.10	0.066	0.020	---	0.05
254	21.17	0.10	0.066	0.020	---	0.05
255	21.25	0.10	0.066	0.020	---	0.05
256	21.33	0.07	0.044	0.020	---	0.02
257	21.42	0.07	0.044	0.020	---	0.02
258	21.50	0.07	0.044	0.020	---	0.02
259	21.58	0.10	0.066	0.020	---	0.05
260	21.67	0.10	0.066	0.019	---	0.05
261	21.75	0.10	0.066	0.019	---	0.05
262	21.83	0.07	0.044	0.019	---	0.02
263	21.92	0.07	0.044	0.019	---	0.02
264	22.00	0.07	0.044	0.019	---	0.02
265	22.08	0.10	0.066	0.019	---	0.05
266	22.17	0.10	0.066	0.019	---	0.05
267	22.25	0.10	0.066	0.019	---	0.05
268	22.33	0.07	0.044	0.019	---	0.03
269	22.42	0.07	0.044	0.019	---	0.03
270	22.50	0.07	0.044	0.019	---	0.03
271	22.58	0.07	0.044	0.019	---	0.03
272	22.67	0.07	0.044	0.019	---	0.03
273	22.75	0.07	0.044	0.019	---	0.03
274	22.83	0.07	0.044	0.019	---	0.03
275	22.92	0.07	0.044	0.019	---	0.03
276	23.00	0.07	0.044	0.019	---	0.03
277	23.08	0.07	0.044	0.019	---	0.03
278	23.17	0.07	0.044	0.018	---	0.03
279	23.25	0.07	0.044	0.018	---	0.03
280	23.33	0.07	0.044	0.018	---	0.03
281	23.42	0.07	0.044	0.018	---	0.03
282	23.50	0.07	0.044	0.018	---	0.03
283	23.58	0.07	0.044	0.018	---	0.03
284	23.67	0.07	0.044	0.018	---	0.03
285	23.75	0.07	0.044	0.018	---	0.03
286	23.83	0.07	0.044	0.018	---	0.03
287	23.92	0.07	0.044	0.018	---	0.03
288	24.00	0.07	0.044	0.018	---	0.03
	Sum =	100.0			Sum =	55.6

```
      Flood volume = Effective rainfall      4.63(In)
       times area      63.0(Ac.)/[(In)/(Ft.)] =      24.3(Ac.Ft)
      Total soil loss =      0.87(In)
      Total soil loss =     4.556(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     1059177.5 Cubic Feet
      Total soil loss =      198462.8 Cubic Feet
      -----------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     43.753(CFS)
      -----------------------------------------------------------------
--
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      -----------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      -----------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       12.5      25.0      37.5
50.0

----------------------------------------------------------------------
    0+ 5       0.0002      0.03  Q         |         |         |
|
    0+10       0.0010      0.12  Q         |         |         |
|
    0+15       0.0022      0.17  Q         |         |         |
|
    0+20       0.0035      0.18  Q         |         |         |
|
    0+25       0.0045      0.15  Q         |         |         |
|
    0+30       0.0055      0.15  Q         |         |         |
|
    0+35       0.0066      0.16  Q         |         |         |
|
    0+40       0.0077      0.16  Q         |         |         |
|
    0+45       0.0090      0.18  Q         |         |         |
|
    0+50       0.0112      0.33  Q         |         |         |
|
    0+55       0.0169      0.82  Q         |         |         |
|
    1+ 0       0.0242      1.07  Q         |         |         |
|
    1+ 5       0.0315      1.06  Q         |         |         |
|
    1+10       0.0363      0.70  Q         |         |         |
|
    1+15       0.0400      0.54  Q         |         |         |
|
    1+20       0.0433      0.48  Q         |         |         |
|
    1+25       0.0464      0.44  Q         |         |         |
|
```

```
    1+30       0.0493      0.43  Q         |         |         |
|
    1+35       0.0522      0.42  Q         |         |         |
|
    1+40       0.0551      0.42  Q         |         |         |
|
    1+45       0.0580      0.42  Q         |         |         |
|
    1+50       0.0620      0.57  Q         |         |         |
|
    1+55       0.0692      1.05  Q         |         |         |
|
    2+ 0       0.0781      1.29  VQ        |         |         |
|
    2+ 5       0.0880      1.43  VQ        |         |         |
|
    2+10       0.0985      1.53  VQ        |         |         |
|
    2+15       0.1096      1.61  VQ        |         |         |
|
    2+20       0.1210      1.65  VQ        |         |         |
|
    2+25       0.1326      1.69  VQ        |         |         |
|
    2+30       0.1445      1.73  VQ        |         |         |
|
    2+35       0.1577      1.91  VQ        |         |         |
|
    2+40       0.1744      2.42  VQ        |         |         |
|
    2+45       0.1929      2.69  V Q       |         |         |
|
    2+50       0.2126      2.85  V Q       |         |         |
|
    2+55       0.2330      2.97  V Q       |         |         |
|
    3+ 0       0.2541      3.06  V Q       |         |         |
|
    3+ 5       0.2757      3.14  V Q       |         |         |
|
    3+10       0.2977      3.20  V Q       |         |         |
|
    3+15       0.3202      3.26  V Q       |         |         |
|
    3+20       0.3429      3.30  V Q       |         |         |
|
    3+25       0.3659      3.34  V Q       |         |         |
|
    3+30       0.3892      3.38  V Q       |         |         |
|
    3+35       0.4127      3.41  V Q       |         |         |
|
    3+40       0.4363      3.44  V Q       |         |         |
|
    3+45       0.4602      3.47  V Q       |         |         |
|
    3+50       0.4853      3.64  V Q       |         |         |
|
    3+55       0.5138      4.14  V  Q      |         |         |
|
```

```
    4+ 0       0.5441      4.40  V  Q      |         |         |
|
    4+ 5       0.5753      4.54  V  Q      |         |         |
|
    4+10       0.6073      4.64  V  Q      |         |         |
|
    4+15       0.6398      4.72  |V Q      |         |         |
|
    4+20       0.6736      4.92  |V Q      |         |         |
|
    4+25       0.7111      5.44  |V  Q     |         |         |
|
    4+30       0.7505      5.72  |V  Q     |         |         |
|
    4+35       0.7911      5.89  |V  Q     |         |         |
|
    4+40       0.8325      6.01  |V  Q     |         |         |
|
    4+45       0.8746      6.11  |V  Q     |         |         |
|
    4+50       0.9182      6.33  |V   Q    |         |         |
|
    4+55       0.9656      6.87  |V   Q    |         |         |
|
    5+ 0       1.0149      7.17  |V   Q    |         |         |
|
    5+ 5       1.0636      7.06  |V   Q    |         |         |
|
    5+10       1.1067      6.26  |V   Q    |         |         |
|
    5+15       1.1473      5.90  |V  Q     |         |         |
|
    5+20       1.1878      5.87  |V  Q     |         |         |
|
    5+25       1.2307      6.23  | V Q     |         |         |
|
    5+30       1.2748      6.40  | V  Q    |         |         |
|
    5+35       1.3205      6.63  | V  Q    |         |         |
|
    5+40       1.3698      7.17  | V  Q    |         |         |
|
    5+45       1.4211      7.44  | V  Q    |         |         |
|
    5+50       1.4734      7.59  | V   Q   |         |         |
|
    5+55       1.5264      7.70  | V   Q   |         |         |
|
    6+ 0       1.5800      7.78  | V   Q   |         |         |
|
    6+ 5       1.6351      7.99  | V   Q   |         |         |
|
    6+10       1.6937      8.52  | V   Q   |         |         |
|
    6+15       1.7544      8.80  | V    Q  |         |         |
|
    6+20       1.8160      8.96  | V    Q  |         |         |
|
    6+25       1.8785      9.07  |  V   Q  |         |         |
|
```

```
    6+30       1.9416      9.16  |  V   Q  |         |         |
|
    6+35       2.0063      9.39  |  V   Q  |         |         |
|
    6+40       2.0748      9.95  |  V   Q  |         |         |
|
    6+45       2.1454     10.25  |  V    Q |         |         |
|
    6+50       2.2172     10.43  |  V    Q |         |         |
|
    6+55       2.2900     10.57  |  V    Q |         |         |
|
    7+ 0       2.3635     10.68  |  V    Q |         |         |
|
    7+ 5       2.4376     10.75  |   V   Q |         |         |
|
    7+10       2.5121     10.82  |   V   Q |         |         |
|
    7+15       2.5870     10.88  |   V   Q |         |         |
|
    7+20       2.6633     11.08  |   V   Q |         |         |
|
    7+25       2.7432     11.60  |   V    Q|         |         |
|
    7+30       2.8250     11.88  |   V    Q|         |         |
|
    7+35       2.9088     12.18  |   V    Q|         |         |
|
    7+40       2.9967     12.76  |   V     Q         |         |
|
    7+45       3.0869     13.09  |    V    Q         |         |
|
    7+50       3.1793     13.43  |    V    Q         |         |
|
    7+55       3.2761     14.05  |    V    |Q        |         |
|
    8+ 0       3.3753     14.40  |    V    |Q        |         |
|
    8+ 5       3.4779     14.90  |    V    |Q        |         |
|
    8+10       3.5881     16.00  |    V    | Q       |         |
|
    8+15       3.7025     16.60  |     V   |  Q      |         |
|
    8+20       3.8192     16.95  |     V   |  Q      |         |
|
    8+25       3.9378     17.22  |     V   |  Q      |         |
|
    8+30       4.0578     17.42  |     V   |  Q      |         |
|
    8+35       4.1799     17.73  |     V   |   Q     |         |
|
    8+40       4.3063     18.34  |      V  |   Q     |         |
|
    8+45       4.4351     18.70  |      V  |   Q     |         |
|
    8+50       4.5664     19.07  |      V  |    Q    |         |
|
    8+55       4.7022     19.71  |      V  |    Q    |         |
|
```

```
    9+ 0       4.8405     20.09  |      V  |     Q   |         |
|
    9+ 5       4.9825     20.61  |       V |     Q   |         |
|
    9+10       5.1322     21.73  |       V |      Q  |         |
|
    9+15       5.2861     22.35  |       V |      Q  |         |
|
    9+20       5.4435     22.86  |       V |       Q |         |
|
    9+25       5.6061     23.60  |        V|       Q |         |
|
    9+30       5.7717     24.05  |        V|        Q|         |
|
    9+35       5.9402     24.47  |        V|        Q|         |
|
    9+40       6.1134     25.15  |         V         Q         |
|
    9+45       6.2894     25.56  |         V         Q         |
|
    9+50       6.4683     25.97  |         V         Q         |
|
    9+55       6.6519     26.66  |         V         |Q        |
|
   10+ 0       6.8383     27.07  |         |V        |Q        |
|
   10+ 5       7.0196     26.33  |         |V        |Q        |
|
   10+10       7.1797     23.24  |         |V      Q |         |
|
   10+15       7.3296     21.76  |         | V    Q  |         |
|
   10+20       7.4744     21.02  |         | V   Q   |         |
|
   10+25       7.6158     20.53  |         | V   Q   |         |
|
   10+30       7.7548     20.19  |         | V   Q   |         |
|
   10+35       7.8970     20.64  |         | V   Q   |         |
|
   10+40       8.0540     22.80  |         |  V    Q |         |
|
   10+45       8.2180     23.81  |         |  V     Q|         |
|
   10+50       8.3852     24.28  |         |  V     Q|         |
|
   10+55       8.5546     24.60  |         |   V    Q|         |
|
   11+ 0       8.7254     24.80  |         |   V    Q|         |
|
   11+ 5       8.8962     24.79  |         |   V    Q|         |
|
   11+10       9.0644     24.43  |         |   V    Q|         |
|
   11+15       9.2316     24.27  |         |    V   Q|         |
|
   11+20       9.3982     24.19  |         |    V   Q|         |
|
   11+25       9.5644     24.13  |         |    V   Q|         |
|
```

```
   11+30       9.7305     24.12  |         |     V  Q|         |
|
   11+35       9.8950     23.89  |         |     V  Q|         |
|
   11+40      10.0534     23.00  |         |     V Q |         |
|
   11+45      10.2089     22.58  |         |     V Q |         |
|
   11+50      10.3640     22.53  |         |      VQ |         |
|
   11+55      10.5217     22.89  |         |      VQ |         |
|
   12+ 0      10.6803     23.03  |         |      VQ |         |
|
   12+ 5      10.8460     24.06  |         |      V Q|         |
|
   12+10      11.0344     27.36  |         |       V |Q        |
|
   12+15      11.2341     29.00  |         |       V |  Q      |
|
   12+20      11.4407     30.00  |         |       V |  Q      |
|
   12+25      11.6546     31.07  |         |        V|   Q     |
|
   12+30      11.8732     31.74  |         |        V|    Q    |
|
   12+35      12.0968     32.47  |         |        V|    Q    |
|
   12+40      12.3294     33.77  |         |         V      Q  |
|
   12+45      12.5672     34.53  |         |         V      Q  |
|
   12+50      12.8093     35.15  |         |         |V      Q |
|
   12+55      13.0572     36.00  |         |         |V      Q |
|
   13+ 0      13.3089     36.54  |         |         |V       Q|
|
   13+ 5      13.5682     37.65  |         |         | V       Q
|
   13+10      13.8459     40.32  |         |         | V       | Q
|
   13+15      14.1336     41.77  |         |         |  V      |  Q
|
   13+20      14.4271     42.62  |         |         |  V      |   Q
|
   13+25      14.7251     43.27  |         |         |   V     |   Q
|
   13+30      15.0265     43.75  |         |         |   V     |    Q
|
   13+35      15.3192     42.50  |         |         |    V    |   Q
|
   13+40      15.5781     37.60  |         |         |    V    Q
|
   13+45      15.8208     35.24  |         |         |     V Q |
|
   13+50      16.0554     34.07  |         |         |     VQ  |
|
   13+55      16.2846     33.28  |         |         |     Q   |
|
```

```
   14+ 0      16.5101     32.73  |         |         |     QV  |
|
   14+ 5      16.7367     32.90  |         |         |     QV  |
|
   14+10      16.9741     34.48  |         |         |      Q  |
|
   14+15      17.2162     35.15  |         |         |       Q |
|
   14+20      17.4593     35.29  |         |         |       Q |
|
   14+25      17.7003     34.99  |         |         |      Q V|
|
   14+30      17.9402     34.84  |         |         |      Q V|
|
   14+35      18.1793     34.72  |         |         |      Q V|
|
   14+40      18.4178     34.62  |         |         |      Q  V
|
   14+45      18.6556     34.53  |         |         |      Q  V
|
   14+50      18.8918     34.30  |         |         |      Q  |V
|
   14+55      19.1242     33.74  |         |         |     Q   |V
|
   15+ 0      19.3546     33.46  |         |         |     Q   |V
|
   15+ 5      19.5836     33.24  |         |         |     Q   | V
|
   15+10      19.8090     32.73  |         |         |     Q   | V
|
   15+15      20.0327     32.48  |         |         |    Q    | V
|
   15+20      20.2546     32.22  |         |         |    Q    |  V
|
   15+25      20.4728     31.68  |         |         |    Q    |  V
|
   15+30      20.6889     31.38  |         |         |    Q    |   V
|
   15+35      20.8996     30.60  |         |         |   Q     |   V
|
   15+40      21.0964     28.57  |         |         | Q       |   V
|
   15+45      21.2859     27.51  |         |         | Q       |    V
|
   15+50      21.4713     26.93  |         |         |Q        |    V
|
   15+55      21.6540     26.52  |         |         |Q        |    V
|
   16+ 0      21.8344     26.20  |         |         Q         |    V
|
   16+ 5      21.9985     23.83  |         |        Q|         |     V
|
   16+10      22.1127     16.58  |         |  Q      |         |     V
|
   16+15      22.2014     12.89  |         Q         |         |     V
|
   16+20      22.2764     10.89  |       Q |         |         |     V
|
   16+25      22.3416      9.46  |      Q  |         |         |     V
|
```

```
   16+30      22.3995      8.42  |     Q   |         |         |     V
|
   16+35      22.4512      7.49  |    Q    |         |         |     V
|
   16+40      22.4952      6.40  |    Q    |         |         |      V
|
   16+45      22.5339      5.62  |   Q     |         |         |      V
|
   16+50      22.5686      5.04  |   Q     |         |         |      V
|
   16+55      22.6000      4.55  |  Q      |         |         |      V
|
   17+ 0      22.6285      4.14  |  Q      |         |         |      V
|
   17+ 5      22.6569      4.12  |  Q      |         |         |      V
|
   17+10      22.6899      4.80  |  Q      |         |         |      V
|
   17+15      22.7246      5.03  |   Q     |         |         |      V
|
   17+20      22.7593      5.04  |   Q     |         |         |      V
|
   17+25      22.7935      4.98  |  Q      |         |         |      V
|
   17+30      22.8276      4.95  |  Q      |         |         |      V
|
   17+35      22.8623      5.03  |   Q     |         |         |      V
|
   17+40      22.8974      5.10  |   Q     |         |         |      V
|
   17+45      22.9329      5.16  |   Q     |         |         |      V
|
   17+50      22.9677      5.06  |   Q     |         |         |      V
|
   17+55      22.9996      4.63  |  Q      |         |         |      V
|
   18+ 0      23.0302      4.44  |  Q      |         |         |      V
|
   18+ 5      23.0602      4.35  |  Q      |         |         |      V
|
   18+10      23.0898      4.31  |  Q      |         |         |      V
|
   18+15      23.1193      4.28  |  Q      |         |         |       V
|
   18+20      23.1487      4.27  |  Q      |         |         |       V
|
   18+25      23.1781      4.27  |  Q      |         |         |       V
|
   18+30      23.2075      4.26  |  Q      |         |         |       V
|
   18+35      23.2357      4.10  |  Q      |         |         |       V
|
   18+40      23.2606      3.61  | Q       |         |         |       V
|
   18+45      23.2838      3.36  | Q       |         |         |       V
|
   18+50      23.3050      3.09  | Q       |         |         |       V
|
   18+55      23.3224      2.52  | Q       |         |         |       V
|
```

```
   19+ 0      23.3376      2.21  |Q         |         |         |       V
|
   19+ 5      23.3526      2.18  |Q         |         |         |       V
|
   19+10      23.3700      2.52  | Q        |         |         |       V
|
   19+15      23.3882      2.65  | Q        |         |         |       V
|
   19+20      23.4079      2.85  | Q        |         |         |       V
|
   19+25      23.4310      3.36  | Q        |         |         |       V
|
   19+30      23.4559      3.61  | Q        |         |         |       V
|
   19+35      23.4806      3.60  | Q        |         |         |       V
|
   19+40      23.5028      3.22  | Q        |         |         |       V
|
   19+45      23.5238      3.05  | Q        |         |         |       V
|
   19+50      23.5433      2.83  | Q        |         |         |       V
|
   19+55      23.5593      2.31  |Q         |         |         |       V
|
   20+ 0      23.5734      2.05  |Q         |         |         |       V
|
   20+ 5      23.5875      2.06  |Q         |         |         |       V
|
   20+10      23.6043      2.43  |Q         |         |         |       V
|
   20+15      23.6222      2.60  | Q        |         |         |       V
|
   20+20      23.6408      2.69  | Q        |         |         |       V
|
   20+25      23.6598      2.76  | Q        |         |         |       V
|
   20+30      23.6790      2.80  | Q        |         |         |       V
|
   20+35      23.6984      2.82  | Q        |         |         |       V
|
   20+40      23.7180      2.84  | Q        |         |         |
V|
   20+45      23.7376      2.85  | Q        |         |         |
V|
   20+50      23.7562      2.71  | Q        |         |         |
V|
   20+55      23.7716      2.23  |Q         |         |         |
V|
   21+ 0      23.7854      2.00  |Q         |         |         |
V|
   21+ 5      23.7994      2.03  |Q         |         |         |
V|
   21+10      23.8160      2.42  |Q         |         |         |
V|
   21+15      23.8339      2.60  | Q        |         |         |
V|
   21+20      23.8515      2.55  | Q        |         |         |
V|
   21+25      23.8664      2.15  |Q         |         |         |
V|
```

```
   21+30      23.8799      1.96  |Q         |         |         |
V|
   21+35      23.8937      2.01  |Q         |         |         |
V|
   21+40      23.9103      2.41  |Q         |         |         |
V|
   21+45      23.9282      2.60  | Q       |         |         |
V|
   21+50      23.9457      2.55  | Q       |         |         |
V|
   21+55      23.9604      2.14  |Q         |         |         |
V|
   22+ 0      23.9738      1.94  |Q         |         |         |
V|
   22+ 5      23.9875      1.99  |Q         |         |         |
V|
   22+10      24.0040      2.39  |Q         |         |         |
V|
   22+15      24.0218      2.58  | Q       |         |         |
V|
   22+20      24.0393      2.55  | Q       |         |         |
V|
   22+25      24.0542      2.15  |Q         |         |         |
V|
   22+30      24.0677      1.97  |Q         |         |         |
V|
   22+35      24.0806      1.87  |Q         |         |         |
V|
   22+40      24.0930      1.80  |Q         |         |         |
V|
   22+45      24.1051      1.76  |Q         |         |         |
V|
   22+50      24.1171      1.74  |Q         |         |         |
V|
   22+55      24.1290      1.73  |Q         |         |         |
V|
   23+ 0      24.1408      1.72  |Q         |         |         |
V|
   23+ 5      24.1525      1.69  |Q         |         |         |
V|
   23+10      24.1640      1.67  |Q         |         |         |
V|
   23+15      24.1755      1.66  |Q         |         |         |
V|
   23+20      24.1869      1.66  |Q         |         |         |
V|
   23+25      24.1984      1.66  |Q         |         |         |
V|
   23+30      24.2098      1.66  |Q         |         |         |
V|
   23+35      24.2211      1.65  |Q         |         |         |
V|
   23+40      24.2324      1.64  |Q         |         |         |
V|
   23+45      24.2436      1.63  |Q         |         |         |
V|
   23+50      24.2549      1.63  |Q         |         |         |
V|
   23+55      24.2661      1.63  |Q         |         |         |
V|
```

```
    24+ 0      24.2773      1.63  |Q         |         |         |
V|
    24+ 5      24.2875      1.47  |Q         |         |         |
V|
    24+10      24.2938      0.92  Q          |         |         |
V|
    24+15      24.2982      0.64  Q          |         |         |
V|
    24+20      24.3016      0.50  Q          |         |         |
V|
    24+25      24.3043      0.39  Q          |         |         |
V|
    24+30      24.3065      0.32  Q          |         |         |
V|
    24+35      24.3084      0.27  Q          |         |         |
V|
    24+40      24.3099      0.22  Q          |         |         |
V|
    24+45      24.3112      0.18  Q          |         |         |
V|
    24+50      24.3122      0.15  Q          |         |         |
V|
    24+55      24.3131      0.13  Q          |         |         |
V|
    25+ 0      24.3138      0.10  Q          |         |         |
V|
    25+ 5      24.3144      0.08  Q          |         |         |
V|
    25+10      24.3148      0.06  Q          |         |         |
V|
    25+15      24.3151      0.05  Q          |         |         |
V|
    25+20      24.3153      0.03  Q          |         |         |
V|
    25+25      24.3154      0.01  Q          |         |         |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: cyn5apre24100.out


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Canyon 5a Prelandfill
      Badlands Landfill
      100 year 24 Hour Storm Event

      -----------------------------------------------------------------
--
      Drainage Area =      17.10(Ac.)  =      0.027 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      17.10(Ac.)  =
0.027 Sq. Mi.
      Length along longest watercourse =    1430.00(Ft.)
      Length along longest watercourse measured to centroid =     623.00
(Ft.)
      Length along longest watercourse =      0.271 Mi.
      Length along longest watercourse measured to centroid =      0.118
Mi.
      Difference in elevation =     326.00(Ft.)
      Slope along watercourse =   1203.6923 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.067 Hr.
      Lag time =     4.04 Min.
      25% of lag time =     1.01 Min.
      40% of lag time =     1.62 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             17.10              2.00                   34.20

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             17.10              5.50                   94.05

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =  100.00 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          17.100           93.00         0.000
       Total Area Entered =     17.10(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083       123.627        28.648             4.937
          2   0.167       247.254        38.019             6.552
          3   0.250       370.882        12.707             2.190
          4   0.333       494.509         6.749             1.163
          5   0.417       618.136         4.536             0.782
          6   0.500       741.763         3.324             0.573
          7   0.583       865.391         2.481             0.428
          8   0.667       989.018         2.226             0.384
          9   0.750      1112.645         1.310             0.226
                                    Sum = 100.000   Sum=      17.234
-----------------------------------------------------------------------
```

```
Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
     (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
 1   0.08     0.07      0.044         0.065     0.040         0.00
 2   0.17     0.07      0.044         0.064     0.040         0.00
 3   0.25     0.07      0.044         0.064     0.040         0.00
 4   0.33     0.10      0.066         0.064      ---          0.00
 5   0.42     0.10      0.066         0.064      ---          0.00
 6   0.50     0.10      0.066         0.063      ---          0.00
 7   0.58     0.10      0.066         0.063      ---          0.00
 8   0.67     0.10      0.066         0.063      ---          0.00
 9   0.75     0.10      0.066         0.063      ---          0.00
10   0.83     0.13      0.088         0.062      ---          0.03
11   0.92     0.13      0.088         0.062      ---          0.03
12   1.00     0.13      0.088         0.062      ---          0.03
13   1.08     0.10      0.066         0.062      ---          0.00
14   1.17     0.10      0.066         0.061      ---          0.00
15   1.25     0.10      0.066         0.061      ---          0.00
16   1.33     0.10      0.066         0.061      ---          0.01
17   1.42     0.10      0.066         0.061      ---          0.01
18   1.50     0.10      0.066         0.060      ---          0.01
19   1.58     0.10      0.066         0.060      ---          0.01
20   1.67     0.10      0.066         0.060      ---          0.01
21   1.75     0.10      0.066         0.060      ---          0.01
22   1.83     0.13      0.088         0.059      ---          0.03
23   1.92     0.13      0.088         0.059      ---          0.03
24   2.00     0.13      0.088         0.059      ---          0.03
25   2.08     0.13      0.088         0.059      ---          0.03
26   2.17     0.13      0.088         0.058      ---          0.03
27   2.25     0.13      0.088         0.058      ---          0.03
28   2.33     0.13      0.088         0.058      ---          0.03
29   2.42     0.13      0.088         0.058      ---          0.03
30   2.50     0.13      0.088         0.057      ---          0.03
31   2.58     0.17      0.110         0.057      ---          0.05
32   2.67     0.17      0.110         0.057      ---          0.05
33   2.75     0.17      0.110         0.057      ---          0.05
34   2.83     0.17      0.110         0.057      ---          0.05
35   2.92     0.17      0.110         0.056      ---          0.05
36   3.00     0.17      0.110         0.056      ---          0.05
37   3.08     0.17      0.110         0.056      ---          0.05
38   3.17     0.17      0.110         0.056      ---          0.05
39   3.25     0.17      0.110         0.055      ---          0.05
40   3.33     0.17      0.110         0.055      ---          0.05
41   3.42     0.17      0.110         0.055      ---          0.06
42   3.50     0.17      0.110         0.055      ---          0.06
43   3.58     0.17      0.110         0.054      ---          0.06
44   3.67     0.17      0.110         0.054      ---          0.06
45   3.75     0.17      0.110         0.054      ---          0.06
46   3.83     0.20      0.132         0.054      ---          0.08
47   3.92     0.20      0.132         0.054      ---          0.08
48   4.00     0.20      0.132         0.053      ---          0.08
49   4.08     0.20      0.132         0.053      ---          0.08
50   4.17     0.20      0.132         0.053      ---          0.08
51   4.25     0.20      0.132         0.053      ---          0.08
52   4.33     0.23      0.154         0.052      ---          0.10
53   4.42     0.23      0.154         0.052      ---          0.10
54   4.50     0.23      0.154         0.052      ---          0.10
55   4.58     0.23      0.154         0.052      ---          0.10
56   4.67     0.23      0.154         0.052      ---          0.10
57   4.75     0.23      0.154         0.051      ---          0.10
58   4.83     0.27      0.176         0.051      ---          0.12
```

59	4.92	0.27	0.176	0.051	---	0.13
60	5.00	0.27	0.176	0.051	---	0.13
61	5.08	0.20	0.132	0.050	---	0.08
62	5.17	0.20	0.132	0.050	---	0.08
63	5.25	0.20	0.132	0.050	---	0.08
64	5.33	0.23	0.154	0.050	---	0.10
65	5.42	0.23	0.154	0.050	---	0.10
66	5.50	0.23	0.154	0.049	---	0.10
67	5.58	0.27	0.176	0.049	---	0.13
68	5.67	0.27	0.176	0.049	---	0.13
69	5.75	0.27	0.176	0.049	---	0.13
70	5.83	0.27	0.176	0.048	---	0.13
71	5.92	0.27	0.176	0.048	---	0.13
72	6.00	0.27	0.176	0.048	---	0.13
73	6.08	0.30	0.198	0.048	---	0.15
74	6.17	0.30	0.198	0.048	---	0.15
75	6.25	0.30	0.198	0.047	---	0.15
76	6.33	0.30	0.198	0.047	---	0.15
77	6.42	0.30	0.198	0.047	---	0.15
78	6.50	0.30	0.198	0.047	---	0.15
79	6.58	0.33	0.220	0.047	---	0.17
80	6.67	0.33	0.220	0.046	---	0.17
81	6.75	0.33	0.220	0.046	---	0.17
82	6.83	0.33	0.220	0.046	---	0.17
83	6.92	0.33	0.220	0.046	---	0.17
84	7.00	0.33	0.220	0.046	---	0.17
85	7.08	0.33	0.220	0.045	---	0.17
86	7.17	0.33	0.220	0.045	---	0.17
87	7.25	0.33	0.220	0.045	---	0.18
88	7.33	0.37	0.242	0.045	---	0.20
89	7.42	0.37	0.242	0.044	---	0.20
90	7.50	0.37	0.242	0.044	---	0.20
91	7.58	0.40	0.264	0.044	---	0.22
92	7.67	0.40	0.264	0.044	---	0.22
93	7.75	0.40	0.264	0.044	---	0.22
94	7.83	0.43	0.286	0.043	---	0.24
95	7.92	0.43	0.286	0.043	---	0.24
96	8.00	0.43	0.286	0.043	---	0.24
97	8.08	0.50	0.330	0.043	---	0.29
98	8.17	0.50	0.330	0.043	---	0.29
99	8.25	0.50	0.330	0.042	---	0.29
100	8.33	0.50	0.330	0.042	---	0.29
101	8.42	0.50	0.330	0.042	---	0.29
102	8.50	0.50	0.330	0.042	---	0.29
103	8.58	0.53	0.352	0.042	---	0.31
104	8.67	0.53	0.352	0.041	---	0.31
105	8.75	0.53	0.352	0.041	---	0.31
106	8.83	0.57	0.374	0.041	---	0.33
107	8.92	0.57	0.374	0.041	---	0.33
108	9.00	0.57	0.374	0.041	---	0.33
109	9.08	0.63	0.418	0.041	---	0.38
110	9.17	0.63	0.418	0.040	---	0.38
111	9.25	0.63	0.418	0.040	---	0.38
112	9.33	0.67	0.440	0.040	---	0.40
113	9.42	0.67	0.440	0.040	---	0.40
114	9.50	0.67	0.440	0.040	---	0.40
115	9.58	0.70	0.462	0.039	---	0.42
116	9.67	0.70	0.462	0.039	---	0.42
117	9.75	0.70	0.462	0.039	---	0.42
118	9.83	0.73	0.484	0.039	---	0.45

```
119   9.92     0.73      0.484         0.039      ---          0.45
120  10.00     0.73      0.484         0.038      ---          0.45
121  10.08     0.50      0.330         0.038      ---          0.29
122  10.17     0.50      0.330         0.038      ---          0.29
123  10.25     0.50      0.330         0.038      ---          0.29
124  10.33     0.50      0.330         0.038      ---          0.29
125  10.42     0.50      0.330         0.038      ---          0.29
126  10.50     0.50      0.330         0.037      ---          0.29
127  10.58     0.67      0.440         0.037      ---          0.40
128  10.67     0.67      0.440         0.037      ---          0.40
129  10.75     0.67      0.440         0.037      ---          0.40
130  10.83     0.67      0.440         0.037      ---          0.40
131  10.92     0.67      0.440         0.036      ---          0.40
132  11.00     0.67      0.440         0.036      ---          0.40
133  11.08     0.63      0.418         0.036      ---          0.38
134  11.17     0.63      0.418         0.036      ---          0.38
135  11.25     0.63      0.418         0.036      ---          0.38
136  11.33     0.63      0.418         0.036      ---          0.38
137  11.42     0.63      0.418         0.035      ---          0.38
138  11.50     0.63      0.418         0.035      ---          0.38
139  11.58     0.57      0.374         0.035      ---          0.34
140  11.67     0.57      0.374         0.035      ---          0.34
141  11.75     0.57      0.374         0.035      ---          0.34
142  11.83     0.60      0.396         0.034      ---          0.36
143  11.92     0.60      0.396         0.034      ---          0.36
144  12.00     0.60      0.396         0.034      ---          0.36
145  12.08     0.83      0.550         0.034      ---          0.52
146  12.17     0.83      0.550         0.034      ---          0.52
147  12.25     0.83      0.550         0.034      ---          0.52
148  12.33     0.87      0.572         0.033      ---          0.54
149  12.42     0.87      0.572         0.033      ---          0.54
150  12.50     0.87      0.572         0.033      ---          0.54
151  12.58     0.93      0.616         0.033      ---          0.58
152  12.67     0.93      0.616         0.033      ---          0.58
153  12.75     0.93      0.616         0.033      ---          0.58
154  12.83     0.97      0.638         0.032      ---          0.61
155  12.92     0.97      0.638         0.032      ---          0.61
156  13.00     0.97      0.638         0.032      ---          0.61
157  13.08     1.13      0.748         0.032      ---          0.72
158  13.17     1.13      0.748         0.032      ---          0.72
159  13.25     1.13      0.748         0.032      ---          0.72
160  13.33     1.13      0.748         0.031      ---          0.72
161  13.42     1.13      0.748         0.031      ---          0.72
162  13.50     1.13      0.748         0.031      ---          0.72
163  13.58     0.77      0.506         0.031      ---          0.47
164  13.67     0.77      0.506         0.031      ---          0.48
165  13.75     0.77      0.506         0.031      ---          0.48
166  13.83     0.77      0.506         0.031      ---          0.48
167  13.92     0.77      0.506         0.030      ---          0.48
168  14.00     0.77      0.506         0.030      ---          0.48
169  14.08     0.90      0.594         0.030      ---          0.56
170  14.17     0.90      0.594         0.030      ---          0.56
171  14.25     0.90      0.594         0.030      ---          0.56
172  14.33     0.87      0.572         0.030      ---          0.54
173  14.42     0.87      0.572         0.029      ---          0.54
174  14.50     0.87      0.572         0.029      ---          0.54
175  14.58     0.87      0.572         0.029      ---          0.54
176  14.67     0.87      0.572         0.029      ---          0.54
177  14.75     0.87      0.572         0.029      ---          0.54
178  14.83     0.83      0.550         0.029      ---          0.52
```

```
179  14.92      0.83      0.550          0.029        ---           0.52
180  15.00      0.83      0.550          0.028        ---           0.52
181  15.08      0.80      0.528          0.028        ---           0.50
182  15.17      0.80      0.528          0.028        ---           0.50
183  15.25      0.80      0.528          0.028        ---           0.50
184  15.33      0.77      0.506          0.028        ---           0.48
185  15.42      0.77      0.506          0.028        ---           0.48
186  15.50      0.77      0.506          0.028        ---           0.48
187  15.58      0.63      0.418          0.027        ---           0.39
188  15.67      0.63      0.418          0.027        ---           0.39
189  15.75      0.63      0.418          0.027        ---           0.39
190  15.83      0.63      0.418          0.027        ---           0.39
191  15.92      0.63      0.418          0.027        ---           0.39
192  16.00      0.63      0.418          0.027        ---           0.39
193  16.08      0.13      0.088          0.027        ---           0.06
194  16.17      0.13      0.088          0.026        ---           0.06
195  16.25      0.13      0.088          0.026        ---           0.06
196  16.33      0.13      0.088          0.026        ---           0.06
197  16.42      0.13      0.088          0.026        ---           0.06
198  16.50      0.13      0.088          0.026        ---           0.06
199  16.58      0.10      0.066          0.026        ---           0.04
200  16.67      0.10      0.066          0.026        ---           0.04
201  16.75      0.10      0.066          0.026        ---           0.04
202  16.83      0.10      0.066          0.025        ---           0.04
203  16.92      0.10      0.066          0.025        ---           0.04
204  17.00      0.10      0.066          0.025        ---           0.04
205  17.08      0.17      0.110          0.025        ---           0.08
206  17.17      0.17      0.110          0.025        ---           0.09
207  17.25      0.17      0.110          0.025        ---           0.09
208  17.33      0.17      0.110          0.025        ---           0.09
209  17.42      0.17      0.110          0.025        ---           0.09
210  17.50      0.17      0.110          0.024        ---           0.09
211  17.58      0.17      0.110          0.024        ---           0.09
212  17.67      0.17      0.110          0.024        ---           0.09
213  17.75      0.17      0.110          0.024        ---           0.09
214  17.83      0.13      0.088          0.024        ---           0.06
215  17.92      0.13      0.088          0.024        ---           0.06
216  18.00      0.13      0.088          0.024        ---           0.06
217  18.08      0.13      0.088          0.024        ---           0.06
218  18.17      0.13      0.088          0.023        ---           0.06
219  18.25      0.13      0.088          0.023        ---           0.06
220  18.33      0.13      0.088          0.023        ---           0.06
221  18.42      0.13      0.088          0.023        ---           0.06
222  18.50      0.13      0.088          0.023        ---           0.07
223  18.58      0.10      0.066          0.023        ---           0.04
224  18.67      0.10      0.066          0.023        ---           0.04
225  18.75      0.10      0.066          0.023        ---           0.04
226  18.83      0.07      0.044          0.023        ---           0.02
227  18.92      0.07      0.044          0.022        ---           0.02
228  19.00      0.07      0.044          0.022        ---           0.02
229  19.08      0.10      0.066          0.022        ---           0.04
230  19.17      0.10      0.066          0.022        ---           0.04
231  19.25      0.10      0.066          0.022        ---           0.04
232  19.33      0.13      0.088          0.022        ---           0.07
233  19.42      0.13      0.088          0.022        ---           0.07
234  19.50      0.13      0.088          0.022        ---           0.07
235  19.58      0.10      0.066          0.022        ---           0.04
236  19.67      0.10      0.066          0.022        ---           0.04
237  19.75      0.10      0.066          0.021        ---           0.04
238  19.83      0.07      0.044          0.021        ---           0.02
```

```
 239  19.92     0.07      0.044         0.021      ---          0.02
 240  20.00     0.07      0.044         0.021      ---          0.02
 241  20.08     0.10      0.066         0.021      ---          0.04
 242  20.17     0.10      0.066         0.021      ---          0.05
 243  20.25     0.10      0.066         0.021      ---          0.05
 244  20.33     0.10      0.066         0.021      ---          0.05
 245  20.42     0.10      0.066         0.021      ---          0.05
 246  20.50     0.10      0.066         0.021      ---          0.05
 247  20.58     0.10      0.066         0.021      ---          0.05
 248  20.67     0.10      0.066         0.020      ---          0.05
 249  20.75     0.10      0.066         0.020      ---          0.05
 250  20.83     0.07      0.044         0.020      ---          0.02
 251  20.92     0.07      0.044         0.020      ---          0.02
 252  21.00     0.07      0.044         0.020      ---          0.02
 253  21.08     0.10      0.066         0.020      ---          0.05
 254  21.17     0.10      0.066         0.020      ---          0.05
 255  21.25     0.10      0.066         0.020      ---          0.05
 256  21.33     0.07      0.044         0.020      ---          0.02
 257  21.42     0.07      0.044         0.020      ---          0.02
 258  21.50     0.07      0.044         0.020      ---          0.02
 259  21.58     0.10      0.066         0.020      ---          0.05
 260  21.67     0.10      0.066         0.019      ---          0.05
 261  21.75     0.10      0.066         0.019      ---          0.05
 262  21.83     0.07      0.044         0.019      ---          0.02
 263  21.92     0.07      0.044         0.019      ---          0.02
 264  22.00     0.07      0.044         0.019      ---          0.02
 265  22.08     0.10      0.066         0.019      ---          0.05
 266  22.17     0.10      0.066         0.019      ---          0.05
 267  22.25     0.10      0.066         0.019      ---          0.05
 268  22.33     0.07      0.044         0.019      ---          0.03
 269  22.42     0.07      0.044         0.019      ---          0.03
 270  22.50     0.07      0.044         0.019      ---          0.03
 271  22.58     0.07      0.044         0.019      ---          0.03
 272  22.67     0.07      0.044         0.019      ---          0.03
 273  22.75     0.07      0.044         0.019      ---          0.03
 274  22.83     0.07      0.044         0.019      ---          0.03
 275  22.92     0.07      0.044         0.019      ---          0.03
 276  23.00     0.07      0.044         0.019      ---          0.03
 277  23.08     0.07      0.044         0.019      ---          0.03
 278  23.17     0.07      0.044         0.018      ---          0.03
 279  23.25     0.07      0.044         0.018      ---          0.03
 280  23.33     0.07      0.044         0.018      ---          0.03
 281  23.42     0.07      0.044         0.018      ---          0.03
 282  23.50     0.07      0.044         0.018      ---          0.03
 283  23.58     0.07      0.044         0.018      ---          0.03
 284  23.67     0.07      0.044         0.018      ---          0.03
 285  23.75     0.07      0.044         0.018      ---          0.03
 286  23.83     0.07      0.044         0.018      ---          0.03
 287  23.92     0.07      0.044         0.018      ---          0.03
 288  24.00     0.07      0.044         0.018      ---          0.03
     Sum =     100.0                                   Sum =    55.6
      Flood volume = Effective rainfall      4.63(In)
       times area      17.1(Ac.)/[(In)/(Ft.)] =       6.6(Ac.Ft)
      Total soil loss =      0.87(In)
      Total soil loss =     1.237(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      287521.6 Cubic Feet
      Total soil loss =       53868.5 Cubic Feet
      ------------------------------------------------------------------
--
```

```
       Peak flow rate of this hydrograph =     12.241(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0
20.0

-----------------------------------------------------------------------
    0+ 5       0.0001      0.02  Q         |         |         |
|
    0+10       0.0005      0.05  Q         |         |         |
|
    0+15       0.0009      0.06  Q         |         |         |
|
    0+20       0.0013      0.05  Q         |         |         |
|
    0+25       0.0016      0.04  Q         |         |         |
|
    0+30       0.0019      0.05  Q         |         |         |
|
    0+35       0.0022      0.05  Q         |         |         |
|
    0+40       0.0026      0.05  Q         |         |         |
|
    0+45       0.0030      0.06  Q         |         |         |
|
    0+50       0.0041      0.17  Q         |         |         |
|
    0+55       0.0063      0.31  Q         |         |         |
|
    1+ 0       0.0088      0.37  Q         |         |         |
|
    1+ 5       0.0108      0.29  Q         |         |         |
|
    1+10       0.0119      0.16  Q         |         |         |
|
    1+15       0.0129      0.13  Q         |         |         |
|
    1+20       0.0137      0.12  Q         |         |         |
|
    1+25       0.0145      0.12  Q         |         |         |
|
    1+30       0.0153      0.11  Q         |         |         |
|
    1+35       0.0160      0.11  Q         |         |         |
|
    1+40       0.0168      0.10  Q         |         |         |
|
    1+45       0.0175      0.10  Q         |         |         |
|
    1+50       0.0189      0.22  Q         |         |         |
```

```
|
      1+55       0.0215      0.36  Q          |         |         |
|
      2+ 0       0.0243      0.42  Q          |         |         |
|
      2+ 5       0.0274      0.45  Q          |         |         |
|
      2+10       0.0306      0.47  Q          |         |         |
|
      2+15       0.0340      0.48  Q          |         |         |
|
      2+20       0.0374      0.50  Q          |         |         |
|
      2+25       0.0409      0.51  VQ         |         |         |
|
      2+30       0.0445      0.52  VQ         |         |         |
|
      2+35       0.0488      0.63  VQ         |         |         |
|
      2+40       0.0542      0.78  VQ         |         |         |
|
      2+45       0.0600      0.83  VQ         |         |         |
|
      2+50       0.0659      0.86  VQ         |         |         |
|
      2+55       0.0720      0.88  VQ         |         |         |
|
      3+ 0       0.0782      0.90  VQ         |         |         |
|
      3+ 5       0.0845      0.91  VQ         |         |         |
|
      3+10       0.0908      0.93  VQ         |         |         |
|
      3+15       0.0973      0.94  VQ         |         |         |
|
      3+20       0.1038      0.94  VQ         |         |         |
|
      3+25       0.1103      0.94  VQ         |         |         |
|
      3+30       0.1168      0.95  VQ         |         |         |
|
      3+35       0.1233      0.95  VQ         |         |         |
|
      3+40       0.1299      0.96  VQ         |         |         |
|
      3+45       0.1365      0.96  VQ         |         |         |
|
      3+50       0.1439      1.07  V Q        |         |         |
|
      3+55       0.1523      1.22  V Q        |         |         |
|
      4+ 0       0.1611      1.27  V Q        |         |         |
|
      4+ 5       0.1700      1.30  |VQ        |         |         |
|
      4+10       0.1791      1.32  |VQ        |         |         |
|
      4+15       0.1883      1.34  |VQ        |         |         |
|
      4+20       0.1984      1.46  |VQ        |         |         |
```

```
|
    4+25       0.2095      1.62  |V Q       |         |         |
|
    4+30       0.2211      1.67  |V Q       |         |         |
|
    4+35       0.2328      1.70  |V Q       |         |         |
|
    4+40       0.2447      1.73  |V Q       |         |         |
|
    4+45       0.2567      1.74  |V Q       |         |         |
|
    4+50       0.2695      1.86  |V Q       |         |         |
|
    4+55       0.2834      2.02  |V  Q      |         |         |
|
    5+ 0       0.2977      2.08  |V  Q      |         |         |
|
    5+ 5       0.3107      1.89  |V Q       |         |         |
|
    5+10       0.3219      1.62  |V Q       |         |         |
|
    5+15       0.3325      1.54  | VQ       |         |         |
|
    5+20       0.3436      1.61  | VQ       |         |         |
|
    5+25       0.3556      1.73  | VQ       |         |         |
|
    5+30       0.3677      1.77  | VQ       |         |         |
|
    5+35       0.3807      1.89  | VQ       |         |         |
|
    5+40       0.3947      2.03  | V Q      |         |         |
|
    5+45       0.4091      2.09  | V Q      |         |         |
|
    5+50       0.4238      2.13  | V Q      |         |         |
|
    5+55       0.4386      2.16  | V Q      |         |         |
|
    6+ 0       0.4536      2.18  | V Q      |         |         |
|
    6+ 5       0.4694      2.30  | V Q      |         |         |
|
    6+10       0.4863      2.46  | V Q      |         |         |
|
    6+15       0.5037      2.51  |  V Q     |         |         |
|
    6+20       0.5212      2.54  |  V Q     |         |         |
|
    6+25       0.5388      2.56  |  V Q     |         |         |
|
    6+30       0.5566      2.58  |  V Q     |         |         |
|
    6+35       0.5752      2.70  |  V Q     |         |         |
|
    6+40       0.5948      2.86  |  V Q     |         |         |
|
    6+45       0.6149      2.91  |  V Q     |         |         |
|
    6+50       0.6352      2.94  |  V Q     |         |         |
```

```
|
    6+55       0.6556      2.96  |  V Q    |         |         |
|
    7+ 0       0.6761      2.98  |   VQ    |         |         |
|
    7+ 5       0.6967      2.99  |   VQ    |         |         |
|
    7+10       0.7174      3.00  |   V Q   |         |         |
|
    7+15       0.7382      3.01  |   V Q   |         |         |
|
    7+20       0.7597      3.13  |   V Q   |         |         |
|
    7+25       0.7822      3.27  |   V Q   |         |         |
|
    7+30       0.8051      3.33  |   V Q   |         |         |
|
    7+35       0.8290      3.46  |    VQ   |         |         |
|
    7+40       0.8540      3.63  |    V Q  |         |         |
|
    7+45       0.8794      3.69  |    V Q  |         |         |
|
    7+50       0.9058      3.84  |    V Q  |         |         |
|
    7+55       0.9335      4.01  |    V  Q |         |         |
|
    8+ 0       0.9616      4.08  |    V  Q |         |         |
|
    8+ 5       0.9914      4.34  |     V Q |         |         |
|
    8+10       1.0235      4.66  |     V  Q|         |         |
|
    8+15       1.0564      4.77  |     V  Q|         |         |
|
    8+20       1.0897      4.84  |     V  Q|         |         |
|
    8+25       1.1233      4.88  |     V  Q|         |         |
|
    8+30       1.1572      4.92  |      V Q|         |         |
|
    8+35       1.1919      5.05  |      V  Q         |         |
|
    8+40       1.2278      5.21  |      V  Q         |         |
|
    8+45       1.2642      5.27  |      V  Q         |         |
|
    8+50       1.3014      5.41  |      V  Q         |         |
|
    8+55       1.3398      5.58  |       V |Q        |         |
|
    9+ 0       1.3787      5.64  |       V |Q        |         |
|
    9+ 5       1.4193      5.90  |       V |Q        |         |
|
    9+10       1.4621      6.21  |       V | Q       |         |
|
    9+15       1.5057      6.33  |        V| Q       |         |
|
    9+20       1.5504      6.50  |        V|  Q      |         |
```

```
|
    9+25       1.5965      6.69  |        V|  Q      |         |
|
    9+30       1.6432      6.78  |        V|  Q      |         |
|
    9+35       1.6909      6.93  |         V  Q      |         |
|
    9+40       1.7399      7.11  |         V   Q     |         |
|
    9+45       1.7894      7.19  |         V   Q     |         |
|
    9+50       1.8399      7.33  |         |V  Q     |         |
|
    9+55       1.8916      7.51  |         |V   Q    |         |
|
   10+ 0       1.9438      7.58  |         |V   Q    |         |
|
   10+ 5       1.9910      6.85  |         | VQ      |         |
|
   10+10       2.0315      5.87  |         |QV       |         |
|
   10+15       2.0697      5.56  |         |QV       |         |
|
   10+20       2.1068      5.39  |         Q V       |         |
|
   10+25       2.1432      5.28  |         Q V       |         |
|
   10+30       2.1790      5.20  |         Q  V      |         |
|
   10+35       2.2182      5.68  |         |Q V      |         |
|
   10+40       2.2619      6.35  |         | QV      |         |
|
   10+45       2.3070      6.56  |         |  Q      |         |
|
   10+50       2.3531      6.69  |         |  QV     |         |
|
   10+55       2.3997      6.78  |         |  QV     |         |
|
   11+ 0       2.4469      6.84  |         |  QV     |         |
|
   11+ 5       2.4936      6.78  |         |  Q V    |         |
|
   11+10       2.5396      6.68  |         |  Q V    |         |
|
   11+15       2.5855      6.66  |         |  Q V    |         |
|
   11+20       2.6313      6.64  |         |  Q V    |         |
|
   11+25       2.6769      6.63  |         |  Q  V   |         |
|
   11+30       2.7225      6.62  |         |  Q  V   |         |
|
   11+35       2.7665      6.39  |         | Q   V   |         |
|
   11+40       2.8086      6.10  |         | Q    V  |         |
|
   11+45       2.8499      6.00  |         | Q    V  |         |
|
   11+50       2.8917      6.06  |         | Q    V  |         |
```

```
|
  11+55       2.9342      6.18  |         | Q    V  |         |
|
  12+ 0       2.9769      6.20  |         | Q     V |         |
|
  12+ 5       3.0249      6.97  |         |  Q    V |         |
|
  12+10       3.0799      7.98  |         |    Q  V |         |
|
  12+15       3.1373      8.33  |         |     Q  V|         |
|
  12+20       3.1967      8.63  |         |      Q V|         |
|
  12+25       3.2580      8.90  |         |      Q V|         |
|
  12+30       3.3203      9.05  |         |       Q V         |
|
  12+35       3.3848      9.36  |         |       Q V         |
|
  12+40       3.4518      9.73  |         |        QV         |
|
  12+45       3.5198      9.87  |         |        Q|V        |
|
  12+50       3.5890     10.05  |         |         QV        |
|
  12+55       3.6595     10.24  |         |         Q V       |
|
  13+ 0       3.7305     10.32  |         |         Q V       |
|
  13+ 5       3.8057     10.91  |         |         |Q V      |
|
  13+10       3.8860     11.67  |         |         |  Q      |
|
  13+15       3.9682     11.93  |         |         |  QV     |
|
  13+20       4.0513     12.07  |         |         |   Q     |
|
  13+25       4.1352     12.17  |         |         |   QV    |
|
  13+30       4.2195     12.24  |         |         |   QV    |
|
  13+35       4.2959     11.10  |         |         | Q   V   |
|
  13+40       4.3617      9.55  |         |        Q|     V   |
|
  13+45       4.4240      9.05  |         |       Q |     V   |
|
  13+50       4.4844      8.77  |         |      Q  |      V  |
|
  13+55       4.5436      8.59  |         |      Q  |      V  |
|
  14+ 0       4.6017      8.45  |         |     Q   |      V  |
|
  14+ 5       4.6622      8.78  |         |      Q  |       V |
|
  14+10       4.7261      9.27  |         |       Q |       V |
|
  14+15       4.7909      9.41  |         |       Q |        V|
|
  14+20       4.8557      9.41  |         |       Q |        V|
```

```
|
   14+25       4.9200      9.33  |         |       Q |        V|
|
   14+30       4.9843      9.34  |         |       Q |         V
|
   14+35       5.0487      9.35  |         |       Q |         V
|
   14+40       5.1133      9.37  |         |       Q |         V
|
   14+45       5.1779      9.38  |         |       Q |         |V
|
   14+50       5.2417      9.27  |         |       Q |         |V
|
   14+55       5.3045      9.12  |         |       Q |         | V
|
   15+ 0       5.3670      9.07  |         |       Q |         | V
|
   15+ 5       5.4285      8.94  |         |      Q  |         | V
|
   15+10       5.4890      8.78  |         |      Q  |         |  V
|
   15+15       5.5490      8.72  |         |      Q  |         |  V
|
   15+20       5.6081      8.58  |         |      Q  |         |  V
|
   15+25       5.6660      8.41  |         |     Q   |         |   V
|
   15+30       5.7235      8.35  |         |     Q   |         |   V
|
   15+35       5.7777      7.88  |         |    Q    |         |    V
|
   15+40       5.8279      7.28  |         |   Q     |         |    V
|
   15+45       5.8766      7.07  |         |   Q     |         |    V
|
   15+50       5.9245      6.96  |         |  Q      |         |    V
|
   15+55       5.9719      6.89  |         |  Q      |         |     V
|
   16+ 0       6.0190      6.83  |         |  Q      |         |     V
|
   16+ 5       6.0546      5.17  |         Q         |         |     V
|
   16+10       6.0751      2.97  |    Q    |         |         |     V
|
   16+15       6.0904      2.23  |   Q     |         |         |     V
|
   16+20       6.1032      1.85  |  Q      |         |         |     V
|
   16+25       6.1142      1.60  |  Q      |         |         |      V
|
   16+30       6.1239      1.41  | Q       |         |         |      V
|
   16+35       6.1319      1.16  | Q       |         |         |      V
|
   16+40       6.1380      0.89  |Q        |         |         |      V
|
   16+45       6.1434      0.77  |Q        |         |         |      V
|
   16+50       6.1485      0.75  |Q        |         |         |      V
```

```
|
  16+55       6.1536      0.73  |Q        |         |         |      V
|
  17+ 0       6.1586      0.72  |Q        |         |         |      V
|
  17+ 5       6.1650      0.93  |Q        |         |         |      V
|
  17+10       6.1734      1.22  | Q       |         |         |      V
|
  17+15       6.1824      1.31  | Q       |         |         |      V
|
  17+20       6.1918      1.36  | Q       |         |         |      V
|
  17+25       6.2014      1.40  | Q       |         |         |      V
|
  17+30       6.2112      1.43  | Q       |         |         |      V
|
  17+35       6.2212      1.45  | Q       |         |         |      V
|
  17+40       6.2313      1.47  | Q       |         |         |      V
|
  17+45       6.2415      1.48  | Q       |         |         |      V
|
  17+50       6.2510      1.37  | Q       |         |         |      V
|
  17+55       6.2594      1.23  | Q       |         |         |      V
|
  18+ 0       6.2676      1.18  | Q       |         |         |      V
|
  18+ 5       6.2756      1.16  | Q       |         |         |       V
|
  18+10       6.2835      1.15  | Q       |         |         |       V
|
  18+15       6.2913      1.13  | Q       |         |         |       V
|
  18+20       6.2990      1.13  | Q       |         |         |       V
|
  18+25       6.3068      1.12  | Q       |         |         |       V
|
  18+30       6.3145      1.12  | Q       |         |         |       V
|
  18+35       6.3214      1.01  | Q       |         |         |       V
|
  18+40       6.3274      0.87  |Q        |         |         |       V
|
  18+45       6.3331      0.82  |Q        |         |         |       V
|
  18+50       6.3378      0.69  |Q        |         |         |       V
|
  18+55       6.3415      0.53  |Q        |         |         |       V
|
  19+ 0       6.3447      0.47  Q         |         |         |       V
|
  19+ 5       6.3485      0.55  |Q        |         |         |       V
|
  19+10       6.3531      0.67  |Q        |         |         |       V
|
  19+15       6.3579      0.70  |Q        |         |         |       V
|
  19+20       6.3636      0.83  |Q        |         |         |       V
```

```
|
   19+25       6.3704      0.98  |Q         |         |         |       V
|
   19+30       6.3775      1.04  | Q        |         |         |       V
|
   19+35       6.3842      0.97  |Q         |         |         |       V
|
   19+40       6.3900      0.85  |Q         |         |         |       V
|
   19+45       6.3957      0.82  |Q         |         |         |       V
|
   19+50       6.4005      0.70  |Q         |         |         |       V
|
   19+55       6.4043      0.55  |Q         |         |         |       V
|
   20+ 0       6.4077      0.49  Q          |         |         |       V
|
   20+ 5       6.4116      0.57  |Q         |         |         |       V
|
   20+10       6.4163      0.69  |Q         |         |         |       V
|
   20+15       6.4213      0.72  |Q         |         |         |       V
|
   20+20       6.4263      0.74  |Q         |         |         |       V
|
   20+25       6.4315      0.75  |Q         |         |         |       V
|
   20+30       6.4367      0.76  |Q         |         |         |
V|
   20+35       6.4420      0.77  |Q         |         |         |
V|
   20+40       6.4474      0.78  |Q         |         |         |
V|
   20+45       6.4528      0.78  |Q         |         |         |
V|
   20+50       6.4574      0.68  |Q         |         |         |
V|
   20+55       6.4611      0.53  |Q         |         |         |
V|
   21+ 0       6.4645      0.49  Q          |         |         |
V|
   21+ 5       6.4684      0.57  |Q         |         |         |
V|
   21+10       6.4733      0.70  |Q         |         |         |
V|
   21+15       6.4783      0.74  |Q         |         |         |
V|
   21+20       6.4828      0.65  |Q         |         |         |
V|
   21+25       6.4863      0.51  |Q         |         |         |
V|
   21+30       6.4896      0.47  Q          |         |         |
V|
   21+35       6.4935      0.57  |Q         |         |         |
V|
   21+40       6.4984      0.70  |Q         |         |         |
V|
   21+45       6.5035      0.75  |Q         |         |         |
V|
   21+50       6.5080      0.65  |Q         |         |         |
```

```
V|
   21+55       6.5116       0.52  |Q         |          |          |
V|
   22+ 0       6.5149       0.48  Q          |          |          |
V|
   22+ 5       6.5188       0.57  |Q         |          |          |
V|
   22+10       6.5237       0.71  |Q         |          |          |
V|
   22+15       6.5289       0.75  |Q         |          |          |
V|
   22+20       6.5335       0.66  |Q         |          |          |
V|
   22+25       6.5371       0.53  |Q         |          |          |
V|
   22+30       6.5405       0.49  Q          |          |          |
V|
   22+35       6.5437       0.47  Q          |          |          |
V|
   22+40       6.5469       0.46  Q          |          |          |
V|
   22+45       6.5501       0.46  Q          |          |          |
V|
   22+50       6.5532       0.45  Q          |          |          |
V|
   22+55       6.5562       0.44  Q          |          |          |
V|
   23+ 0       6.5592       0.44  Q          |          |          |
V|
   23+ 5       6.5622       0.44  Q          |          |          |
V|
   23+10       6.5652       0.44  Q          |          |          |
V|
   23+15       6.5683       0.44  Q          |          |          |
V|
   23+20       6.5713       0.44  Q          |          |          |
V|
   23+25       6.5743       0.44  Q          |          |          |
V|
   23+30       6.5774       0.44  Q          |          |          |
V|
   23+35       6.5804       0.44  Q          |          |          |
V|
   23+40       6.5835       0.44  Q          |          |          |
V|
   23+45       6.5865       0.44  Q          |          |          |
V|
   23+50       6.5896       0.44  Q          |          |          |
V|
   23+55       6.5926       0.44  Q          |          |          |
V|
   24+ 0       6.5957       0.44  Q          |          |          |
V|
   24+ 5       6.5979       0.32  Q          |          |          |
V|
   24+10       6.5989       0.15  Q          |          |          |
V|
   24+15       6.5995       0.09  Q          |          |          |
V|
   24+20       6.6000       0.06  Q          |          |          |
```

```
V|
   24+25       6.6003      0.04  Q         |         |         |
V|
   24+30       6.6004      0.03  Q         |         |         |
V|
   24+35       6.6005      0.02  Q         |         |         |
V|
   24+40       6.6006      0.01  Q         |         |         |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: cyn6pre24100.out


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      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Canyon 6 Prelandfill
      Badlands Landfill
      100 year 24 Hour Storm Event

      -----------------------------------------------------------------
--
      Drainage Area =     231.40(Ac.)  =      0.362 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =     231.40(Ac.)  =
0.362 Sq. Mi.
      Length along longest watercourse =    7448.00(Ft.)
      Length along longest watercourse measured to centroid =    3698.00
(Ft.)
      Length along longest watercourse =      1.411 Mi.
      Length along longest watercourse measured to centroid =      0.700
Mi.
      Difference in elevation =     725.00(Ft.)
      Slope along watercourse =    513.9635 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.292 Hr.
      Lag time =    17.51 Min.
      25% of lag time =     4.38 Min.
      40% of lag time =     7.00 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
            231.40            2.00                 462.80

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
            231.40            5.50                1272.70

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.95 %
      Adjusted average point rain =    5.498(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
         231.400           93.00         0.000
       Total Area Entered =    231.40(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
            Combination of 'S' Curves:
            VALLEY 'S' Curve Percentage =    0.00
            FOOTHILL 'S' Curve Percentage =   15.00
            MOUNTAIN 'S' Curve Percentage =   85.00
            DESERT 'S' Curve Percentage =    0.00
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                            Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083         28.551          3.310              7.719
          2   0.167         57.102         11.687             27.254
          3   0.250         85.654         19.079             44.495
          4   0.333        114.205         15.164             35.362
          5   0.417        142.756          9.206             21.469
          6   0.500        171.307          6.036             14.077
          7   0.583        199.858          4.627             10.791
          8   0.667        228.409          3.815              8.896
          9   0.750        256.961          3.214              7.495
```

```
         10   0.833        285.512          2.669              6.225
         11   0.917        314.063          2.293              5.347
         12   1.000        342.614          1.921              4.479
         13   1.083        371.165          1.618              3.774
         14   1.167        399.716          1.422              3.315
         15   1.250        428.268          1.230              2.868
         16   1.333        456.819          1.069              2.493
         17   1.417        485.370          1.030              2.402
         18   1.500        513.921          0.988              2.305
         19   1.583        542.472          0.830              1.936
         20   1.667        571.023          0.791              1.846
         21   1.750        599.575          0.764              1.781
         22   1.833        628.126          0.707              1.649
         23   1.917        656.677          0.647              1.508
         24   2.000        685.228          0.608              1.417
         25   2.083        713.779          0.580              1.352
         26   2.167        742.330          0.498              1.162
         27   2.250        770.882          0.472              1.102
         28   2.333        799.433          0.439              1.023
         29   2.417        827.984          0.437              1.019
         30   2.500        856.535          0.437              1.019
         31   2.583        885.086          0.437              1.019
         32   2.667        913.637          0.437              1.019
         33   2.750        942.189          0.437              1.019
         34   2.833        970.740          0.437              1.019
         35   2.917        999.291          0.437              1.019
         36   3.000       1027.842          0.229              0.535
                                    Sum = 100.000   Sum=     233.208
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
```

```
28   2.33     0.13      0.088         0.058      ---          0.03
29   2.42     0.13      0.088         0.058      ---          0.03
30   2.50     0.13      0.088         0.057      ---          0.03
31   2.58     0.17      0.110         0.057      ---          0.05
32   2.67     0.17      0.110         0.057      ---          0.05
33   2.75     0.17      0.110         0.057      ---          0.05
34   2.83     0.17      0.110         0.057      ---          0.05
35   2.92     0.17      0.110         0.056      ---          0.05
36   3.00     0.17      0.110         0.056      ---          0.05
37   3.08     0.17      0.110         0.056      ---          0.05
38   3.17     0.17      0.110         0.056      ---          0.05
39   3.25     0.17      0.110         0.055      ---          0.05
40   3.33     0.17      0.110         0.055      ---          0.05
41   3.42     0.17      0.110         0.055      ---          0.06
42   3.50     0.17      0.110         0.055      ---          0.06
43   3.58     0.17      0.110         0.054      ---          0.06
44   3.67     0.17      0.110         0.054      ---          0.06
45   3.75     0.17      0.110         0.054      ---          0.06
46   3.83     0.20      0.132         0.054      ---          0.08
47   3.92     0.20      0.132         0.054      ---          0.08
48   4.00     0.20      0.132         0.053      ---          0.08
49   4.08     0.20      0.132         0.053      ---          0.08
50   4.17     0.20      0.132         0.053      ---          0.08
51   4.25     0.20      0.132         0.053      ---          0.08
52   4.33     0.23      0.154         0.052      ---          0.10
53   4.42     0.23      0.154         0.052      ---          0.10
54   4.50     0.23      0.154         0.052      ---          0.10
55   4.58     0.23      0.154         0.052      ---          0.10
56   4.67     0.23      0.154         0.052      ---          0.10
57   4.75     0.23      0.154         0.051      ---          0.10
58   4.83     0.27      0.176         0.051      ---          0.12
59   4.92     0.27      0.176         0.051      ---          0.13
60   5.00     0.27      0.176         0.051      ---          0.13
61   5.08     0.20      0.132         0.050      ---          0.08
62   5.17     0.20      0.132         0.050      ---          0.08
63   5.25     0.20      0.132         0.050      ---          0.08
64   5.33     0.23      0.154         0.050      ---          0.10
65   5.42     0.23      0.154         0.050      ---          0.10
66   5.50     0.23      0.154         0.049      ---          0.10
67   5.58     0.27      0.176         0.049      ---          0.13
68   5.67     0.27      0.176         0.049      ---          0.13
69   5.75     0.27      0.176         0.049      ---          0.13
70   5.83     0.27      0.176         0.048      ---          0.13
71   5.92     0.27      0.176         0.048      ---          0.13
72   6.00     0.27      0.176         0.048      ---          0.13
73   6.08     0.30      0.198         0.048      ---          0.15
74   6.17     0.30      0.198         0.048      ---          0.15
75   6.25     0.30      0.198         0.047      ---          0.15
76   6.33     0.30      0.198         0.047      ---          0.15
77   6.42     0.30      0.198         0.047      ---          0.15
78   6.50     0.30      0.198         0.047      ---          0.15
79   6.58     0.33      0.220         0.047      ---          0.17
80   6.67     0.33      0.220         0.046      ---          0.17
81   6.75     0.33      0.220         0.046      ---          0.17
82   6.83     0.33      0.220         0.046      ---          0.17
83   6.92     0.33      0.220         0.046      ---          0.17
84   7.00     0.33      0.220         0.046      ---          0.17
85   7.08     0.33      0.220         0.045      ---          0.17
86   7.17     0.33      0.220         0.045      ---          0.17
87   7.25     0.33      0.220         0.045      ---          0.17
```

```
  88    7.33      0.37       0.242          0.045         ---           0.20
  89    7.42      0.37       0.242          0.044         ---           0.20
  90    7.50      0.37       0.242          0.044         ---           0.20
  91    7.58      0.40       0.264          0.044         ---           0.22
  92    7.67      0.40       0.264          0.044         ---           0.22
  93    7.75      0.40       0.264          0.044         ---           0.22
  94    7.83      0.43       0.286          0.043         ---           0.24
  95    7.92      0.43       0.286          0.043         ---           0.24
  96    8.00      0.43       0.286          0.043         ---           0.24
  97    8.08      0.50       0.330          0.043         ---           0.29
  98    8.17      0.50       0.330          0.043         ---           0.29
  99    8.25      0.50       0.330          0.042         ---           0.29
 100    8.33      0.50       0.330          0.042         ---           0.29
 101    8.42      0.50       0.330          0.042         ---           0.29
 102    8.50      0.50       0.330          0.042         ---           0.29
 103    8.58      0.53       0.352          0.042         ---           0.31
 104    8.67      0.53       0.352          0.041         ---           0.31
 105    8.75      0.53       0.352          0.041         ---           0.31
 106    8.83      0.57       0.374          0.041         ---           0.33
 107    8.92      0.57       0.374          0.041         ---           0.33
 108    9.00      0.57       0.374          0.041         ---           0.33
 109    9.08      0.63       0.418          0.041         ---           0.38
 110    9.17      0.63       0.418          0.040         ---           0.38
 111    9.25      0.63       0.418          0.040         ---           0.38
 112    9.33      0.67       0.440          0.040         ---           0.40
 113    9.42      0.67       0.440          0.040         ---           0.40
 114    9.50      0.67       0.440          0.040         ---           0.40
 115    9.58      0.70       0.462          0.039         ---           0.42
 116    9.67      0.70       0.462          0.039         ---           0.42
 117    9.75      0.70       0.462          0.039         ---           0.42
 118    9.83      0.73       0.484          0.039         ---           0.44
 119    9.92      0.73       0.484          0.039         ---           0.45
 120   10.00      0.73       0.484          0.038         ---           0.45
 121   10.08      0.50       0.330          0.038         ---           0.29
 122   10.17      0.50       0.330          0.038         ---           0.29
 123   10.25      0.50       0.330          0.038         ---           0.29
 124   10.33      0.50       0.330          0.038         ---           0.29
 125   10.42      0.50       0.330          0.038         ---           0.29
 126   10.50      0.50       0.330          0.037         ---           0.29
 127   10.58      0.67       0.440          0.037         ---           0.40
 128   10.67      0.67       0.440          0.037         ---           0.40
 129   10.75      0.67       0.440          0.037         ---           0.40
 130   10.83      0.67       0.440          0.037         ---           0.40
 131   10.92      0.67       0.440          0.036         ---           0.40
 132   11.00      0.67       0.440          0.036         ---           0.40
 133   11.08      0.63       0.418          0.036         ---           0.38
 134   11.17      0.63       0.418          0.036         ---           0.38
 135   11.25      0.63       0.418          0.036         ---           0.38
 136   11.33      0.63       0.418          0.036         ---           0.38
 137   11.42      0.63       0.418          0.035         ---           0.38
 138   11.50      0.63       0.418          0.035         ---           0.38
 139   11.58      0.57       0.374          0.035         ---           0.34
 140   11.67      0.57       0.374          0.035         ---           0.34
 141   11.75      0.57       0.374          0.035         ---           0.34
 142   11.83      0.60       0.396          0.034         ---           0.36
 143   11.92      0.60       0.396          0.034         ---           0.36
 144   12.00      0.60       0.396          0.034         ---           0.36
 145   12.08      0.83       0.550          0.034         ---           0.52
 146   12.17      0.83       0.550          0.034         ---           0.52
 147   12.25      0.83       0.550          0.034         ---           0.52
```

```
148  12.33     0.87      0.572         0.033      ---          0.54
149  12.42     0.87      0.572         0.033      ---          0.54
150  12.50     0.87      0.572         0.033      ---          0.54
151  12.58     0.93      0.616         0.033      ---          0.58
152  12.67     0.93      0.616         0.033      ---          0.58
153  12.75     0.93      0.616         0.033      ---          0.58
154  12.83     0.97      0.638         0.032      ---          0.61
155  12.92     0.97      0.638         0.032      ---          0.61
156  13.00     0.97      0.638         0.032      ---          0.61
157  13.08     1.13      0.748         0.032      ---          0.72
158  13.17     1.13      0.748         0.032      ---          0.72
159  13.25     1.13      0.748         0.032      ---          0.72
160  13.33     1.13      0.748         0.031      ---          0.72
161  13.42     1.13      0.748         0.031      ---          0.72
162  13.50     1.13      0.748         0.031      ---          0.72
163  13.58     0.77      0.506         0.031      ---          0.47
164  13.67     0.77      0.506         0.031      ---          0.47
165  13.75     0.77      0.506         0.031      ---          0.48
166  13.83     0.77      0.506         0.031      ---          0.48
167  13.92     0.77      0.506         0.030      ---          0.48
168  14.00     0.77      0.506         0.030      ---          0.48
169  14.08     0.90      0.594         0.030      ---          0.56
170  14.17     0.90      0.594         0.030      ---          0.56
171  14.25     0.90      0.594         0.030      ---          0.56
172  14.33     0.87      0.572         0.030      ---          0.54
173  14.42     0.87      0.572         0.029      ---          0.54
174  14.50     0.87      0.572         0.029      ---          0.54
175  14.58     0.87      0.572         0.029      ---          0.54
176  14.67     0.87      0.572         0.029      ---          0.54
177  14.75     0.87      0.572         0.029      ---          0.54
178  14.83     0.83      0.550         0.029      ---          0.52
179  14.92     0.83      0.550         0.029      ---          0.52
180  15.00     0.83      0.550         0.028      ---          0.52
181  15.08     0.80      0.528         0.028      ---          0.50
182  15.17     0.80      0.528         0.028      ---          0.50
183  15.25     0.80      0.528         0.028      ---          0.50
184  15.33     0.77      0.506         0.028      ---          0.48
185  15.42     0.77      0.506         0.028      ---          0.48
186  15.50     0.77      0.506         0.028      ---          0.48
187  15.58     0.63      0.418         0.027      ---          0.39
188  15.67     0.63      0.418         0.027      ---          0.39
189  15.75     0.63      0.418         0.027      ---          0.39
190  15.83     0.63      0.418         0.027      ---          0.39
191  15.92     0.63      0.418         0.027      ---          0.39
192  16.00     0.63      0.418         0.027      ---          0.39
193  16.08     0.13      0.088         0.027      ---          0.06
194  16.17     0.13      0.088         0.026      ---          0.06
195  16.25     0.13      0.088         0.026      ---          0.06
196  16.33     0.13      0.088         0.026      ---          0.06
197  16.42     0.13      0.088         0.026      ---          0.06
198  16.50     0.13      0.088         0.026      ---          0.06
199  16.58     0.10      0.066         0.026      ---          0.04
200  16.67     0.10      0.066         0.026      ---          0.04
201  16.75     0.10      0.066         0.026      ---          0.04
202  16.83     0.10      0.066         0.025      ---          0.04
203  16.92     0.10      0.066         0.025      ---          0.04
204  17.00     0.10      0.066         0.025      ---          0.04
205  17.08     0.17      0.110         0.025      ---          0.08
206  17.17     0.17      0.110         0.025      ---          0.09
207  17.25     0.17      0.110         0.025      ---          0.09
```

208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.06
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07
233	19.42	0.13	0.088	0.022	---	0.07
234	19.50	0.13	0.088	0.022	---	0.07
235	19.58	0.10	0.066	0.022	---	0.04
236	19.67	0.10	0.066	0.022	---	0.04
237	19.75	0.10	0.066	0.021	---	0.04
238	19.83	0.07	0.044	0.021	---	0.02
239	19.92	0.07	0.044	0.021	---	0.02
240	20.00	0.07	0.044	0.021	---	0.02
241	20.08	0.10	0.066	0.021	---	0.04
242	20.17	0.10	0.066	0.021	---	0.05
243	20.25	0.10	0.066	0.021	---	0.05
244	20.33	0.10	0.066	0.021	---	0.05
245	20.42	0.10	0.066	0.021	---	0.05
246	20.50	0.10	0.066	0.021	---	0.05
247	20.58	0.10	0.066	0.021	---	0.05
248	20.67	0.10	0.066	0.020	---	0.05
249	20.75	0.10	0.066	0.020	---	0.05
250	20.83	0.07	0.044	0.020	---	0.02
251	20.92	0.07	0.044	0.020	---	0.02
252	21.00	0.07	0.044	0.020	---	0.02
253	21.08	0.10	0.066	0.020	---	0.05
254	21.17	0.10	0.066	0.020	---	0.05
255	21.25	0.10	0.066	0.020	---	0.05
256	21.33	0.07	0.044	0.020	---	0.02
257	21.42	0.07	0.044	0.020	---	0.02
258	21.50	0.07	0.044	0.020	---	0.02
259	21.58	0.10	0.066	0.020	---	0.05
260	21.67	0.10	0.066	0.019	---	0.05
261	21.75	0.10	0.066	0.019	---	0.05
262	21.83	0.07	0.044	0.019	---	0.02
263	21.92	0.07	0.044	0.019	---	0.02
264	22.00	0.07	0.044	0.019	---	0.02
265	22.08	0.10	0.066	0.019	---	0.05
266	22.17	0.10	0.066	0.019	---	0.05
267	22.25	0.10	0.066	0.019	---	0.05

```
 268  22.33     0.07      0.044         0.019      ---          0.03
 269  22.42     0.07      0.044         0.019      ---          0.03
 270  22.50     0.07      0.044         0.019      ---          0.03
 271  22.58     0.07      0.044         0.019      ---          0.03
 272  22.67     0.07      0.044         0.019      ---          0.03
 273  22.75     0.07      0.044         0.019      ---          0.03
 274  22.83     0.07      0.044         0.019      ---          0.03
 275  22.92     0.07      0.044         0.019      ---          0.03
 276  23.00     0.07      0.044         0.019      ---          0.03
 277  23.08     0.07      0.044         0.019      ---          0.03
 278  23.17     0.07      0.044         0.018      ---          0.03
 279  23.25     0.07      0.044         0.018      ---          0.03
 280  23.33     0.07      0.044         0.018      ---          0.03
 281  23.42     0.07      0.044         0.018      ---          0.03
 282  23.50     0.07      0.044         0.018      ---          0.03
 283  23.58     0.07      0.044         0.018      ---          0.03
 284  23.67     0.07      0.044         0.018      ---          0.03
 285  23.75     0.07      0.044         0.018      ---          0.03
 286  23.83     0.07      0.044         0.018      ---          0.03
 287  23.92     0.07      0.044         0.018      ---          0.03
 288  24.00     0.07      0.044         0.018      ---          0.03
     Sum =     100.0                                   Sum =    55.6
      Flood volume = Effective rainfall      4.63(In)
       times area     231.4(Ac.)/[(In)/(Ft.)] =      89.3(Ac.Ft)
      Total soil loss =      0.87(In)
      Total soil loss =    16.734(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     3888858.9 Cubic Feet
      Total soil loss =      728954.2 Cubic Feet
      -----------------------------------------------------------------
--
       Peak flow rate of this hydrograph =    151.032(CFS)
      -----------------------------------------------------------------
--
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      -----------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      -----------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0
200.0

----------------------------------------------------------------------
    0+ 5       0.0002      0.03  Q         |         |         |
|
    0+10       0.0013      0.15  Q         |         |         |
|
    0+15       0.0037      0.35  Q         |         |         |
|
    0+20       0.0071      0.49  Q         |         |         |
|
    0+25       0.0107      0.52  Q         |         |         |
|
    0+30       0.0141      0.50  Q         |         |         |
|
```

```
    0+35      0.0174     0.49  Q         |         |         |
|
    0+40      0.0209     0.51  Q         |         |         |
|
    0+45      0.0247     0.54  Q         |         |         |
|
    0+50      0.0298     0.75  Q         |         |         |
|
    0+55      0.0394     1.40  Q         |         |         |
|
    1+ 0      0.0561     2.42  Q         |         |         |
|
    1+ 5      0.0773     3.07  Q         |         |         |
|
    1+10      0.0979     2.99  Q         |         |         |
|
    1+15      0.1143     2.37  Q         |         |         |
|
    1+20      0.1272     1.88  Q         |         |         |
|
    1+25      0.1387     1.66  Q         |         |         |
|
    1+30      0.1494     1.57  Q         |         |         |
|
    1+35      0.1599     1.52  Q         |         |         |
|
    1+40      0.1702     1.49  Q         |         |         |
|
    1+45      0.1804     1.48  Q         |         |         |
|
    1+50      0.1918     1.65  Q         |         |         |
|
    1+55      0.2073     2.26  Q         |         |         |
|
    2+ 0      0.2298     3.26  Q         |         |         |
|
    2+ 5      0.2577     4.06  Q         |         |         |
|
    2+10      0.2892     4.57  Q         |         |         |
|
    2+15      0.3231     4.92  Q         |         |         |
|
    2+20      0.3589     5.20  VQ        |         |         |
|
    2+25      0.3963     5.44  VQ        |         |         |
|
    2+30      0.4352     5.65  VQ        |         |         |
|
    2+35      0.4765     6.00  VQ        |         |         |
|
    2+40      0.5232     6.77  VQ        |         |         |
|
    2+45      0.5775     7.89  VQ        |         |         |
|
    2+50      0.6382     8.80  VQ        |         |         |
|
    2+55      0.7029     9.40  VQ        |         |         |
|
    3+ 0      0.7705     9.82  VQ        |         |         |
|
```

```
    3+ 5       0.8404     10.16  V Q       |         |         |
|
    3+10       0.9124     10.45  V Q       |         |         |
|
    3+15       0.9863     10.72  V Q       |         |         |
|
    3+20       1.0617     10.95  V Q       |         |         |
|
    3+25       1.1386     11.17  V Q       |         |         |
|
    3+30       1.2169     11.36  V Q       |         |         |
|
    3+35       1.2963     11.53  V Q       |         |         |
|
    3+40       1.3768     11.69  V Q       |         |         |
|
    3+45       1.4583     11.83  V Q       |         |         |
|
    3+50       1.5417     12.12  V Q       |         |         |
|
    3+55       1.6301     12.83  V Q       |         |         |
|
    4+ 0       1.7260     13.92  V Q       |         |         |
|
    4+ 5       1.8280     14.82  V Q       |         |         |
|
    4+10       1.9341     15.41  V  Q      |         |         |
|
    4+15       2.0432     15.83  V  Q      |         |         |
|
    4+20       2.1558     16.35  V  Q      |         |         |
|
    4+25       2.2746     17.26  |V Q      |         |         |
|
    4+30       2.4021     18.51  |V Q      |         |         |
|
    4+35       2.5365     19.53  |V Q      |         |         |
|
    4+40       2.6758     20.22  |V  Q     |         |         |
|
    4+45       2.8184     20.71  |V  Q     |         |         |
|
    4+50       2.9650     21.28  |V  Q     |         |         |
|
    4+55       3.1180     22.22  |V  Q     |         |         |
|
    5+ 0       3.2799     23.50  |V  Q     |         |         |
|
    5+ 5       3.4466     24.21  |V  Q     |         |         |
|
    5+10       3.6100     23.73  |V  Q     |         |         |
|
    5+15       3.7636     22.30  |V  Q     |         |         |
|
    5+20       3.9106     21.35  |V  Q     |         |         |
|
    5+25       4.0580     21.39  |V  Q     |         |         |
|
    5+30       4.2100     22.08  |V  Q     |         |         |
|
```

```
    5+35       4.3673     22.83  |V  Q     |         |         |
|
    5+40       4.5310     23.77  | V Q     |         |         |
|
    5+45       4.7029     24.96  | V Q     |         |         |
|
    5+50       4.8813     25.91  | V  Q    |         |         |
|
    5+55       5.0640     26.53  | V  Q    |         |         |
|
    6+ 0       5.2498     26.98  | V  Q    |         |         |
|
    6+ 5       5.4394     27.53  | V  Q    |         |         |
|
    6+10       5.6354     28.45  | V  Q    |         |         |
|
    6+15       5.8401     29.72  | V  Q    |         |         |
|
    6+20       6.0519     30.76  | V   Q   |         |         |
|
    6+25       6.2685     31.45  | V   Q   |         |         |
|
    6+30       6.4886     31.96  | V   Q   |         |         |
|
    6+35       6.7128     32.55  |  V  Q   |         |         |
|
    6+40       6.9436     33.52  |  V  Q   |         |         |
|
    6+45       7.1834     34.81  |  V  Q   |         |         |
|
    6+50       7.4303     35.85  |  V   Q  |         |         |
|
    6+55       7.6821     36.57  |  V   Q  |         |         |
|
    7+ 0       7.9376     37.10  |  V   Q  |         |         |
|
    7+ 5       8.1961     37.53  |  V   Q  |         |         |
|
    7+10       8.4572     37.92  |  V   Q  |         |         |
|
    7+15       8.7207     38.25  |  V   Q  |         |         |
|
    7+20       8.9872     38.70  |   V  Q  |         |         |
|
    7+25       9.2597     39.56  |   V  Q  |         |         |
|
    7+30       9.5405     40.77  |   V   Q |         |         |
|
    7+35       9.8292     41.92  |   V   Q |         |         |
|
    7+40      10.1266     43.18  |   V   Q |         |         |
|
    7+45      10.4339     44.63  |   V   Q |         |         |
|
    7+50      10.7505     45.96  |   V    Q|         |         |
|
    7+55      11.0766     47.36  |   V    Q|         |         |
|
    8+ 0      11.4138     48.96  |    V   Q|         |         |
|
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```
    8+ 5      11.7625     50.62  |    V    Q         |         |
|
    8+10      12.1258     52.76  |    V    Q         |         |
|
    8+15      12.5076     55.44  |    V    |Q        |         |
|
    8+20      12.9042     57.58  |    V    |Q        |         |
|
    8+25      13.3108     59.04  |    V    |Q        |         |
|
    8+30      13.7247     60.10  |     V   | Q       |         |
|
    8+35      14.1456     61.11  |     V   | Q       |         |
|
    8+40      14.5756     62.44  |     V   | Q       |         |
|
    8+45      15.0168     64.06  |     V   | Q       |         |
|
    8+50      15.4682     65.55  |     V   |  Q      |         |
|
    8+55      15.9305     67.12  |      V  |  Q      |         |
|
    9+ 0      16.4045     68.83  |      V  |  Q      |         |
|
    9+ 5      16.8904     70.56  |      V  |   Q     |         |
|
    9+10      17.3916     72.77  |      V  |   Q     |         |
|
    9+15      17.9116     75.51  |       V |    Q    |         |
|
    9+20      18.4481     77.90  |       V |    Q    |         |
|
    9+25      18.9993     80.03  |       V |     Q   |         |
|
    9+30      19.5651     82.15  |       V |     Q   |         |
|
    9+35      20.1436     84.01  |        V|     Q   |         |
|
    9+40      20.7350     85.87  |        V|      Q  |         |
|
    9+45      21.3400     87.85  |        V|      Q  |         |
|
    9+50      21.9574     89.64  |        V|      Q  |         |
|
    9+55      22.5872     91.45  |         V       Q |         |
|
   10+ 0      23.2303     93.39  |         V       Q |         |
|
   10+ 5      23.8763     93.79  |         V       Q |         |
|
   10+10      24.5014     90.78  |         V       Q |         |
|
   10+15      25.0859     84.86  |         |V    Q   |         |
|
   10+20      25.6382     80.20  |         |V    Q   |         |
|
   10+25      26.1726     77.59  |         |V   Q    |         |
|
   10+30      26.6963     76.04  |         |V   Q    |         |
|
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```
   10+35      27.2181     75.77  |         | V  Q    |         |
|
   10+40      27.7545     77.89  |         | V  Q    |         |
|
   10+45      28.3197     82.07  |         | V   Q   |         |
|
   10+50      28.9079     85.40  |         | V    Q  |         |
|
   10+55      29.5092     87.31  |         |  V   Q  |         |
|
   11+ 0      30.1186     88.49  |         |  V   Q  |         |
|
   11+ 5      30.7330     89.21  |         |  V   Q  |         |
|
   11+10      31.3483     89.34  |         |   V  Q  |         |
|
   11+15      31.9613     89.00  |         |   V  Q  |         |
|
   11+20      32.5726     88.77  |         |   V  Q  |         |
|
   11+25      33.1838     88.74  |         |   V  Q  |         |
|
   11+30      33.7953     88.79  |         |    V Q  |         |
|
   11+35      34.4049     88.52  |         |    V Q  |         |
|
   11+40      35.0069     87.40  |         |    V Q  |         |
|
   11+45      35.5957     85.49  |         |    V Q  |         |
|
   11+50      36.1752     84.15  |         |     Q   |         |
|
   11+55      36.7529     83.88  |         |     Q   |         |
|
   12+ 0      37.3335     84.31  |         |     Q   |         |
|
   12+ 5      37.9246     85.83  |         |     VQ  |         |
|
   12+10      38.5456     90.17  |         |      VQ |         |
|
   12+15      39.2141     97.06  |         |      V Q|         |
|
   12+20      39.9213    102.69  |         |      V  Q         |
|
   12+25      40.6555    106.60  |         |       V |Q        |
|
   12+30      41.4113    109.74  |         |       V |Q        |
|
   12+35      42.1860    112.50  |         |       V | Q       |
|
   12+40      42.9815    115.51  |         |        V|  Q      |
|
   12+45      43.8003    118.88  |         |        V|  Q      |
|
   12+50      44.6386    121.73  |         |         V   Q     |
|
   12+55      45.4941    124.22  |         |         V   Q     |
|
   13+ 0      46.3666    126.68  |         |         V    Q    |
|
```

```
   13+ 5      47.2590    129.59  |         |         |V   Q    |
|
   13+10      48.1831    134.17  |         |         |V    Q   |
|
   13+15      49.1497    140.35  |         |         | V     Q |
|
   13+20      50.1505    145.31  |         |         | V      Q|
|
   13+25      51.1742    148.65  |         |         | V      Q|
|
   13+30      52.2144    151.03  |         |         |  V      Q
|
   13+35      53.2543    151.00  |         |         |  V      Q
|
   13+40      54.2597    145.98  |         |         |   V    Q|
|
   13+45      55.2004    136.58  |         |         |   V  Q  |
|
   13+50      56.0902    129.20  |         |         |    Q    |
|
   13+55      56.9513    125.04  |         |         |    Q    |
|
   14+ 0      57.7953    122.55  |         |         |   QV    |
|
   14+ 5      58.6317    121.43  |         |         |   Q V   |
|
   14+10      59.4747    122.41  |         |         |   Q V   |
|
   14+15      60.3367    125.17  |         |         |    Q V  |
|
   14+20      61.2127    127.19  |         |         |    Q V  |
|
   14+25      62.0926    127.76  |         |         |    Q V  |
|
   14+30      62.9707    127.50  |         |         |    Q  V |
|
   14+35      63.8475    127.31  |         |         |    Q  V |
|
   14+40      64.7245    127.34  |         |         |    Q  V |
|
   14+45      65.6026    127.50  |         |         |    Q   V|
|
   14+50      66.4807    127.51  |         |         |    Q   V|
|
   14+55      67.3558    127.05  |         |         |    Q    V
|
   15+ 0      68.2243    126.11  |         |         |    Q    V
|
   15+ 5      69.0863    125.16  |         |         |    Q    V
|
   15+10      69.9408    124.07  |         |         |   Q     |V
|
   15+15      70.7861    122.74  |         |         |   Q     |V
|
   15+20      71.6230    121.51  |         |         |   Q     | V
|
   15+25      72.4510    120.23  |         |         |   Q     | V
|
   15+30      73.2689    118.76  |         |         |  Q      | V
|
```

```
   15+35      74.0739    116.89  |         |         |  Q      |  V
|
   15+40      74.8569    113.70  |         |         | Q       |  V
|
   15+45      75.6091    109.21  |         |         |Q        |  V
|
   15+50      76.3366    105.64  |         |         |Q        |   V
|
   15+55      77.0484    103.35  |         |         Q         |   V
|
   16+ 0      77.7490    101.72  |         |         Q         |   V
|
   16+ 5      78.4226     97.82  |         |        Q|         |    V
|
   16+10      79.0263     87.65  |         |      Q  |         |    V
|
   16+15      79.5218     71.95  |         |   Q     |         |    V
|
   16+20      79.9309     59.40  |         |Q        |         |    V
|
   16+25      80.2857     51.52  |         Q         |         |    V
|
   16+30      80.6046     46.30  |        Q|         |         |     V
|
   16+35      80.8952     42.20  |       Q |         |         |     V
|
   16+40      81.1593     38.35  |      Q  |         |         |     V
|
   16+45      81.3977     34.62  |     Q   |         |         |     V
|
   16+50      81.6150     31.56  |     Q   |         |         |     V
|
   16+55      81.8155     29.11  |    Q    |         |         |     V
|
   17+ 0      82.0020     27.08  |    Q    |         |         |     V
|
   17+ 5      82.1789     25.68  |    Q    |         |         |     V
|
   17+10      82.3535     25.36  |    Q    |         |         |     V
|
   17+15      82.5325     25.99  |    Q    |         |         |     V
|
   17+20      82.7143     26.40  |    Q    |         |         |      V
|
   17+25      82.8951     26.26  |    Q    |         |         |      V
|
   17+30      83.0732     25.85  |    Q    |         |         |      V
|
   17+35      83.2484     25.45  |    Q    |         |         |      V
|
   17+40      83.4207     25.02  |    Q    |         |         |      V
|
   17+45      83.5900     24.57  |   Q     |         |         |      V
|
   17+50      83.7551     23.97  |   Q     |         |         |      V
|
   17+55      83.9131     22.95  |   Q     |         |         |      V
|
   18+ 0      84.0616     21.56  |   Q     |         |         |      V
|
```

```
   18+ 5      84.2019     20.37  |   Q     |         |         |      V
|
   18+10      84.3365     19.54  |  Q      |         |         |      V
|
   18+15      84.4665     18.88  |  Q      |         |         |      V
|
   18+20      84.5926     18.32  |  Q      |         |         |      V
|
   18+25      84.7152     17.79  |  Q      |         |         |      V
|
   18+30      84.8346     17.34  |  Q      |         |         |       V
|
   18+35      84.9502     16.78  |  Q      |         |         |       V
|
   18+40      85.0591     15.81  |  Q      |         |         |       V
|
   18+45      85.1588     14.48  | Q       |         |         |       V
|
   18+50      85.2497     13.19  | Q       |         |         |       V
|
   18+55      85.3308     11.78  | Q       |         |         |       V
|
   19+ 0      85.4019     10.32  | Q       |         |         |       V
|
   19+ 5      85.4671      9.48  |Q        |         |         |       V
|
   19+10      85.5320      9.41  |Q        |         |         |       V
|
   19+15      85.6003      9.92  |Q        |         |         |       V
|
   19+20      85.6726     10.50  | Q       |         |         |       V
|
   19+25      85.7501     11.26  | Q       |         |         |       V
|
   19+30      85.8349     12.31  | Q       |         |         |       V
|
   19+35      85.9242     12.97  | Q       |         |         |       V
|
   19+40      86.0129     12.88  | Q       |         |         |       V
|
   19+45      86.0973     12.25  | Q       |         |         |       V
|
   19+50      86.1770     11.58  | Q       |         |         |       V
|
   19+55      86.2509     10.74  | Q       |         |         |       V
|
   20+ 0      86.3172      9.62  |Q        |         |         |       V
|
   20+ 5      86.3785      8.90  |Q        |         |         |       V
|
   20+10      86.4400      8.93  |Q        |         |         |       V
|
   20+15      86.5054      9.50  |Q        |         |         |       V
|
   20+20      86.5741      9.97  |Q        |         |         |       V
|
   20+25      86.6442     10.18  | Q       |         |         |       V
|
   20+30      86.7149     10.27  | Q       |         |         |       V
|
```

```
     20+35      86.7860     10.32  | Q        |         |         |       V
 |
     20+40      86.8573     10.36  | Q        |         |         |       V
 |
     20+45      86.9289     10.40  | Q        |         |         |       V
 |
     20+50      86.9997     10.28  | Q        |         |         |       V
 |
     20+55      87.0667      9.72  |Q         |         |         |
V|
     21+ 0      87.1271      8.77  |Q         |         |         |
V|
     21+ 5      87.1834      8.19  |Q         |         |         |
V|
     21+10      87.2408      8.33  |Q         |         |         |
V|
     21+15      87.3028      9.00  |Q         |         |         |
V|
     21+20      87.3674      9.37  |Q         |         |         |
V|
     21+25      87.4297      9.05  |Q         |         |         |
V|
     21+30      87.4864      8.23  |Q         |         |         |
V|
     21+35      87.5397      7.74  |Q         |         |         |
V|
     21+40      87.5946      7.97  |Q         |         |         |
V|
     21+45      87.6548      8.74  |Q         |         |         |
V|
     21+50      87.7182      9.21  |Q         |         |         |
V|
     21+55      87.7801      8.98  |Q         |         |         |
V|
     22+ 0      87.8366      8.22  |Q         |         |         |
V|
     22+ 5      87.8901      7.76  |Q         |         |         |
V|
     22+10      87.9452      8.01  |Q         |         |         |
V|
     22+15      88.0056      8.76  |Q         |         |         |
V|
     22+20      88.0689      9.19  |Q         |         |         |
V|
     22+25      88.1303      8.92  |Q         |         |         |
V|
     22+30      88.1864      8.14  |Q         |         |         |
V|
     22+35      88.2381      7.51  |Q         |         |         |
V|
     22+40      88.2874      7.16  |Q         |         |         |
V|
     22+45      88.3353      6.96  |Q         |         |         |
V|
     22+50      88.3823      6.83  |Q         |         |         |
V|
     22+55      88.4287      6.73  |Q         |         |         |
V|
     23+ 0      88.4745      6.65  |Q         |         |         |
V|
```

```
   23+ 5      88.5197      6.57  |Q         |         |         |
V|
   23+10      88.5644      6.49  |Q         |         |         |
V|
   23+15      88.6087      6.43  |Q         |         |         |
V|
   23+20      88.6526      6.37  |Q         |         |         |
V|
   23+25      88.6962      6.33  |Q         |         |         |
V|
   23+30      88.7396      6.30  |Q         |         |         |
V|
   23+35      88.7827      6.27  |Q         |         |         |
V|
   23+40      88.8256      6.23  |Q         |         |         |
V|
   23+45      88.8684      6.21  |Q         |         |         |
V|
   23+50      88.9112      6.21  |Q         |         |         |
V|
   23+55      88.9539      6.21  |Q         |         |         |
V|
   24+ 0      88.9966      6.19  |Q         |         |         |
V|
   24+ 5      89.0377      5.97  |Q         |         |         |
V|
   24+10      89.0738      5.24  |Q         |         |         |
V|
   24+15      89.1019      4.08  Q          |         |         |
V|
   24+20      89.1237      3.17  Q          |         |         |
V|
   24+25      89.1417      2.61  Q          |         |         |
V|
   24+30      89.1571      2.24  Q          |         |         |
V|
   24+35      89.1705      1.94  Q          |         |         |
V|
   24+40      89.1821      1.69  Q          |         |         |
V|
   24+45      89.1923      1.49  Q          |         |         |
V|
   24+50      89.2015      1.33  Q          |         |         |
V|
   24+55      89.2097      1.19  Q          |         |         |
V|
   25+ 0      89.2171      1.07  Q          |         |         |
V|
   25+ 5      89.2236      0.95  Q          |         |         |
V|
   25+10      89.2294      0.84  Q          |         |         |
V|
   25+15      89.2346      0.76  Q          |         |         |
V|
   25+20      89.2394      0.69  Q          |         |         |
V|
   25+25      89.2438      0.63  Q          |         |         |
V|
   25+30      89.2477      0.57  Q          |         |         |
V|
```

```
   25+35      89.2513      0.53  Q          |          |          |
V|
   25+40      89.2546      0.48  Q          |          |          |
V|
   25+45      89.2576      0.43  Q          |          |          |
V|
   25+50      89.2603      0.39  Q          |          |          |
V|
   25+55      89.2627      0.35  Q          |          |          |
V|
   26+ 0      89.2649      0.32  Q          |          |          |
V|
   26+ 5      89.2668      0.28  Q          |          |          |
V|
   26+10      89.2686      0.25  Q          |          |          |
V|
   26+15      89.2701      0.22  Q          |          |          |
V|
   26+20      89.2715      0.20  Q          |          |          |
V|
   26+25      89.2726      0.17  Q          |          |          |
V|
   26+30      89.2736      0.14  Q          |          |          |
V|
   26+35      89.2745      0.12  Q          |          |          |
V|
   26+40      89.2751      0.09  Q          |          |          |
V|
   26+45      89.2755      0.07  Q          |          |          |
V|
   26+50      89.2758      0.04  Q          |          |          |
V|
   26+55      89.2759      0.01  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/02/18 File: stockpile2areapre24100.out

      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---

      Badlands Landfill
      Stockpile area 2
      24 hour 100 year storm event
      -----------------------------------------------------------------
--
      Drainage Area =      29.90(Ac.)  =      0.047 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      29.90(Ac.)  =
0.047 Sq. Mi.
      Length along longest watercourse =    2076.00(Ft.)
      Length along longest watercourse measured to centroid =     875.00
(Ft.)
      Length along longest watercourse =      0.393 Mi.
      Length along longest watercourse measured to centroid =      0.166
Mi.
      Difference in elevation =     367.00(Ft.)
      Slope along watercourse =    933.4104 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.093 Hr.
      Lag time =     5.56 Min.
      25% of lag time =     1.39 Min.
      40% of lag time =     2.23 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             29.90              2.00                   59.80

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             29.90              5.50                  164.45

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          29.900           93.00         0.000
       Total Area Entered =     29.90(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083         89.857         19.978              6.020
          2   0.167        179.715         38.032             11.460
          3   0.250        269.572         13.900              4.189
          4   0.333        359.429          7.957              2.398
          5   0.417        449.287          5.025              1.514
          6   0.500        539.144          3.709              1.118
          7   0.583        629.002          2.902              0.874
          8   0.667        718.859          2.359              0.711
          9   0.750        808.716          1.876              0.565
         10   0.833        898.574          1.628              0.491
         11   0.917        988.431          1.617              0.487
         12   1.000       1078.288          1.017              0.306
                                     Sum = 100.000   Sum=      30.134
```

```
-----------------------------------------------------------------------

  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
  28   2.33     0.13      0.088         0.058      ---          0.03
  29   2.42     0.13      0.088         0.058      ---          0.03
  30   2.50     0.13      0.088         0.057      ---          0.03
  31   2.58     0.17      0.110         0.057      ---          0.05
  32   2.67     0.17      0.110         0.057      ---          0.05
  33   2.75     0.17      0.110         0.057      ---          0.05
  34   2.83     0.17      0.110         0.057      ---          0.05
  35   2.92     0.17      0.110         0.056      ---          0.05
  36   3.00     0.17      0.110         0.056      ---          0.05
  37   3.08     0.17      0.110         0.056      ---          0.05
  38   3.17     0.17      0.110         0.056      ---          0.05
  39   3.25     0.17      0.110         0.055      ---          0.05
  40   3.33     0.17      0.110         0.055      ---          0.05
  41   3.42     0.17      0.110         0.055      ---          0.06
  42   3.50     0.17      0.110         0.055      ---          0.06
  43   3.58     0.17      0.110         0.054      ---          0.06
  44   3.67     0.17      0.110         0.054      ---          0.06
  45   3.75     0.17      0.110         0.054      ---          0.06
  46   3.83     0.20      0.132         0.054      ---          0.08
  47   3.92     0.20      0.132         0.054      ---          0.08
  48   4.00     0.20      0.132         0.053      ---          0.08
  49   4.08     0.20      0.132         0.053      ---          0.08
  50   4.17     0.20      0.132         0.053      ---          0.08
  51   4.25     0.20      0.132         0.053      ---          0.08
  52   4.33     0.23      0.154         0.052      ---          0.10
  53   4.42     0.23      0.154         0.052      ---          0.10
  54   4.50     0.23      0.154         0.052      ---          0.10
  55   4.58     0.23      0.154         0.052      ---          0.10
```

56	4.67	0.23	0.154	0.052	---	0.10
57	4.75	0.23	0.154	0.051	---	0.10
58	4.83	0.27	0.176	0.051	---	0.12
59	4.92	0.27	0.176	0.051	---	0.13
60	5.00	0.27	0.176	0.051	---	0.13
61	5.08	0.20	0.132	0.050	---	0.08
62	5.17	0.20	0.132	0.050	---	0.08
63	5.25	0.20	0.132	0.050	---	0.08
64	5.33	0.23	0.154	0.050	---	0.10
65	5.42	0.23	0.154	0.050	---	0.10
66	5.50	0.23	0.154	0.049	---	0.10
67	5.58	0.27	0.176	0.049	---	0.13
68	5.67	0.27	0.176	0.049	---	0.13
69	5.75	0.27	0.176	0.049	---	0.13
70	5.83	0.27	0.176	0.048	---	0.13
71	5.92	0.27	0.176	0.048	---	0.13
72	6.00	0.27	0.176	0.048	---	0.13
73	6.08	0.30	0.198	0.048	---	0.15
74	6.17	0.30	0.198	0.048	---	0.15
75	6.25	0.30	0.198	0.047	---	0.15
76	6.33	0.30	0.198	0.047	---	0.15
77	6.42	0.30	0.198	0.047	---	0.15
78	6.50	0.30	0.198	0.047	---	0.15
79	6.58	0.33	0.220	0.047	---	0.17
80	6.67	0.33	0.220	0.046	---	0.17
81	6.75	0.33	0.220	0.046	---	0.17
82	6.83	0.33	0.220	0.046	---	0.17
83	6.92	0.33	0.220	0.046	---	0.17
84	7.00	0.33	0.220	0.046	---	0.17
85	7.08	0.33	0.220	0.045	---	0.17
86	7.17	0.33	0.220	0.045	---	0.17
87	7.25	0.33	0.220	0.045	---	0.18
88	7.33	0.37	0.242	0.045	---	0.20
89	7.42	0.37	0.242	0.044	---	0.20
90	7.50	0.37	0.242	0.044	---	0.20
91	7.58	0.40	0.264	0.044	---	0.22
92	7.67	0.40	0.264	0.044	---	0.22
93	7.75	0.40	0.264	0.044	---	0.22
94	7.83	0.43	0.286	0.043	---	0.24
95	7.92	0.43	0.286	0.043	---	0.24
96	8.00	0.43	0.286	0.043	---	0.24
97	8.08	0.50	0.330	0.043	---	0.29
98	8.17	0.50	0.330	0.043	---	0.29
99	8.25	0.50	0.330	0.042	---	0.29
100	8.33	0.50	0.330	0.042	---	0.29
101	8.42	0.50	0.330	0.042	---	0.29
102	8.50	0.50	0.330	0.042	---	0.29
103	8.58	0.53	0.352	0.042	---	0.31
104	8.67	0.53	0.352	0.041	---	0.31
105	8.75	0.53	0.352	0.041	---	0.31
106	8.83	0.57	0.374	0.041	---	0.33
107	8.92	0.57	0.374	0.041	---	0.33
108	9.00	0.57	0.374	0.041	---	0.33
109	9.08	0.63	0.418	0.041	---	0.38
110	9.17	0.63	0.418	0.040	---	0.38
111	9.25	0.63	0.418	0.040	---	0.38
112	9.33	0.67	0.440	0.040	---	0.40
113	9.42	0.67	0.440	0.040	---	0.40
114	9.50	0.67	0.440	0.040	---	0.40
115	9.58	0.70	0.462	0.039	---	0.42

```
116   9.67     0.70      0.462         0.039      ---          0.42
117   9.75     0.70      0.462         0.039      ---          0.42
118   9.83     0.73      0.484         0.039      ---          0.45
119   9.92     0.73      0.484         0.039      ---          0.45
120  10.00     0.73      0.484         0.038      ---          0.45
121  10.08     0.50      0.330         0.038      ---          0.29
122  10.17     0.50      0.330         0.038      ---          0.29
123  10.25     0.50      0.330         0.038      ---          0.29
124  10.33     0.50      0.330         0.038      ---          0.29
125  10.42     0.50      0.330         0.038      ---          0.29
126  10.50     0.50      0.330         0.037      ---          0.29
127  10.58     0.67      0.440         0.037      ---          0.40
128  10.67     0.67      0.440         0.037      ---          0.40
129  10.75     0.67      0.440         0.037      ---          0.40
130  10.83     0.67      0.440         0.037      ---          0.40
131  10.92     0.67      0.440         0.036      ---          0.40
132  11.00     0.67      0.440         0.036      ---          0.40
133  11.08     0.63      0.418         0.036      ---          0.38
134  11.17     0.63      0.418         0.036      ---          0.38
135  11.25     0.63      0.418         0.036      ---          0.38
136  11.33     0.63      0.418         0.036      ---          0.38
137  11.42     0.63      0.418         0.035      ---          0.38
138  11.50     0.63      0.418         0.035      ---          0.38
139  11.58     0.57      0.374         0.035      ---          0.34
140  11.67     0.57      0.374         0.035      ---          0.34
141  11.75     0.57      0.374         0.035      ---          0.34
142  11.83     0.60      0.396         0.034      ---          0.36
143  11.92     0.60      0.396         0.034      ---          0.36
144  12.00     0.60      0.396         0.034      ---          0.36
145  12.08     0.83      0.550         0.034      ---          0.52
146  12.17     0.83      0.550         0.034      ---          0.52
147  12.25     0.83      0.550         0.034      ---          0.52
148  12.33     0.87      0.572         0.033      ---          0.54
149  12.42     0.87      0.572         0.033      ---          0.54
150  12.50     0.87      0.572         0.033      ---          0.54
151  12.58     0.93      0.616         0.033      ---          0.58
152  12.67     0.93      0.616         0.033      ---          0.58
153  12.75     0.93      0.616         0.033      ---          0.58
154  12.83     0.97      0.638         0.032      ---          0.61
155  12.92     0.97      0.638         0.032      ---          0.61
156  13.00     0.97      0.638         0.032      ---          0.61
157  13.08     1.13      0.748         0.032      ---          0.72
158  13.17     1.13      0.748         0.032      ---          0.72
159  13.25     1.13      0.748         0.032      ---          0.72
160  13.33     1.13      0.748         0.031      ---          0.72
161  13.42     1.13      0.748         0.031      ---          0.72
162  13.50     1.13      0.748         0.031      ---          0.72
163  13.58     0.77      0.506         0.031      ---          0.47
164  13.67     0.77      0.506         0.031      ---          0.48
165  13.75     0.77      0.506         0.031      ---          0.48
166  13.83     0.77      0.506         0.031      ---          0.48
167  13.92     0.77      0.506         0.030      ---          0.48
168  14.00     0.77      0.506         0.030      ---          0.48
169  14.08     0.90      0.594         0.030      ---          0.56
170  14.17     0.90      0.594         0.030      ---          0.56
171  14.25     0.90      0.594         0.030      ---          0.56
172  14.33     0.87      0.572         0.030      ---          0.54
173  14.42     0.87      0.572         0.029      ---          0.54
174  14.50     0.87      0.572         0.029      ---          0.54
175  14.58     0.87      0.572         0.029      ---          0.54
```

176	14.67	0.87	0.572	0.029	---	0.54
177	14.75	0.87	0.572	0.029	---	0.54
178	14.83	0.83	0.550	0.029	---	0.52
179	14.92	0.83	0.550	0.029	---	0.52
180	15.00	0.83	0.550	0.028	---	0.52
181	15.08	0.80	0.528	0.028	---	0.50
182	15.17	0.80	0.528	0.028	---	0.50
183	15.25	0.80	0.528	0.028	---	0.50
184	15.33	0.77	0.506	0.028	---	0.48
185	15.42	0.77	0.506	0.028	---	0.48
186	15.50	0.77	0.506	0.028	---	0.48
187	15.58	0.63	0.418	0.027	---	0.39
188	15.67	0.63	0.418	0.027	---	0.39
189	15.75	0.63	0.418	0.027	---	0.39
190	15.83	0.63	0.418	0.027	---	0.39
191	15.92	0.63	0.418	0.027	---	0.39
192	16.00	0.63	0.418	0.027	---	0.39
193	16.08	0.13	0.088	0.027	---	0.06
194	16.17	0.13	0.088	0.026	---	0.06
195	16.25	0.13	0.088	0.026	---	0.06
196	16.33	0.13	0.088	0.026	---	0.06
197	16.42	0.13	0.088	0.026	---	0.06
198	16.50	0.13	0.088	0.026	---	0.06
199	16.58	0.10	0.066	0.026	---	0.04
200	16.67	0.10	0.066	0.026	---	0.04
201	16.75	0.10	0.066	0.026	---	0.04
202	16.83	0.10	0.066	0.025	---	0.04
203	16.92	0.10	0.066	0.025	---	0.04
204	17.00	0.10	0.066	0.025	---	0.04
205	17.08	0.17	0.110	0.025	---	0.08
206	17.17	0.17	0.110	0.025	---	0.09
207	17.25	0.17	0.110	0.025	---	0.09
208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.07
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07
233	19.42	0.13	0.088	0.022	---	0.07
234	19.50	0.13	0.088	0.022	---	0.07
235	19.58	0.10	0.066	0.022	---	0.04

```
236  19.67     0.10      0.066         0.022      ---          0.04
237  19.75     0.10      0.066         0.021      ---          0.04
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      29.9(Ac.)/[(In)/(Ft.)] =      11.5(Ac.Ft)
     Total soil loss =      0.87(In)
     Total soil loss =     2.162(Ac.Ft)
     Total rainfall =      5.50(In)
     Flood volume =      502727.5 Cubic Feet
```

```
      Total soil loss =       94191.1 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     21.193(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0002      0.03  Q         |         |         |
|
    0+10       0.0007      0.08  Q         |         |         |
|
    0+15       0.0014      0.10  Q         |         |         |
|
    0+20       0.0020      0.09  Q         |         |         |
|
    0+25       0.0025      0.08  Q         |         |         |
|
    0+30       0.0031      0.08  Q         |         |         |
|
    0+35       0.0036      0.08  Q         |         |         |
|
    0+40       0.0042      0.09  Q         |         |         |
|
    0+45       0.0048      0.09  Q         |         |         |
|
    0+50       0.0064      0.23  Q         |         |         |
|
    0+55       0.0098      0.49  Q         |         |         |
|
    1+ 0       0.0139      0.59  Q         |         |         |
|
    1+ 5       0.0174      0.52  Q         |         |         |
|
    1+10       0.0195      0.30  Q         |         |         |
|
    1+15       0.0212      0.24  Q         |         |         |
|
    1+20       0.0227      0.22  Q         |         |         |
|
    1+25       0.0241      0.21  Q         |         |         |
|
    1+30       0.0255      0.20  Q         |         |         |
|
    1+35       0.0269      0.20  Q         |         |         |
|
    1+40       0.0283      0.20  Q         |         |         |
|
```

```
     1+45       0.0297      0.20  Q         |         |         |
|
     1+50       0.0320      0.33  Q         |         |         |
|
     1+55       0.0360      0.58  Q         |         |         |
|
     2+ 0       0.0406      0.67  Q         |         |         |
|
     2+ 5       0.0457      0.73  Q         |         |         |
|
     2+10       0.0510      0.78  VQ        |         |         |
|
     2+15       0.0566      0.81  VQ        |         |         |
|
     2+20       0.0623      0.83  VQ        |         |         |
|
     2+25       0.0682      0.86  VQ        |         |         |
|
     2+30       0.0743      0.88  VQ        |         |         |
|
     2+35       0.0813      1.03  VQ        |         |         |
|
     2+40       0.0903      1.30  VQ        |         |         |
|
     2+45       0.0999      1.40  VQ        |         |         |
|
     2+50       0.1100      1.46  VQ        |         |         |
|
     2+55       0.1203      1.50  V Q       |         |         |
|
     3+ 0       0.1309      1.53  V Q       |         |         |
|
     3+ 5       0.1416      1.56  V Q       |         |         |
|
     3+10       0.1525      1.58  V Q       |         |         |
|
     3+15       0.1636      1.60  V Q       |         |         |
|
     3+20       0.1747      1.62  V Q       |         |         |
|
     3+25       0.1860      1.64  V Q       |         |         |
|
     3+30       0.1974      1.65  V Q       |         |         |
|
     3+35       0.2088      1.66  V Q       |         |         |
|
     3+40       0.2203      1.67  V Q       |         |         |
|
     3+45       0.2318      1.67  V Q       |         |         |
|
     3+50       0.2443      1.81  V Q       |         |         |
|
     3+55       0.2586      2.07  V Q       |         |         |
|
     4+ 0       0.2735      2.17  V Q       |         |         |
|
     4+ 5       0.2889      2.23  |VQ       |         |         |
|
     4+10       0.3045      2.27  |V Q      |         |         |
|
```

```
    4+15       0.3204      2.30  |V Q      |         |         |
|
    4+20       0.3373      2.46  |V Q      |         |         |
|
    4+25       0.3561      2.73  |V Q      |         |         |
|
    4+30       0.3757      2.85  |V Q      |         |         |
|
    4+35       0.3958      2.92  |V Q      |         |         |
|
    4+40       0.4163      2.97  |V Q      |         |         |
|
    4+45       0.4369      3.01  |V  Q     |         |         |
|
    4+50       0.4587      3.16  |V  Q     |         |         |
|
    4+55       0.4824      3.44  |V  Q     |         |         |
|
    5+ 0       0.5069      3.55  |V  Q     |         |         |
|
    5+ 5       0.5300      3.35  |V  Q     |         |         |
|
    5+10       0.5499      2.90  |V Q      |         |         |
|
    5+15       0.5689      2.75  |V Q      |         |         |
|
    5+20       0.5883      2.81  | VQ      |         |         |
|
    5+25       0.6090      3.02  | V Q     |         |         |
|
    5+30       0.6302      3.08  | V Q     |         |         |
|
    5+35       0.6525      3.24  | V Q     |         |         |
|
    5+40       0.6767      3.51  | V Q     |         |         |
|
    5+45       0.7017      3.62  | V Q     |         |         |
|
    5+50       0.7270      3.68  | V Q     |         |         |
|
    5+55       0.7525      3.71  | V Q     |         |         |
|
    6+ 0       0.7783      3.74  | V Q     |         |         |
|
    6+ 5       0.8052      3.91  | V  Q    |         |         |
|
    6+10       0.8341      4.19  | V  Q    |         |         |
|
    6+15       0.8638      4.31  | V  Q    |         |         |
|
    6+20       0.8939      4.38  |  V Q    |         |         |
|
    6+25       0.9244      4.43  |  V Q    |         |         |
|
    6+30       0.9552      4.47  |  V Q    |         |         |
|
    6+35       0.9871      4.63  |  V  Q   |         |         |
|
    6+40       1.0209      4.90  |  V  Q   |         |         |
|
```

```
    6+45       1.0554       5.01 |  V  Q   |         |         |
|
    6+50       1.0904       5.08 |  V  Q   |         |         |
|
    6+55       1.1257       5.13 |  V  Q   |         |         |
|
    7+ 0       1.1613       5.17 |   V Q   |         |         |
|
    7+ 5       1.1971       5.20 |   V Q   |         |         |
|
    7+10       1.2331       5.22 |   V Q   |         |         |
|
    7+15       1.2691       5.24 |   V Q   |         |         |
|
    7+20       1.3062       5.39 |   V  Q  |         |         |
|
    7+25       1.3452       5.66 |   V  Q  |         |         |
|
    7+30       1.3848       5.76 |   V  Q  |         |         |
|
    7+35       1.4258       5.95 |   V  Q  |         |         |
|
    7+40       1.4688       6.24 |    V  Q |         |         |
|
    7+45       1.5127       6.37 |    V  Q |         |         |
|
    7+50       1.5580       6.58 |    V  Q |         |         |
|
    7+55       1.6054       6.88 |    V   Q|         |         |
|
    8+ 0       1.6537       7.02 |    V   Q|         |         |
|
    8+ 5       1.7045       7.37 |    V   Q|         |         |
|
    8+10       1.7592       7.94 |     V   Q         |         |
|
    8+15       1.8156       8.18 |     V   Q         |         |
|
    8+20       1.8729       8.32 |     V   |Q        |         |
|
    8+25       1.9308       8.42 |     V   |Q        |         |
|
    8+30       1.9893       8.49 |     V   |Q        |         |
|
    8+35       2.0491       8.68 |      V  |Q        |         |
|
    8+40       2.1110       8.98 |      V  |Q        |         |
|
    8+45       2.1737       9.11 |      V  | Q       |         |
|
    8+50       2.2379       9.32 |      V  | Q       |         |
|
    8+55       2.3043       9.64 |      V  | Q       |         |
|
    9+ 0       2.3716       9.77 |       V |  Q      |         |
|
    9+ 5       2.4413      10.12 |       V |  Q      |         |
|
    9+10       2.5148      10.67 |       V |   Q     |         |
|
```

```
    9+15       2.5899     10.90  |       V |   Q     |         |
|
    9+20       2.6668     11.18  |        V|   Q     |         |
|
    9+25       2.7462     11.53  |        V|    Q    |         |
|
    9+30       2.8268     11.69  |        V|    Q    |         |
|
    9+35       2.9090     11.93  |         V    Q    |         |
|
    9+40       2.9934     12.27  |         V     Q   |         |
|
    9+45       3.0790     12.42  |         V     Q   |         |
|
    9+50       3.1661     12.65  |         V     Q   |         |
|
    9+55       3.2555     12.98  |         |V     Q  |         |
|
   10+ 0       3.3460     13.13  |         |V     Q  |         |
|
   10+ 5       3.4306     12.29  |         |V    Q   |         |
|
   10+10       3.5035     10.59  |         | V Q     |         |
|
   10+15       3.5724      9.99  |         | VQ      |         |
|
   10+20       3.6389      9.66  |         | Q       |         |
|
   10+25       3.7041      9.46  |         | Q       |         |
|
   10+30       3.7682      9.31  |         | QV      |         |
|
   10+35       3.8361      9.86  |         |  Q      |         |
|
   10+40       3.9120     11.02  |         |  VQ     |         |
|
   10+45       3.9906     11.41  |         |  V Q    |         |
|
   10+50       4.0705     11.60  |         |   VQ    |         |
|
   10+55       4.1511     11.70  |         |   VQ    |         |
|
   11+ 0       4.2322     11.78  |         |   VQ    |         |
|
   11+ 5       4.3132     11.75  |         |   VQ    |         |
|
   11+10       4.3929     11.58  |         |    Q    |         |
|
   11+15       4.4725     11.56  |         |    Q    |         |
|
   11+20       4.5522     11.56  |         |    Q    |         |
|
   11+25       4.6320     11.59  |         |    QV   |         |
|
   11+30       4.7119     11.60  |         |    QV   |         |
|
   11+35       4.7899     11.33  |         |    QV   |         |
|
   11+40       4.8644     10.81  |         |   Q V   |         |
|
```

```
   11+45       4.9375     10.62  |         |   Q  V  |         |
|
   11+50       5.0108     10.64  |         |   Q  V  |         |
|
   11+55       5.0853     10.82  |         |   Q  V  |         |
|
   12+ 0       5.1601     10.86  |         |   Q  V  |         |
|
   12+ 5       5.2415     11.81  |         |    Q  V |         |
|
   12+10       5.3350     13.58  |         |       Q |         |
|
   12+15       5.4330     14.23  |         |       Q |         |
|
   12+20       5.5345     14.74  |         |        Q|         |
|
   12+25       5.6393     15.22  |         |        VQ         |
|
   12+30       5.7460     15.49  |         |        VQ         |
|
   12+35       5.8559     15.96  |         |         VQ        |
|
   12+40       5.9704     16.62  |         |         V Q       |
|
   12+45       6.0870     16.93  |         |         |VQ       |
|
   12+50       6.2059     17.27  |         |         |V Q      |
|
   12+55       6.3277     17.68  |         |         |V Q      |
|
   13+ 0       6.4509     17.89  |         |         | VQ      |
|
   13+ 5       6.5794     18.66  |         |         | V Q     |
|
   13+10       6.7171     20.00  |         |         |  V  Q   |
|
   13+15       6.8585     20.52  |         |         |  V   Q  |
|
   13+20       7.0019     20.83  |         |         |   V  Q  |
|
   13+25       7.1468     21.04  |         |         |   V   Q |
|
   13+30       7.2928     21.19  |         |         |    V  Q |
|
   13+35       7.4295     19.85  |         |         |    VQ   |
|
   13+40       7.5477     17.17  |         |         | Q   V   |
|
   13+45       7.6595     16.23  |         |         |Q    V   |
|
   13+50       7.7676     15.70  |         |         Q     V   |
|
   13+55       7.8737     15.40  |         |         Q      V  |
|
   14+ 0       7.9781     15.16  |         |         Q      V  |
|
   14+ 5       8.0848     15.49  |         |         Q       V |
|
   14+10       8.1972     16.33  |         |         |Q      V |
|
```

```
   14+15       8.3113     16.57  |         |         | Q     V |
|
   14+20       8.4251     16.53  |         |         | Q      V|
|
   14+25       8.5374     16.30  |         |         |Q       V|
|
   14+30       8.6492     16.23  |         |         |Q       V|
|
   14+35       8.7612     16.26  |         |         |Q        V
|
   14+40       8.8734     16.30  |         |         |Q        V
|
   14+45       8.9859     16.33  |         |         |Q        |V
|
   14+50       9.0976     16.22  |         |         |Q        |V
|
   14+55       9.2078     16.00  |         |         |Q        |V
|
   15+ 0       9.3175     15.93  |         |         |Q        | V
|
   15+ 5       9.4259     15.74  |         |         Q         | V
|
   15+10       9.5323     15.45  |         |         Q         |  V
|
   15+15       9.6378     15.33  |         |         Q         |  V
|
   15+20       9.7420     15.13  |         |         Q         |  V
|
   15+25       9.8441     14.83  |         |        Q|         |   V
|
   15+30       9.9454     14.70  |         |        Q|         |   V
|
   15+35      10.0425     14.10  |         |       Q |         |   V
|
   15+40      10.1322     13.03  |         |      Q  |         |    V
|
   15+45      10.2191     12.62  |         |     Q   |         |    V
|
   15+50      10.3044     12.39  |         |     Q   |         |    V
|
   15+55      10.3887     12.23  |         |     Q   |         |     V
|
   16+ 0      10.4721     12.12  |         |     Q   |         |     V
|
   16+ 5      10.5413     10.05  |         |  Q      |         |     V
|
   16+10      10.5840      6.19  |       Q |         |         |     V
|
   16+15      10.6167      4.76  |     Q   |         |         |     V
|
   16+20      10.6438      3.93  |    Q    |         |         |     V
|
   16+25      10.6671      3.39  |   Q     |         |         |     V
|
   16+30      10.6878      3.00  |  Q      |         |         |      V
|
   16+35      10.7055      2.58  |  Q      |         |         |      V
|
   16+40      10.7200      2.10  | Q       |         |         |      V
|
```

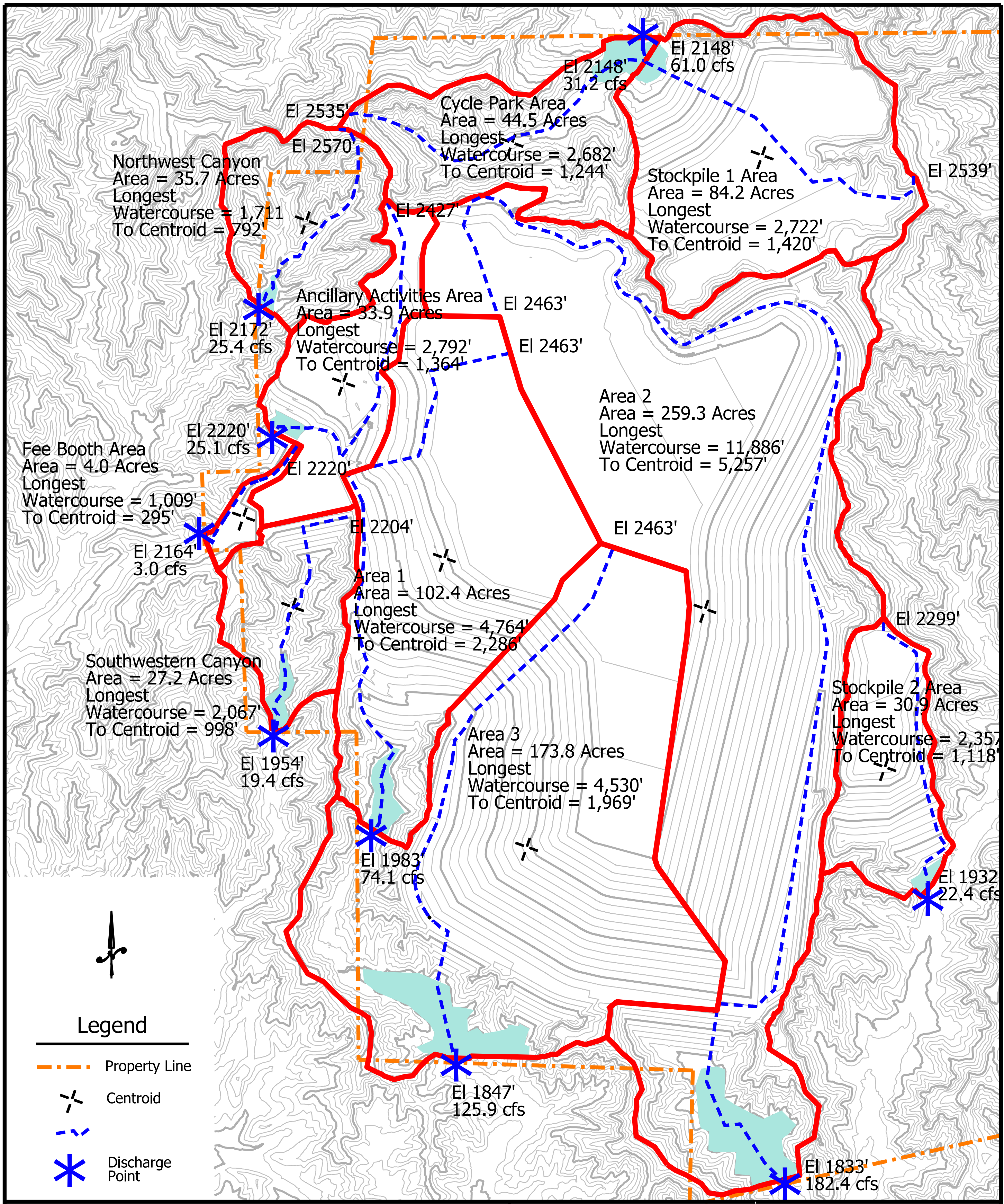
```
   16+45      10.7325      1.82  | Q      |         |         |      V
|
   16+50      10.7436      1.61  | Q      |         |         |      V
|
   16+55      10.7534      1.42  |Q       |         |         |      V
|
   17+ 0      10.7623      1.30  |Q       |         |         |      V
|
   17+ 5      10.7730      1.55  | Q      |         |         |      V
|
   17+10      10.7871      2.04  | Q      |         |         |      V
|
   17+15      10.8023      2.22  | Q      |         |         |      V
|
   17+20      10.8183      2.32  |  Q     |         |         |      V
|
   17+25      10.8346      2.38  |  Q     |         |         |      V
|
   17+30      10.8513      2.42  |  Q     |         |         |      V
|
   17+35      10.8683      2.46  |  Q     |         |         |      V
|
   17+40      10.8855      2.50  |  Q     |         |         |      V
|
   17+45      10.9029      2.53  |  Q     |         |         |      V
|
   17+50      10.9196      2.42  |  Q     |         |         |      V
|
   17+55      10.9347      2.19  | Q      |         |         |      V
|
   18+ 0      10.9492      2.12  | Q      |         |         |      V
|
   18+ 5      10.9635      2.07  | Q      |         |         |      V
|
   18+10      10.9775      2.04  | Q      |         |         |       V
|
   18+15      10.9914      2.02  | Q      |         |         |       V
|
   18+20      11.0052      2.00  | Q      |         |         |       V
|
   18+25      11.0189      1.99  | Q      |         |         |       V
|
   18+30      11.0325      1.98  | Q      |         |         |       V
|
   18+35      11.0452      1.84  | Q      |         |         |       V
|
   18+40      11.0561      1.58  | Q      |         |         |       V
|
   18+45      11.0663      1.49  |Q       |         |         |       V
|
   18+50      11.0753      1.30  |Q       |         |         |       V
|
   18+55      11.0824      1.02  |Q       |         |         |       V
|
   19+ 0      11.0886      0.91  |Q       |         |         |       V
|
   19+ 5      11.0953      0.97  |Q       |         |         |       V
|
   19+10      11.1034      1.18  |Q       |         |         |       V
|
```

```
      19+15       11.1119      1.24  |Q         |         |         |       V
  |
      19+20       11.1215      1.39  |Q         |         |         |       V
  |
      19+25       11.1329      1.66  | Q        |         |         |       V
  |
      19+30       11.1450      1.76  | Q        |         |         |       V
  |
      19+35       11.1567      1.69  | Q        |         |         |       V
  |
      19+40       11.1669      1.48  |Q         |         |         |       V
  |
      19+45       11.1766      1.42  |Q         |         |         |       V
  |
      19+50       11.1854      1.27  |Q         |         |         |       V
  |
      19+55       11.1923      1.01  |Q         |         |         |       V
  |
      20+ 0       11.1986      0.92  |Q         |         |         |       V
  |
      20+ 5       11.2055      0.99  |Q         |         |         |       V
  |
      20+10       11.2138      1.21  |Q         |         |         |       V
  |
      20+15       11.2226      1.27  |Q         |         |         |       V
  |
      20+20       11.2315      1.30  |Q         |         |         |       V
  |
      20+25       11.2405      1.31  |Q         |         |         |       V
  |
      20+30       11.2496      1.32  |Q         |         |         |       V
  |
      20+35       11.2587      1.33  |Q         |         |         |
 V|
      20+40       11.2679      1.33  |Q         |         |         |
 V|
      20+45       11.2771      1.34  |Q         |         |         |
 V|
      20+50       11.2856      1.22  |Q         |         |         |
 V|
      20+55       11.2923      0.98  |Q         |         |         |
 V|
      21+ 0       11.2985      0.90  |Q         |         |         |
 V|
      21+ 5       11.3053      0.98  |Q         |         |         |
 V|
      21+10       11.3136      1.21  |Q         |         |         |
 V|
      21+15       11.3224      1.28  |Q         |         |         |
 V|
      21+20       11.3305      1.18  |Q         |         |         |
 V|
      21+25       11.3370      0.95  |Q         |         |         |
 V|
      21+30       11.3430      0.87  |Q         |         |         |
 V|
      21+35       11.3496      0.96  |Q         |         |         |
 V|
      21+40       11.3578      1.19  |Q         |         |         |
 V|
```

```
     21+45      11.3665      1.26  |Q          |           |           |
V|
     21+50      11.3746      1.17  |Q          |           |           |
V|
     21+55      11.3811      0.95  |Q          |           |           |
V|
     22+ 0      11.3872      0.88  |Q          |           |           |
V|
     22+ 5      11.3939      0.97  |Q          |           |           |
V|
     22+10      11.4021      1.20  |Q          |           |           |
V|
     22+15      11.4109      1.27  |Q          |           |           |
V|
     22+20      11.4191      1.19  |Q          |           |           |
V|
     22+25      11.4257      0.96  |Q          |           |           |
V|
     22+30      11.4319      0.89  |Q          |           |           |
V|
     22+35      11.4377      0.85  |Q          |           |           |
V|
     22+40      11.4434      0.82  |Q          |           |           |
V|
     22+45      11.4489      0.81  |Q          |           |           |
V|
     22+50      11.4544      0.80  |Q          |           |           |
V|
     22+55      11.4599      0.80  |Q          |           |           |
V|
     23+ 0      11.4654      0.79  |Q          |           |           |
V|
     23+ 5      11.4708      0.78  |Q          |           |           |
V|
     23+10      11.4761      0.77  |Q          |           |           |
V|
     23+15      11.4814      0.77  |Q          |           |           |
V|
     23+20      11.4867      0.77  |Q          |           |           |
V|
     23+25      11.4920      0.77  |Q          |           |           |
V|
     23+30      11.4973      0.77  |Q          |           |           |
V|
     23+35      11.5026      0.77  |Q          |           |           |
V|
     23+40      11.5079      0.77  |Q          |           |           |
V|
     23+45      11.5133      0.77  |Q          |           |           |
V|
     23+50      11.5186      0.78  |Q          |           |           |
V|
     23+55      11.5240      0.78  |Q          |           |           |
V|
     24+ 0      11.5293      0.78  |Q          |           |           |
V|
     24+ 5      11.5336      0.62  Q           |           |           |
V|
     24+10      11.5358      0.33  Q           |           |           |
V|
```

```
    24+15      11.5373      0.22  Q          |          |          |
V|
    24+20      11.5384      0.16  Q          |          |          |
V|
    24+25      11.5392      0.12  Q          |          |          |
V|
    24+30      11.5398      0.09  Q          |          |          |
V|
    24+35      11.5403      0.07  Q          |          |          |
V|
    24+40      11.5406      0.05  Q          |          |          |
V|
    24+45      11.5408      0.03  Q          |          |          |
V|
    24+50      11.5410      0.02  Q          |          |          |
V|
    24+55      11.5410      0.01  Q          |          |          |
V|
-----------------------------------------------------------------------
```

Post Project Hydrology



RIVERSIDE COUNTY
DEPARTMENT OF
WASTE RESOURCES

Badlands Sanitary Landfill

Post Expansion Hydrology

Figure 99

Scale: 1" = 1000'

0 500 1000 1500 2000 2500

Datum is mean sea level Contour Interval is 20 feet

Project Title: Post Expansion Hydrology	Designed By: KJJ	Scale: 1"=1000'
Folder/File: sites\Badlands\ba18\Projects\Hydrology	Drawn By: KJJ	Date: March 7, 2018
Model Name:	Checked By: AC	Flight Date: May 2018

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: stockpile1post24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Stockple Area 1 Post Landfill
      24 hour 100 year storm event

      ------------------------------------------------------------------
--
      Drainage Area =      84.20(Ac.)  =      0.132 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      84.20(Ac.)  =
0.132 Sq. Mi.
      Length along longest watercourse =    2722.00(Ft.)
      Length along longest watercourse measured to centroid =    1420.00
(Ft.)
      Length along longest watercourse =      0.516 Mi.
      Length along longest watercourse measured to centroid =      0.269
Mi.
      Difference in elevation =     391.00(Ft.)
      Slope along watercourse =    758.4423 Ft./Mi.
      Average Manning's 'N' = 0.025
      Lag time =    0.080 Hr.
      Lag time =     4.82 Min.
      25% of lag time =     1.20 Min.
      40% of lag time =     1.93 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             84.20              2.00                 168.40

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             84.20              5.50                 463.10

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.98 %
      Adjusted average point rain =    5.499(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          84.200           93.00         0.100
       Total Area Entered =     84.20(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.100        0.033       1.000
0.033
                                                          Sum (F) =
0.033
      Area averaged mean soil loss (F) (In/Hr) =  0.033
      Minimum soil loss rate ((In/Hr)) =  0.017
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.820
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %            (CFS)
      ------------------------------------------------------------------
---
          1   0.083        103.736        15.745            13.361
          2   0.167        207.471        55.995            47.516
          3   0.250        311.207        17.800            15.105
          4   0.333        414.942         7.000             5.940
          5   0.417        518.678         2.109             1.789
          6   0.500        622.413         0.815             0.691
          7   0.583        726.149         0.536             0.455
                                    Sum = 100.000   Sum=      84.858
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
```

1	0.08	0.07	0.044	0.059	0.036	0.01
2	0.17	0.07	0.044	0.058	0.036	0.01
3	0.25	0.07	0.044	0.058	0.036	0.01
4	0.33	0.10	0.066	0.058	---	0.01
5	0.42	0.10	0.066	0.058	---	0.01
6	0.50	0.10	0.066	0.058	---	0.01
7	0.58	0.10	0.066	0.057	---	0.01
8	0.67	0.10	0.066	0.057	---	0.01
9	0.75	0.10	0.066	0.057	---	0.01
10	0.83	0.13	0.088	0.057	---	0.03
11	0.92	0.13	0.088	0.056	---	0.03
12	1.00	0.13	0.088	0.056	---	0.03
13	1.08	0.10	0.066	0.056	---	0.01
14	1.17	0.10	0.066	0.056	---	0.01
15	1.25	0.10	0.066	0.056	---	0.01
16	1.33	0.10	0.066	0.055	---	0.01
17	1.42	0.10	0.066	0.055	---	0.01
18	1.50	0.10	0.066	0.055	---	0.01
19	1.58	0.10	0.066	0.055	---	0.01
20	1.67	0.10	0.066	0.054	---	0.01
21	1.75	0.10	0.066	0.054	---	0.01
22	1.83	0.13	0.088	0.054	---	0.03
23	1.92	0.13	0.088	0.054	---	0.03
24	2.00	0.13	0.088	0.054	---	0.03
25	2.08	0.13	0.088	0.053	---	0.03
26	2.17	0.13	0.088	0.053	---	0.03
27	2.25	0.13	0.088	0.053	---	0.04
28	2.33	0.13	0.088	0.053	---	0.04
29	2.42	0.13	0.088	0.053	---	0.04
30	2.50	0.13	0.088	0.052	---	0.04
31	2.58	0.17	0.110	0.052	---	0.06
32	2.67	0.17	0.110	0.052	---	0.06
33	2.75	0.17	0.110	0.052	---	0.06
34	2.83	0.17	0.110	0.051	---	0.06
35	2.92	0.17	0.110	0.051	---	0.06
36	3.00	0.17	0.110	0.051	---	0.06
37	3.08	0.17	0.110	0.051	---	0.06
38	3.17	0.17	0.110	0.051	---	0.06
39	3.25	0.17	0.110	0.050	---	0.06
40	3.33	0.17	0.110	0.050	---	0.06
41	3.42	0.17	0.110	0.050	---	0.06
42	3.50	0.17	0.110	0.050	---	0.06
43	3.58	0.17	0.110	0.050	---	0.06
44	3.67	0.17	0.110	0.049	---	0.06
45	3.75	0.17	0.110	0.049	---	0.06
46	3.83	0.20	0.132	0.049	---	0.08
47	3.92	0.20	0.132	0.049	---	0.08
48	4.00	0.20	0.132	0.049	---	0.08
49	4.08	0.20	0.132	0.048	---	0.08
50	4.17	0.20	0.132	0.048	---	0.08
51	4.25	0.20	0.132	0.048	---	0.08
52	4.33	0.23	0.154	0.048	---	0.11
53	4.42	0.23	0.154	0.048	---	0.11
54	4.50	0.23	0.154	0.047	---	0.11
55	4.58	0.23	0.154	0.047	---	0.11
56	4.67	0.23	0.154	0.047	---	0.11
57	4.75	0.23	0.154	0.047	---	0.11
58	4.83	0.27	0.176	0.046	---	0.13
59	4.92	0.27	0.176	0.046	---	0.13
60	5.00	0.27	0.176	0.046	---	0.13

61	5.08	0.20	0.132	0.046	---	0.09
62	5.17	0.20	0.132	0.046	---	0.09
63	5.25	0.20	0.132	0.045	---	0.09
64	5.33	0.23	0.154	0.045	---	0.11
65	5.42	0.23	0.154	0.045	---	0.11
66	5.50	0.23	0.154	0.045	---	0.11
67	5.58	0.27	0.176	0.045	---	0.13
68	5.67	0.27	0.176	0.045	---	0.13
69	5.75	0.27	0.176	0.044	---	0.13
70	5.83	0.27	0.176	0.044	---	0.13
71	5.92	0.27	0.176	0.044	---	0.13
72	6.00	0.27	0.176	0.044	---	0.13
73	6.08	0.30	0.198	0.044	---	0.15
74	6.17	0.30	0.198	0.043	---	0.15
75	6.25	0.30	0.198	0.043	---	0.15
76	6.33	0.30	0.198	0.043	---	0.16
77	6.42	0.30	0.198	0.043	---	0.16
78	6.50	0.30	0.198	0.043	---	0.16
79	6.58	0.33	0.220	0.042	---	0.18
80	6.67	0.33	0.220	0.042	---	0.18
81	6.75	0.33	0.220	0.042	---	0.18
82	6.83	0.33	0.220	0.042	---	0.18
83	6.92	0.33	0.220	0.042	---	0.18
84	7.00	0.33	0.220	0.041	---	0.18
85	7.08	0.33	0.220	0.041	---	0.18
86	7.17	0.33	0.220	0.041	---	0.18
87	7.25	0.33	0.220	0.041	---	0.18
88	7.33	0.37	0.242	0.041	---	0.20
89	7.42	0.37	0.242	0.040	---	0.20
90	7.50	0.37	0.242	0.040	---	0.20
91	7.58	0.40	0.264	0.040	---	0.22
92	7.67	0.40	0.264	0.040	---	0.22
93	7.75	0.40	0.264	0.040	---	0.22
94	7.83	0.43	0.286	0.040	---	0.25
95	7.92	0.43	0.286	0.039	---	0.25
96	8.00	0.43	0.286	0.039	---	0.25
97	8.08	0.50	0.330	0.039	---	0.29
98	8.17	0.50	0.330	0.039	---	0.29
99	8.25	0.50	0.330	0.039	---	0.29
100	8.33	0.50	0.330	0.038	---	0.29
101	8.42	0.50	0.330	0.038	---	0.29
102	8.50	0.50	0.330	0.038	---	0.29
103	8.58	0.53	0.352	0.038	---	0.31
104	8.67	0.53	0.352	0.038	---	0.31
105	8.75	0.53	0.352	0.038	---	0.31
106	8.83	0.57	0.374	0.037	---	0.34
107	8.92	0.57	0.374	0.037	---	0.34
108	9.00	0.57	0.374	0.037	---	0.34
109	9.08	0.63	0.418	0.037	---	0.38
110	9.17	0.63	0.418	0.037	---	0.38
111	9.25	0.63	0.418	0.037	---	0.38
112	9.33	0.67	0.440	0.036	---	0.40
113	9.42	0.67	0.440	0.036	---	0.40
114	9.50	0.67	0.440	0.036	---	0.40
115	9.58	0.70	0.462	0.036	---	0.43
116	9.67	0.70	0.462	0.036	---	0.43
117	9.75	0.70	0.462	0.035	---	0.43
118	9.83	0.73	0.484	0.035	---	0.45
119	9.92	0.73	0.484	0.035	---	0.45
120	10.00	0.73	0.484	0.035	---	0.45

```
121  10.08     0.50      0.330         0.035      ---          0.30
122  10.17     0.50      0.330         0.035      ---          0.30
123  10.25     0.50      0.330         0.034      ---          0.30
124  10.33     0.50      0.330         0.034      ---          0.30
125  10.42     0.50      0.330         0.034      ---          0.30
126  10.50     0.50      0.330         0.034      ---          0.30
127  10.58     0.67      0.440         0.034      ---          0.41
128  10.67     0.67      0.440         0.034      ---          0.41
129  10.75     0.67      0.440         0.033      ---          0.41
130  10.83     0.67      0.440         0.033      ---          0.41
131  10.92     0.67      0.440         0.033      ---          0.41
132  11.00     0.67      0.440         0.033      ---          0.41
133  11.08     0.63      0.418         0.033      ---          0.39
134  11.17     0.63      0.418         0.033      ---          0.39
135  11.25     0.63      0.418         0.033      ---          0.39
136  11.33     0.63      0.418         0.032      ---          0.39
137  11.42     0.63      0.418         0.032      ---          0.39
138  11.50     0.63      0.418         0.032      ---          0.39
139  11.58     0.57      0.374         0.032      ---          0.34
140  11.67     0.57      0.374         0.032      ---          0.34
141  11.75     0.57      0.374         0.032      ---          0.34
142  11.83     0.60      0.396         0.031      ---          0.36
143  11.92     0.60      0.396         0.031      ---          0.36
144  12.00     0.60      0.396         0.031      ---          0.36
145  12.08     0.83      0.550         0.031      ---          0.52
146  12.17     0.83      0.550         0.031      ---          0.52
147  12.25     0.83      0.550         0.031      ---          0.52
148  12.33     0.87      0.572         0.030      ---          0.54
149  12.42     0.87      0.572         0.030      ---          0.54
150  12.50     0.87      0.572         0.030      ---          0.54
151  12.58     0.93      0.616         0.030      ---          0.59
152  12.67     0.93      0.616         0.030      ---          0.59
153  12.75     0.93      0.616         0.030      ---          0.59
154  12.83     0.97      0.638         0.030      ---          0.61
155  12.92     0.97      0.638         0.029      ---          0.61
156  13.00     0.97      0.638         0.029      ---          0.61
157  13.08     1.13      0.748         0.029      ---          0.72
158  13.17     1.13      0.748         0.029      ---          0.72
159  13.25     1.13      0.748         0.029      ---          0.72
160  13.33     1.13      0.748         0.029      ---          0.72
161  13.42     1.13      0.748         0.029      ---          0.72
162  13.50     1.13      0.748         0.028      ---          0.72
163  13.58     0.77      0.506         0.028      ---          0.48
164  13.67     0.77      0.506         0.028      ---          0.48
165  13.75     0.77      0.506         0.028      ---          0.48
166  13.83     0.77      0.506         0.028      ---          0.48
167  13.92     0.77      0.506         0.028      ---          0.48
168  14.00     0.77      0.506         0.028      ---          0.48
169  14.08     0.90      0.594         0.027      ---          0.57
170  14.17     0.90      0.594         0.027      ---          0.57
171  14.25     0.90      0.594         0.027      ---          0.57
172  14.33     0.87      0.572         0.027      ---          0.54
173  14.42     0.87      0.572         0.027      ---          0.55
174  14.50     0.87      0.572         0.027      ---          0.55
175  14.58     0.87      0.572         0.027      ---          0.55
176  14.67     0.87      0.572         0.026      ---          0.55
177  14.75     0.87      0.572         0.026      ---          0.55
178  14.83     0.83      0.550         0.026      ---          0.52
179  14.92     0.83      0.550         0.026      ---          0.52
180  15.00     0.83      0.550         0.026      ---          0.52
```

```
181  15.08     0.80      0.528         0.026      ---          0.50
182  15.17     0.80      0.528         0.026      ---          0.50
183  15.25     0.80      0.528         0.025      ---          0.50
184  15.33     0.77      0.506         0.025      ---          0.48
185  15.42     0.77      0.506         0.025      ---          0.48
186  15.50     0.77      0.506         0.025      ---          0.48
187  15.58     0.63      0.418         0.025      ---          0.39
188  15.67     0.63      0.418         0.025      ---          0.39
189  15.75     0.63      0.418         0.025      ---          0.39
190  15.83     0.63      0.418         0.025      ---          0.39
191  15.92     0.63      0.418         0.024      ---          0.39
192  16.00     0.63      0.418         0.024      ---          0.39
193  16.08     0.13      0.088         0.024      ---          0.06
194  16.17     0.13      0.088         0.024      ---          0.06
195  16.25     0.13      0.088         0.024      ---          0.06
196  16.33     0.13      0.088         0.024      ---          0.06
197  16.42     0.13      0.088         0.024      ---          0.06
198  16.50     0.13      0.088         0.024      ---          0.06
199  16.58     0.10      0.066         0.023      ---          0.04
200  16.67     0.10      0.066         0.023      ---          0.04
201  16.75     0.10      0.066         0.023      ---          0.04
202  16.83     0.10      0.066         0.023      ---          0.04
203  16.92     0.10      0.066         0.023      ---          0.04
204  17.00     0.10      0.066         0.023      ---          0.04
205  17.08     0.17      0.110         0.023      ---          0.09
206  17.17     0.17      0.110         0.023      ---          0.09
207  17.25     0.17      0.110         0.023      ---          0.09
208  17.33     0.17      0.110         0.022      ---          0.09
209  17.42     0.17      0.110         0.022      ---          0.09
210  17.50     0.17      0.110         0.022      ---          0.09
211  17.58     0.17      0.110         0.022      ---          0.09
212  17.67     0.17      0.110         0.022      ---          0.09
213  17.75     0.17      0.110         0.022      ---          0.09
214  17.83     0.13      0.088         0.022      ---          0.07
215  17.92     0.13      0.088         0.022      ---          0.07
216  18.00     0.13      0.088         0.022      ---          0.07
217  18.08     0.13      0.088         0.021      ---          0.07
218  18.17     0.13      0.088         0.021      ---          0.07
219  18.25     0.13      0.088         0.021      ---          0.07
220  18.33     0.13      0.088         0.021      ---          0.07
221  18.42     0.13      0.088         0.021      ---          0.07
222  18.50     0.13      0.088         0.021      ---          0.07
223  18.58     0.10      0.066         0.021      ---          0.05
224  18.67     0.10      0.066         0.021      ---          0.05
225  18.75     0.10      0.066         0.021      ---          0.05
226  18.83     0.07      0.044         0.021      ---          0.02
227  18.92     0.07      0.044         0.020      ---          0.02
228  19.00     0.07      0.044         0.020      ---          0.02
229  19.08     0.10      0.066         0.020      ---          0.05
230  19.17     0.10      0.066         0.020      ---          0.05
231  19.25     0.10      0.066         0.020      ---          0.05
232  19.33     0.13      0.088         0.020      ---          0.07
233  19.42     0.13      0.088         0.020      ---          0.07
234  19.50     0.13      0.088         0.020      ---          0.07
235  19.58     0.10      0.066         0.020      ---          0.05
236  19.67     0.10      0.066         0.020      ---          0.05
237  19.75     0.10      0.066         0.019      ---          0.05
238  19.83     0.07      0.044         0.019      ---          0.02
239  19.92     0.07      0.044         0.019      ---          0.02
240  20.00     0.07      0.044         0.019      ---          0.02
```

```
 241  20.08     0.10      0.066         0.019      ---          0.05
 242  20.17     0.10      0.066         0.019      ---          0.05
 243  20.25     0.10      0.066         0.019      ---          0.05
 244  20.33     0.10      0.066         0.019      ---          0.05
 245  20.42     0.10      0.066         0.019      ---          0.05
 246  20.50     0.10      0.066         0.019      ---          0.05
 247  20.58     0.10      0.066         0.019      ---          0.05
 248  20.67     0.10      0.066         0.019      ---          0.05
 249  20.75     0.10      0.066         0.019      ---          0.05
 250  20.83     0.07      0.044         0.018      ---          0.03
 251  20.92     0.07      0.044         0.018      ---          0.03
 252  21.00     0.07      0.044         0.018      ---          0.03
 253  21.08     0.10      0.066         0.018      ---          0.05
 254  21.17     0.10      0.066         0.018      ---          0.05
 255  21.25     0.10      0.066         0.018      ---          0.05
 256  21.33     0.07      0.044         0.018      ---          0.03
 257  21.42     0.07      0.044         0.018      ---          0.03
 258  21.50     0.07      0.044         0.018      ---          0.03
 259  21.58     0.10      0.066         0.018      ---          0.05
 260  21.67     0.10      0.066         0.018      ---          0.05
 261  21.75     0.10      0.066         0.018      ---          0.05
 262  21.83     0.07      0.044         0.018      ---          0.03
 263  21.92     0.07      0.044         0.018      ---          0.03
 264  22.00     0.07      0.044         0.017      ---          0.03
 265  22.08     0.10      0.066         0.017      ---          0.05
 266  22.17     0.10      0.066         0.017      ---          0.05
 267  22.25     0.10      0.066         0.017      ---          0.05
 268  22.33     0.07      0.044         0.017      ---          0.03
 269  22.42     0.07      0.044         0.017      ---          0.03
 270  22.50     0.07      0.044         0.017      ---          0.03
 271  22.58     0.07      0.044         0.017      ---          0.03
 272  22.67     0.07      0.044         0.017      ---          0.03
 273  22.75     0.07      0.044         0.017      ---          0.03
 274  22.83     0.07      0.044         0.017      ---          0.03
 275  22.92     0.07      0.044         0.017      ---          0.03
 276  23.00     0.07      0.044         0.017      ---          0.03
 277  23.08     0.07      0.044         0.017      ---          0.03
 278  23.17     0.07      0.044         0.017      ---          0.03
 279  23.25     0.07      0.044         0.017      ---          0.03
 280  23.33     0.07      0.044         0.017      ---          0.03
 281  23.42     0.07      0.044         0.017      ---          0.03
 282  23.50     0.07      0.044         0.017      ---          0.03
 283  23.58     0.07      0.044         0.017      ---          0.03
 284  23.67     0.07      0.044         0.017      ---          0.03
 285  23.75     0.07      0.044         0.017      ---          0.03
 286  23.83     0.07      0.044         0.017      ---          0.03
 287  23.92     0.07      0.044         0.017      ---          0.03
 288  24.00     0.07      0.044         0.017      ---          0.03
     Sum =     100.0                                   Sum =    56.5
      Flood volume = Effective rainfall      4.71(In)
       times area      84.2(Ac.)/[(In)/(Ft.)] =      33.0(Ac.Ft)
      Total soil loss =      0.79(In)
      Total soil loss =     5.541(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     1439398.5 Cubic Feet
      Total soil loss =      241378.1 Cubic Feet
      -----------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     61.021(CFS)
      -----------------------------------------------------------------
```

```
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       17.5      35.0      52.5
70.0

-----------------------------------------------------------------------
    0+ 5       0.0007      0.11  Q         |         |         |
|
    0+10       0.0041      0.48  Q         |         |         |
|
    0+15       0.0082      0.60  Q         |         |         |
|
    0+20       0.0127      0.65  Q         |         |         |
|
    0+25       0.0173      0.67  Q         |         |         |
|
    0+30       0.0220      0.69  Q         |         |         |
|
    0+35       0.0269      0.71  Q         |         |         |
|
    0+40       0.0319      0.73  Q         |         |         |
|
    0+45       0.0370      0.75  Q         |         |         |
|
    0+50       0.0443      1.06  Q         |         |         |
|
    0+55       0.0590      2.12  VQ        |         |         |
|
    1+ 0       0.0760      2.48  VQ        |         |         |
|
    1+ 5       0.0921      2.33  VQ        |         |         |
|
    1+10       0.1013      1.34  Q         |         |         |
|
    1+15       0.1085      1.04  Q         |         |         |
|
    1+20       0.1150      0.94  Q         |         |         |
|
    1+25       0.1213      0.92  Q         |         |         |
|
    1+30       0.1277      0.93  Q         |         |         |
|
    1+35       0.1342      0.93  Q         |         |         |
|
    1+40       0.1407      0.95  Q         |         |         |
|
    1+45       0.1474      0.97  Q         |         |         |
|
    1+50       0.1563      1.28  Q         |         |         |
|
    1+55       0.1724      2.35  VQ        |         |         |
```

```
|
    2+ 0       0.1910      2.70  VQ        |         |         |
|
    2+ 5       0.2107      2.85  VQ        |         |         |
|
    2+10       0.2307      2.91  VQ        |         |         |
|
    2+15       0.2509      2.94  VQ        |         |         |
|
    2+20       0.2714      2.97  VQ        |         |         |
|
    2+25       0.2919      2.99  VQ        |         |         |
|
    2+30       0.3126      3.01  VQ        |         |         |
|
    2+35       0.3355      3.32  VQ        |         |         |
|
    2+40       0.3657      4.38  V Q       |         |         |
|
    2+45       0.3982      4.73  V Q       |         |         |
|
    2+50       0.4319      4.88  V Q       |         |         |
|
    2+55       0.4659      4.94  V Q       |         |         |
|
    3+ 0       0.5001      4.97  V Q       |         |         |
|
    3+ 5       0.5345      5.00  V Q       |         |         |
|
    3+10       0.5691      5.02  V Q       |         |         |
|
    3+15       0.6038      5.04  V Q       |         |         |
|
    3+20       0.6386      5.05  V Q       |         |         |
|
    3+25       0.6735      5.07  V Q       |         |         |
|
    3+30       0.7085      5.09  V Q       |         |         |
|
    3+35       0.7437      5.11  V Q       |         |         |
|
    3+40       0.7790      5.12  V Q       |         |         |
|
    3+45       0.8144      5.14  V Q       |         |         |
|
    3+50       0.8520      5.45  |V Q      |         |         |
|
    3+55       0.8969      6.52  |V Q      |         |         |
|
    4+ 0       0.9442      6.87  |V Q      |         |         |
|
    4+ 5       0.9925      7.02  |V  Q     |         |         |
|
    4+10       1.0412      7.07  |V  Q     |         |         |
|
    4+15       1.0901      7.10  |V  Q     |         |         |
|
    4+20       1.1413      7.43  |V  Q     |         |         |
|
    4+25       1.1997      8.49  |V  Q     |         |         |
```

```
|
    4+30       1.2606      8.84  |V   Q    |         |         |
|
    4+35       1.3225      8.99  |V   Q    |         |         |
|
    4+40       1.3848      9.04  |V   Q    |         |         |
|
    4+45       1.4473      9.08  |V   Q    |         |         |
|
    4+50       1.5120      9.40  |V   Q    |         |         |
|
    4+55       1.5840     10.46  |V   Q    |         |         |
|
    5+ 0       1.6585     10.81  | V   Q   |         |         |
|
    5+ 5       1.7299     10.37  | V  Q    |         |         |
|
    5+10       1.7873      8.33  | V Q     |         |         |
|
    5+15       1.8404      7.70  | V Q     |         |         |
|
    5+20       1.8938      7.76  | V Q     |         |         |
|
    5+25       1.9540      8.75  | V Q     |         |         |
|
    5+30       2.0165      9.06  | V  Q    |         |         |
|
    5+35       2.0818      9.49  | V  Q    |         |         |
|
    5+40       2.1547     10.59  | V   Q   |         |         |
|
    5+45       2.2301     10.95  | V   Q   |         |         |
|
    5+50       2.3066     11.11  | V   Q   |         |         |
|
    5+55       2.3835     11.17  | V   Q   |         |         |
|
    6+ 0       2.4606     11.20  | V   Q   |         |         |
|
    6+ 5       2.5400     11.52  |  V  Q   |         |         |
|
    6+10       2.6266     12.58  |  V   Q  |         |         |
|
    6+15       2.7156     12.93  |  V   Q  |         |         |
|
    6+20       2.8057     13.08  |  V   Q  |         |         |
|
    6+25       2.8961     13.13  |  V   Q  |         |         |
|
    6+30       2.9868     13.16  |  V   Q  |         |         |
|
    6+35       3.0796     13.48  |  V   Q  |         |         |
|
    6+40       3.1798     14.55  |  V    Q |         |         |
|
    6+45       3.2824     14.89  |  V    Q |         |         |
|
    6+50       3.3860     15.04  |   V   Q |         |         |
|
    6+55       3.4899     15.10  |   V   Q |         |         |
```

```
|
    7+ 0       3.5941     15.13  |   V   Q |         |         |
|
    7+ 5       3.6985     15.15  |   V   Q |         |         |
|
    7+10       3.8030     15.17  |   V   Q |         |         |
|
    7+15       3.9075     15.19  |   V   Q |         |         |
|
    7+20       4.0143     15.50  |   V   Q |         |         |
|
    7+25       4.1283     16.56  |   V    Q|         |         |
|
    7+30       4.2447     16.91  |    V   Q|         |         |
|
    7+35       4.3642     17.35  |    V   Q|         |         |
|
    7+40       4.4912     18.45  |    V    Q         |         |
|
    7+45       4.6208     18.81  |    V    Q         |         |
|
    7+50       4.7534     19.26  |    V    |Q        |         |
|
    7+55       4.8937     20.36  |    V    |Q        |         |
|
    8+ 0       5.0364     20.72  |     V   |Q        |         |
|
    8+ 5       5.1842     21.47  |     V   | Q       |         |
|
    8+10       5.3469     23.62  |     V   |  Q      |         |
|
    8+15       5.5143     24.31  |     V   |  Q      |         |
|
    8+20       5.6837     24.60  |     V   |   Q     |         |
|
    8+25       5.8538     24.69  |      V  |   Q     |         |
|
    8+30       6.0241     24.74  |      V  |   Q     |         |
|
    8+35       6.1968     25.07  |      V  |   Q     |         |
|
    8+40       6.3767     26.13  |      V  |   Q     |         |
|
    8+45       6.5590     26.48  |      V  |    Q    |         |
|
    8+50       6.7444     26.91  |       V |    Q    |         |
|
    8+55       6.9373     28.02  |       V |     Q   |         |
|
    9+ 0       7.1328     28.38  |       V |     Q   |         |
|
    9+ 5       7.3333     29.12  |       V |     Q   |         |
|
    9+10       7.5487     31.27  |        V|      Q  |         |
|
    9+15       7.7688     31.96  |        V|       Q |         |
|
    9+20       7.9929     32.54  |        V|       Q |         |
|
    9+25       8.2249     33.68  |        V|        Q|         |
```

```
|
    9+30       8.4595     34.06  |         V        Q|         |
|
    9+35       8.6972     34.52  |         V        Q|         |
|
    9+40       8.9425     35.62  |         V         Q         |
|
    9+45       9.1903     35.98  |         |V        Q         |
|
    9+50       9.4412     36.43  |         |V        Q         |
|
    9+55       9.6997     37.53  |         |V        |Q        |
|
   10+ 0       9.9606     37.89  |         | V       |Q        |
|
   10+ 5      10.2085     35.99  |         | V       Q         |
|
   10+10      10.4063     28.72  |         | V   Q   |         |
|
   10+15      10.5883     26.43  |         | V  Q    |         |
|
   10+20      10.7642     25.53  |         |  VQ     |         |
|
   10+25      10.9382     25.27  |         |  VQ     |         |
|
   10+30      11.1116     25.18  |         |  VQ     |         |
|
   10+35      11.2948     26.59  |         |  V Q    |         |
|
   10+40      11.5141     31.84  |         |  V    Q |         |
|
   10+45      11.7449     33.51  |         |   V    Q|         |
|
   10+50      11.9803     34.18  |         |   V    Q|         |
|
   10+55      12.2171     34.39  |         |   V    Q|         |
|
   11+ 0      12.4546     34.48  |         |    V   Q|         |
|
   11+ 5      12.6905     34.25  |         |    V   Q|         |
|
   11+10      12.9193     33.22  |         |    V  Q |         |
|
   11+15      13.1459     32.90  |         |    V  Q |         |
|
   11+20      13.3717     32.78  |         |     V Q |         |
|
   11+25      13.5973     32.76  |         |     V Q |         |
|
   11+30      13.8229     32.76  |         |     V Q |         |
|
   11+35      14.0445     32.17  |         |      VQ |         |
|
   11+40      14.2517     30.09  |         |      Q  |         |
|
   11+45      14.4545     29.44  |         |     QV  |         |
|
   11+50      14.6576     29.49  |         |     QV  |         |
|
   11+55      14.8675     30.47  |         |      Q  |         |
```

```
|
   12+ 0      15.0795     30.78  |         |      QV |         |
|
   12+ 5      15.3065     32.97  |         |       Q |         |
|
   12+10      15.5843     40.34  |         |       V |  Q      |
|
   12+15      15.8784     42.70  |         |        V|   Q     |
|
   12+20      16.1809     43.93  |         |        V|    Q    |
|
   12+25      16.4926     45.26  |         |        V|    Q    |
|
   12+30      16.8075     45.71  |         |         V     Q   |
|
   12+35      17.1278     46.52  |         |         V     Q   |
|
   12+40      17.4629     48.66  |         |         |V     Q  |
|
   12+45      17.8028     49.35  |         |         |V      Q |
|
   12+50      18.1467     49.93  |         |         |V      Q |
|
   12+55      18.4984     51.07  |         |         | V      Q|
|
   13+ 0      18.8527     51.44  |         |         | V      Q|
|
   13+ 5      19.2182     53.08  |         |         |  V      Q
|
   13+10      19.6202     58.36  |         |         |  V      |  Q
|
   13+15      20.0337     60.05  |         |         |   V     |   Q
|
   13+20      20.4519     60.72  |         |         |   V     |   Q
|
   13+25      20.8716     60.93  |         |         |    V    |   Q
|
   13+30      21.2918     61.02  |         |         |    V    |   Q
|
   13+35      21.6902     57.85  |         |         |     V   |  Q
|
   13+40      22.0095     46.36  |         |         |     Q   |
|
   13+45      22.3037     42.71  |         |         |   Q V   |
|
   13+50      22.5880     41.29  |         |         |  Q   V  |
|
   13+55      22.8695     40.87  |         |         |  Q   V  |
|
   14+ 0      23.1499     40.71  |         |         |  Q    V |
|
   14+ 5      23.4377     41.79  |         |         |  Q    V |
|
   14+10      23.7544     45.98  |         |         |     Q V |
|
   14+15      24.0803     47.33  |         |         |      Q V|
|
   14+20      24.4079     47.57  |         |         |      Q V|
|
   14+25      24.7295     46.69  |         |         |     Q  V|
```

```
|
   14+30      25.0492     46.43  |         |         |     Q   V
|
   14+35      25.3685     46.35  |         |         |     Q   V
|
   14+40      25.6875     46.32  |         |         |     Q   |V
|
   14+45      26.0065     46.32  |         |         |     Q   |V
|
   14+50      26.3235     46.03  |         |         |     Q   |V
|
   14+55      26.6334     44.99  |         |         |    Q    | V
|
   15+ 0      26.9411     44.67  |         |         |    Q    | V
|
   15+ 5      27.2459     44.26  |         |         |    Q    | V
|
   15+10      27.5433     43.19  |         |         |   Q     |  V
|
   15+15      27.8384     42.85  |         |         |   Q     |  V
|
   15+20      28.1306     42.43  |         |         |   Q     |   V
|
   15+25      28.4154     41.35  |         |         |  Q      |   V
|
   15+30      28.6978     41.01  |         |         |  Q      |   V
|
   15+35      28.9713     39.71  |         |         | Q       |    V
|
   15+40      29.2158     35.50  |         |         Q         |    V
|
   15+45      29.4511     34.16  |         |        Q|         |    V
|
   15+50      29.6827     33.64  |         |        Q|         |    V
|
   15+55      29.9134     33.49  |         |        Q|         |     V
|
   16+ 0      30.1438     33.44  |         |        Q|         |     V
|
   16+ 5      30.3435     29.00  |         |     Q   |         |     V
|
   16+10      30.4353     13.33  |      Q  |         |         |     V
|
   16+15      30.4928      8.35  |   Q     |         |         |     V
|
   16+20      30.5369      6.40  |  Q      |         |         |     V
|
   16+25      30.5770      5.82  |  Q      |         |         |      V
|
   16+30      30.6156      5.60  |  Q      |         |         |      V
|
   16+35      30.6512      5.17  | Q       |         |         |      V
|
   16+40      30.6797      4.13  | Q       |         |         |      V
|
   16+45      30.7060      3.81  | Q       |         |         |      V
|
   16+50      30.7314      3.69  | Q       |         |         |      V
|
   16+55      30.7566      3.66  | Q       |         |         |      V
```

```
|
   17+ 0      30.7818      3.66  | Q       |         |         |      V
|
   17+ 5      30.8110      4.25  | Q       |         |         |      V
|
   17+10      30.8548      6.35  |  Q      |         |         |      V
|
   17+15      30.9031      7.02  |   Q     |         |         |      V
|
   17+20      30.9533      7.29  |   Q     |         |         |      V
|
   17+25      31.0042      7.38  |   Q     |         |         |      V
|
   17+30      31.0553      7.42  |   Q     |         |         |      V
|
   17+35      31.1066      7.45  |   Q     |         |         |      V
|
   17+40      31.1580      7.46  |   Q     |         |         |      V
|
   17+45      31.2094      7.47  |   Q     |         |         |      V
|
   17+50      31.2589      7.18  |   Q     |         |         |      V
|
   17+55      31.3012      6.15  |  Q      |         |         |      V
|
   18+ 0      31.3413      5.82  |  Q      |         |         |      V
|
   18+ 5      31.3806      5.70  |  Q      |         |         |      V
|
   18+10      31.4197      5.67  |  Q      |         |         |       V
|
   18+15      31.4587      5.67  |  Q      |         |         |       V
|
   18+20      31.4977      5.67  |  Q      |         |         |       V
|
   18+25      31.5368      5.67  |  Q      |         |         |       V
|
   18+30      31.5759      5.68  |  Q      |         |         |       V
|
   18+35      31.6131      5.40  |  Q      |         |         |       V
|
   18+40      31.6431      4.36  | Q       |         |         |       V
|
   18+45      31.6709      4.04  | Q       |         |         |       V
|
   18+50      31.6959      3.62  | Q       |         |         |       V
|
   18+55      31.7134      2.54  |Q        |         |         |       V
|
   19+ 0      31.7285      2.20  |Q        |         |         |       V
|
   19+ 5      31.7448      2.37  |Q        |         |         |       V
|
   19+10      31.7681      3.38  |Q        |         |         |       V
|
   19+15      31.7936      3.71  | Q       |         |         |       V
|
   19+20      31.8221      4.13  | Q       |         |         |       V
|
   19+25      31.8580      5.22  | Q       |         |         |       V
```

```
|
   19+30      31.8964      5.58  |  Q      |         |         |       V
|
   19+35      31.9338      5.43  |  Q      |         |         |       V
|
   19+40      31.9644      4.43  | Q       |         |         |       V
|
   19+45      31.9928      4.12  | Q       |         |         |       V
|
   19+50      32.0184      3.72  | Q       |         |         |       V
|
   19+55      32.0365      2.64  |Q        |         |         |       V
|
   20+ 0      32.0524      2.30  |Q        |         |         |       V
|
   20+ 5      32.0693      2.46  |Q        |         |         |       V
|
   20+10      32.0932      3.47  |Q        |         |         |       V
|
   20+15      32.1193      3.80  | Q       |         |         |       V
|
   20+20      32.1464      3.92  | Q       |         |         |       V
|
   20+25      32.1737      3.97  | Q       |         |         |       V
|
   20+30      32.2012      3.99  | Q       |         |         |       V
|
   20+35      32.2288      4.01  | Q       |         |         |
V|
   20+40      32.2565      4.02  | Q       |         |         |
V|
   20+45      32.2842      4.02  | Q       |         |         |
V|
   20+50      32.3099      3.74  | Q       |         |         |
V|
   20+55      32.3285      2.70  |Q        |         |         |
V|
   21+ 0      32.3448      2.37  |Q        |         |         |
V|
   21+ 5      32.3623      2.54  |Q        |         |         |
V|
   21+10      32.3868      3.55  | Q       |         |         |
V|
   21+15      32.4135      3.88  | Q       |         |         |
V|
   21+20      32.4390      3.71  | Q       |         |         |
V|
   21+25      32.4577      2.71  |Q        |         |         |
V|
   21+30      32.4742      2.40  |Q        |         |         |
V|
   21+35      32.4919      2.58  |Q        |         |         |
V|
   21+40      32.5166      3.59  | Q       |         |         |
V|
   21+45      32.5435      3.91  | Q       |         |         |
V|
   21+50      32.5693      3.74  | Q       |         |         |
V|
   21+55      32.5882      2.74  |Q        |         |         |
```

```
V|
   22+ 0       32.6049      2.43  |Q         |         |         |
V|
   22+ 5       32.6229      2.61  |Q         |         |         |
V|
   22+10       32.6478      3.62  | Q        |         |         |
V|
   22+15       32.6749      3.94  | Q        |         |         |
V|
   22+20       32.7009      3.77  | Q        |         |         |
V|
   22+25       32.7200      2.77  |Q         |         |         |
V|
   22+30       32.7369      2.46  |Q         |         |         |
V|
   22+35       32.7530      2.34  |Q         |         |         |
V|
   22+40       32.7689      2.31  |Q         |         |         |
V|
   22+45       32.7847      2.30  |Q         |         |         |
V|
   22+50       32.8005      2.29  |Q         |         |         |
V|
   22+55       32.8163      2.29  |Q         |         |         |
V|
   23+ 0       32.8321      2.30  |Q         |         |         |
V|
   23+ 5       32.8479      2.30  |Q         |         |         |
V|
   23+10       32.8638      2.30  |Q         |         |         |
V|
   23+15       32.8797      2.31  |Q         |         |         |
V|
   23+20       32.8956      2.31  |Q         |         |         |
V|
   23+25       32.9115      2.31  |Q         |         |         |
V|
   23+30       32.9275      2.32  |Q         |         |         |
V|
   23+35       32.9434      2.32  |Q         |         |         |
V|
   23+40       32.9594      2.32  |Q         |         |         |
V|
   23+45       32.9754      2.32  |Q         |         |         |
V|
   23+50       32.9914      2.32  |Q         |         |         |
V|
   23+55       33.0074      2.33  |Q         |         |         |
V|
   24+ 0       33.0235      2.33  |Q         |         |         |
V|
   24+ 5       33.0370      1.96  |Q         |         |         |
V|
   24+10       33.0415      0.66  Q          |         |         |
V|
   24+15       33.0432      0.24  Q          |         |         |
V|
   24+20       33.0437      0.08  Q          |         |         |
V|
   24+25       33.0440      0.03  Q          |         |         |
```

```
V|
   24+30      33.0440      0.01  Q         |         |         |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: cycleparkpost24100.out


      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Badlands Landfill
      Cycyle Park Area Post Landfill
      24 hour 100 year storm event

      -----------------------------------------------------------------
--
      Drainage Area =      44.50(Ac.)  =      0.070 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      44.50(Ac.)  =
0.070 Sq. Mi.
      Length along longest watercourse =    2682.00(Ft.)
      Length along longest watercourse measured to centroid =    1244.00
(Ft.)
      Length along longest watercourse =      0.508 Mi.
      Length along longest watercourse measured to centroid =      0.236
Mi.
      Difference in elevation =     387.00(Ft.)
      Slope along watercourse =    761.8792 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.121 Hr.
      Lag time =     7.29 Min.
      25% of lag time =     1.82 Min.
      40% of lag time =     2.91 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             44.50              2.00                   89.00

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             44.50              5.50                  244.75

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          44.500           93.00         0.000
       Total Area Entered =     44.50(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083         68.622         13.435              6.025
          2   0.167        137.243         36.215             16.242
          3   0.250        205.865         15.381              6.898
          4   0.333        274.487          8.635              3.873
          5   0.417        343.109          5.856              2.626
          6   0.500        411.730          4.091              1.835
          7   0.583        480.352          3.107              1.394
          8   0.667        548.974          2.626              1.178
          9   0.750        617.595          2.143              0.961
         10   0.833        686.217          1.841              0.826
         11   0.917        754.839          1.574              0.706
         12   1.000        823.461          1.300              0.583
         13   1.083        892.082          1.235              0.554
```

```
         14   1.167        960.704         1.235              0.554
         15   1.250       1029.326         1.325              0.594
                                    Sum = 100.000   Sum=      44.848
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.065     0.040         0.00
   2   0.17     0.07      0.044         0.064     0.040         0.00
   3   0.25     0.07      0.044         0.064     0.040         0.00
   4   0.33     0.10      0.066         0.064      ---          0.00
   5   0.42     0.10      0.066         0.064      ---          0.00
   6   0.50     0.10      0.066         0.063      ---          0.00
   7   0.58     0.10      0.066         0.063      ---          0.00
   8   0.67     0.10      0.066         0.063      ---          0.00
   9   0.75     0.10      0.066         0.063      ---          0.00
  10   0.83     0.13      0.088         0.062      ---          0.03
  11   0.92     0.13      0.088         0.062      ---          0.03
  12   1.00     0.13      0.088         0.062      ---          0.03
  13   1.08     0.10      0.066         0.062      ---          0.00
  14   1.17     0.10      0.066         0.061      ---          0.00
  15   1.25     0.10      0.066         0.061      ---          0.00
  16   1.33     0.10      0.066         0.061      ---          0.01
  17   1.42     0.10      0.066         0.061      ---          0.01
  18   1.50     0.10      0.066         0.060      ---          0.01
  19   1.58     0.10      0.066         0.060      ---          0.01
  20   1.67     0.10      0.066         0.060      ---          0.01
  21   1.75     0.10      0.066         0.060      ---          0.01
  22   1.83     0.13      0.088         0.059      ---          0.03
  23   1.92     0.13      0.088         0.059      ---          0.03
  24   2.00     0.13      0.088         0.059      ---          0.03
  25   2.08     0.13      0.088         0.059      ---          0.03
  26   2.17     0.13      0.088         0.058      ---          0.03
  27   2.25     0.13      0.088         0.058      ---          0.03
  28   2.33     0.13      0.088         0.058      ---          0.03
  29   2.42     0.13      0.088         0.058      ---          0.03
  30   2.50     0.13      0.088         0.057      ---          0.03
  31   2.58     0.17      0.110         0.057      ---          0.05
  32   2.67     0.17      0.110         0.057      ---          0.05
  33   2.75     0.17      0.110         0.057      ---          0.05
  34   2.83     0.17      0.110         0.057      ---          0.05
  35   2.92     0.17      0.110         0.056      ---          0.05
  36   3.00     0.17      0.110         0.056      ---          0.05
  37   3.08     0.17      0.110         0.056      ---          0.05
  38   3.17     0.17      0.110         0.056      ---          0.05
  39   3.25     0.17      0.110         0.055      ---          0.05
  40   3.33     0.17      0.110         0.055      ---          0.05
  41   3.42     0.17      0.110         0.055      ---          0.06
  42   3.50     0.17      0.110         0.055      ---          0.06
  43   3.58     0.17      0.110         0.054      ---          0.06
  44   3.67     0.17      0.110         0.054      ---          0.06
  45   3.75     0.17      0.110         0.054      ---          0.06
  46   3.83     0.20      0.132         0.054      ---          0.08
  47   3.92     0.20      0.132         0.054      ---          0.08
  48   4.00     0.20      0.132         0.053      ---          0.08
  49   4.08     0.20      0.132         0.053      ---          0.08
  50   4.17     0.20      0.132         0.053      ---          0.08
  51   4.25     0.20      0.132         0.053      ---          0.08
  52   4.33     0.23      0.154         0.052      ---          0.10
```

53	4.42	0.23	0.154	0.052	---	0.10
54	4.50	0.23	0.154	0.052	---	0.10
55	4.58	0.23	0.154	0.052	---	0.10
56	4.67	0.23	0.154	0.052	---	0.10
57	4.75	0.23	0.154	0.051	---	0.10
58	4.83	0.27	0.176	0.051	---	0.12
59	4.92	0.27	0.176	0.051	---	0.13
60	5.00	0.27	0.176	0.051	---	0.13
61	5.08	0.20	0.132	0.050	---	0.08
62	5.17	0.20	0.132	0.050	---	0.08
63	5.25	0.20	0.132	0.050	---	0.08
64	5.33	0.23	0.154	0.050	---	0.10
65	5.42	0.23	0.154	0.050	---	0.10
66	5.50	0.23	0.154	0.049	---	0.10
67	5.58	0.27	0.176	0.049	---	0.13
68	5.67	0.27	0.176	0.049	---	0.13
69	5.75	0.27	0.176	0.049	---	0.13
70	5.83	0.27	0.176	0.048	---	0.13
71	5.92	0.27	0.176	0.048	---	0.13
72	6.00	0.27	0.176	0.048	---	0.13
73	6.08	0.30	0.198	0.048	---	0.15
74	6.17	0.30	0.198	0.048	---	0.15
75	6.25	0.30	0.198	0.047	---	0.15
76	6.33	0.30	0.198	0.047	---	0.15
77	6.42	0.30	0.198	0.047	---	0.15
78	6.50	0.30	0.198	0.047	---	0.15
79	6.58	0.33	0.220	0.047	---	0.17
80	6.67	0.33	0.220	0.046	---	0.17
81	6.75	0.33	0.220	0.046	---	0.17
82	6.83	0.33	0.220	0.046	---	0.17
83	6.92	0.33	0.220	0.046	---	0.17
84	7.00	0.33	0.220	0.046	---	0.17
85	7.08	0.33	0.220	0.045	---	0.17
86	7.17	0.33	0.220	0.045	---	0.17
87	7.25	0.33	0.220	0.045	---	0.18
88	7.33	0.37	0.242	0.045	---	0.20
89	7.42	0.37	0.242	0.044	---	0.20
90	7.50	0.37	0.242	0.044	---	0.20
91	7.58	0.40	0.264	0.044	---	0.22
92	7.67	0.40	0.264	0.044	---	0.22
93	7.75	0.40	0.264	0.044	---	0.22
94	7.83	0.43	0.286	0.043	---	0.24
95	7.92	0.43	0.286	0.043	---	0.24
96	8.00	0.43	0.286	0.043	---	0.24
97	8.08	0.50	0.330	0.043	---	0.29
98	8.17	0.50	0.330	0.043	---	0.29
99	8.25	0.50	0.330	0.042	---	0.29
100	8.33	0.50	0.330	0.042	---	0.29
101	8.42	0.50	0.330	0.042	---	0.29
102	8.50	0.50	0.330	0.042	---	0.29
103	8.58	0.53	0.352	0.042	---	0.31
104	8.67	0.53	0.352	0.041	---	0.31
105	8.75	0.53	0.352	0.041	---	0.31
106	8.83	0.57	0.374	0.041	---	0.33
107	8.92	0.57	0.374	0.041	---	0.33
108	9.00	0.57	0.374	0.041	---	0.33
109	9.08	0.63	0.418	0.041	---	0.38
110	9.17	0.63	0.418	0.040	---	0.38
111	9.25	0.63	0.418	0.040	---	0.38
112	9.33	0.67	0.440	0.040	---	0.40

```
113   9.42     0.67     0.440        0.040      ---          0.40
114   9.50     0.67     0.440        0.040      ---          0.40
115   9.58     0.70     0.462        0.039      ---          0.42
116   9.67     0.70     0.462        0.039      ---          0.42
117   9.75     0.70     0.462        0.039      ---          0.42
118   9.83     0.73     0.484        0.039      ---          0.45
119   9.92     0.73     0.484        0.039      ---          0.45
120  10.00     0.73     0.484        0.038      ---          0.45
121  10.08     0.50     0.330        0.038      ---          0.29
122  10.17     0.50     0.330        0.038      ---          0.29
123  10.25     0.50     0.330        0.038      ---          0.29
124  10.33     0.50     0.330        0.038      ---          0.29
125  10.42     0.50     0.330        0.038      ---          0.29
126  10.50     0.50     0.330        0.037      ---          0.29
127  10.58     0.67     0.440        0.037      ---          0.40
128  10.67     0.67     0.440        0.037      ---          0.40
129  10.75     0.67     0.440        0.037      ---          0.40
130  10.83     0.67     0.440        0.037      ---          0.40
131  10.92     0.67     0.440        0.036      ---          0.40
132  11.00     0.67     0.440        0.036      ---          0.40
133  11.08     0.63     0.418        0.036      ---          0.38
134  11.17     0.63     0.418        0.036      ---          0.38
135  11.25     0.63     0.418        0.036      ---          0.38
136  11.33     0.63     0.418        0.036      ---          0.38
137  11.42     0.63     0.418        0.035      ---          0.38
138  11.50     0.63     0.418        0.035      ---          0.38
139  11.58     0.57     0.374        0.035      ---          0.34
140  11.67     0.57     0.374        0.035      ---          0.34
141  11.75     0.57     0.374        0.035      ---          0.34
142  11.83     0.60     0.396        0.034      ---          0.36
143  11.92     0.60     0.396        0.034      ---          0.36
144  12.00     0.60     0.396        0.034      ---          0.36
145  12.08     0.83     0.550        0.034      ---          0.52
146  12.17     0.83     0.550        0.034      ---          0.52
147  12.25     0.83     0.550        0.034      ---          0.52
148  12.33     0.87     0.572        0.033      ---          0.54
149  12.42     0.87     0.572        0.033      ---          0.54
150  12.50     0.87     0.572        0.033      ---          0.54
151  12.58     0.93     0.616        0.033      ---          0.58
152  12.67     0.93     0.616        0.033      ---          0.58
153  12.75     0.93     0.616        0.033      ---          0.58
154  12.83     0.97     0.638        0.032      ---          0.61
155  12.92     0.97     0.638        0.032      ---          0.61
156  13.00     0.97     0.638        0.032      ---          0.61
157  13.08     1.13     0.748        0.032      ---          0.72
158  13.17     1.13     0.748        0.032      ---          0.72
159  13.25     1.13     0.748        0.032      ---          0.72
160  13.33     1.13     0.748        0.031      ---          0.72
161  13.42     1.13     0.748        0.031      ---          0.72
162  13.50     1.13     0.748        0.031      ---          0.72
163  13.58     0.77     0.506        0.031      ---          0.47
164  13.67     0.77     0.506        0.031      ---          0.48
165  13.75     0.77     0.506        0.031      ---          0.48
166  13.83     0.77     0.506        0.031      ---          0.48
167  13.92     0.77     0.506        0.030      ---          0.48
168  14.00     0.77     0.506        0.030      ---          0.48
169  14.08     0.90     0.594        0.030      ---          0.56
170  14.17     0.90     0.594        0.030      ---          0.56
171  14.25     0.90     0.594        0.030      ---          0.56
172  14.33     0.87     0.572        0.030      ---          0.54
```

173	14.42	0.87	0.572	0.029	---	0.54
174	14.50	0.87	0.572	0.029	---	0.54
175	14.58	0.87	0.572	0.029	---	0.54
176	14.67	0.87	0.572	0.029	---	0.54
177	14.75	0.87	0.572	0.029	---	0.54
178	14.83	0.83	0.550	0.029	---	0.52
179	14.92	0.83	0.550	0.029	---	0.52
180	15.00	0.83	0.550	0.028	---	0.52
181	15.08	0.80	0.528	0.028	---	0.50
182	15.17	0.80	0.528	0.028	---	0.50
183	15.25	0.80	0.528	0.028	---	0.50
184	15.33	0.77	0.506	0.028	---	0.48
185	15.42	0.77	0.506	0.028	---	0.48
186	15.50	0.77	0.506	0.028	---	0.48
187	15.58	0.63	0.418	0.027	---	0.39
188	15.67	0.63	0.418	0.027	---	0.39
189	15.75	0.63	0.418	0.027	---	0.39
190	15.83	0.63	0.418	0.027	---	0.39
191	15.92	0.63	0.418	0.027	---	0.39
192	16.00	0.63	0.418	0.027	---	0.39
193	16.08	0.13	0.088	0.027	---	0.06
194	16.17	0.13	0.088	0.026	---	0.06
195	16.25	0.13	0.088	0.026	---	0.06
196	16.33	0.13	0.088	0.026	---	0.06
197	16.42	0.13	0.088	0.026	---	0.06
198	16.50	0.13	0.088	0.026	---	0.06
199	16.58	0.10	0.066	0.026	---	0.04
200	16.67	0.10	0.066	0.026	---	0.04
201	16.75	0.10	0.066	0.026	---	0.04
202	16.83	0.10	0.066	0.025	---	0.04
203	16.92	0.10	0.066	0.025	---	0.04
204	17.00	0.10	0.066	0.025	---	0.04
205	17.08	0.17	0.110	0.025	---	0.08
206	17.17	0.17	0.110	0.025	---	0.09
207	17.25	0.17	0.110	0.025	---	0.09
208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.07
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07

```
233  19.42     0.13      0.088         0.022      ---          0.07
234  19.50     0.13      0.088         0.022      ---          0.07
235  19.58     0.10      0.066         0.022      ---          0.04
236  19.67     0.10      0.066         0.022      ---          0.04
237  19.75     0.10      0.066         0.021      ---          0.04
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall       4.63(In)
      times area      44.5(Ac.)/[(In)/(Ft.)] =      17.2(Ac.Ft)
     Total soil loss =      0.87(In)
```

```
      Total soil loss =     3.218(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      748181.2 Cubic Feet
      Total soil loss =      140184.1 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     31.173(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       10.0      20.0      30.0
40.0

-----------------------------------------------------------------------
    0+ 5       0.0002      0.03  Q         |         |         |
|
    0+10       0.0009      0.10  Q         |         |         |
|
    0+15       0.0017      0.13  Q         |         |         |
|
    0+20       0.0027      0.13  Q         |         |         |
|
    0+25       0.0034      0.11  Q         |         |         |
|
    0+30       0.0042      0.11  Q         |         |         |
|
    0+35       0.0049      0.11  Q         |         |         |
|
    0+40       0.0058      0.12  Q         |         |         |
|
    0+45       0.0067      0.13  Q         |         |         |
|
    0+50       0.0085      0.27  Q         |         |         |
|
    0+55       0.0129      0.64  Q         |         |         |
|
    1+ 0       0.0185      0.80  Q         |         |         |
|
    1+ 5       0.0237      0.77  Q         |         |         |
|
    1+10       0.0270      0.48  Q         |         |         |
|
    1+15       0.0296      0.38  Q         |         |         |
|
    1+20       0.0319      0.33  Q         |         |         |
|
    1+25       0.0340      0.31  Q         |         |         |
|
    1+30       0.0361      0.30  Q         |         |         |
|
    1+35       0.0382      0.30  Q         |         |         |
```

```
|
    1+40       0.0402      0.30  Q         |         |         |
|
    1+45       0.0423      0.30  Q         |         |         |
|
    1+50       0.0453      0.44  Q         |         |         |
|
    1+55       0.0508      0.80  Q         |         |         |
|
    2+ 0       0.0575      0.97  Q         |         |         |
|
    2+ 5       0.0647      1.05  VQ        |         |         |
|
    2+10       0.0723      1.11  VQ        |         |         |
|
    2+15       0.0802      1.14  VQ        |         |         |
|
    2+20       0.0884      1.19  VQ        |         |         |
|
    2+25       0.0968      1.22  VQ        |         |         |
|
    2+30       0.1054      1.25  VQ        |         |         |
|
    2+35       0.1152      1.42  VQ        |         |         |
|
    2+40       0.1276      1.80  VQ        |         |         |
|
    2+45       0.1412      1.97  VQ        |         |         |
|
    2+50       0.1555      2.08  V Q       |         |         |
|
    2+55       0.1704      2.16  V Q       |         |         |
|
    3+ 0       0.1858      2.23  V Q       |         |         |
|
    3+ 5       0.2014      2.27  V Q       |         |         |
|
    3+10       0.2173      2.30  V Q       |         |         |
|
    3+15       0.2333      2.34  V Q       |         |         |
|
    3+20       0.2496      2.36  V Q       |         |         |
|
    3+25       0.2661      2.39  V Q       |         |         |
|
    3+30       0.2827      2.41  V Q       |         |         |
|
    3+35       0.2995      2.44  V Q       |         |         |
|
    3+40       0.3164      2.46  V Q       |         |         |
|
    3+45       0.3335      2.48  V Q       |         |         |
|
    3+50       0.3516      2.63  V Q       |         |         |
|
    3+55       0.3722      2.99  V Q       |         |         |
|
    4+ 0       0.3939      3.15  V  Q      |         |         |
|
    4+ 5       0.4163      3.25  V  Q      |         |         |
```

```
|
    4+10       0.4392      3.32  |V Q      |         |         |
|
    4+15       0.4624      3.37  |V Q      |         |         |
|
    4+20       0.4868      3.54  |V Q      |         |         |
|
    4+25       0.5139      3.94  |V Q      |         |         |
|
    4+30       0.5423      4.12  |V  Q     |         |         |
|
    4+35       0.5714      4.23  |V  Q     |         |         |
|
    4+40       0.6011      4.32  |V  Q     |         |         |
|
    4+45       0.6313      4.38  |V  Q     |         |         |
|
    4+50       0.6627      4.56  |V  Q     |         |         |
|
    4+55       0.6970      4.97  |V  Q     |         |         |
|
    5+ 0       0.7325      5.17  |V   Q    |         |         |
|
    5+ 5       0.7671      5.01  |V   Q    |         |         |
|
    5+10       0.7972      4.38  |V  Q     |         |         |
|
    5+15       0.8258      4.14  |V  Q     |         |         |
|
    5+20       0.8544      4.16  |V  Q     |         |         |
|
    5+25       0.8850      4.45  | V Q     |         |         |
|
    5+30       0.9164      4.56  | V Q     |         |         |
|
    5+35       0.9491      4.75  | V Q     |         |         |
|
    5+40       0.9845      5.13  | V  Q    |         |         |
|
    5+45       1.0211      5.31  | V  Q    |         |         |
|
    5+50       1.0583      5.41  | V  Q    |         |         |
|
    5+55       1.0961      5.48  | V  Q    |         |         |
|
    6+ 0       1.1342      5.54  | V  Q    |         |         |
|
    6+ 5       1.1736      5.71  | V  Q    |         |         |
|
    6+10       1.2155      6.09  | V   Q   |         |         |
|
    6+15       1.2586      6.26  | V   Q   |         |         |
|
    6+20       1.3026      6.39  |  V  Q   |         |         |
|
    6+25       1.3473      6.48  |  V  Q   |         |         |
|
    6+30       1.3924      6.56  |  V  Q   |         |         |
|
    6+35       1.4389      6.74  |  V  Q   |         |         |
```

```
|
    6+40       1.4881      7.15  |  V   Q  |         |         |
|
    6+45       1.5387      7.34  |  V   Q  |         |         |
|
    6+50       1.5900      7.46  |  V   Q  |         |         |
|
    6+55       1.6420      7.54  |  V   Q  |         |         |
|
    7+ 0       1.6943      7.60  |  V   Q  |         |         |
|
    7+ 5       1.7470      7.65  |   V  Q  |         |         |
|
    7+10       1.8001      7.70  |   V  Q  |         |         |
|
    7+15       1.8534      7.75  |   V  Q  |         |         |
|
    7+20       1.9079      7.91  |   V  Q  |         |         |
|
    7+25       1.9649      8.29  |   V   Q |         |         |
|
    7+30       2.0232      8.46  |   V   Q |         |         |
|
    7+35       2.0831      8.70  |   V   Q |         |         |
|
    7+40       2.1461      9.14  |   V    Q|         |         |
|
    7+45       2.2105      9.35  |    V   Q|         |         |
|
    7+50       2.2767      9.61  |    V   Q|         |         |
|
    7+55       2.3459     10.06  |    V    Q         |         |
|
    8+ 0       2.4167     10.28  |    V    Q         |         |
|
    8+ 5       2.4904     10.69  |    V    Q         |         |
|
    8+10       2.5697     11.51  |    V    |Q        |         |
|
    8+15       2.6516     11.90  |     V   |Q        |         |
|
    8+20       2.7352     12.14  |     V   | Q       |         |
|
    8+25       2.8201     12.32  |     V   | Q       |         |
|
    8+30       2.9059     12.46  |     V   | Q       |         |
|
    8+35       2.9933     12.69  |     V   | Q       |         |
|
    8+40       3.0837     13.14  |      V  |  Q      |         |
|
    8+45       3.1758     13.36  |      V  |  Q      |         |
|
    8+50       3.2697     13.64  |      V  |  Q      |         |
|
    8+55       3.3669     14.11  |      V  |   Q     |         |
|
    9+ 0       3.4657     14.35  |       V |   Q     |         |
|
    9+ 5       3.5673     14.76  |       V |   Q     |         |
```

```
|
    9+10       3.6747     15.59  |       V |    Q    |         |
|
    9+15       3.7848     15.99  |       V |    Q    |         |
|
    9+20       3.8975     16.35  |        V|     Q   |         |
|
    9+25       4.0137     16.88  |        V|     Q   |         |
|
    9+30       4.1318     17.15  |        V|      Q  |         |
|
    9+35       4.2521     17.47  |        V|      Q  |         |
|
    9+40       4.3759     17.97  |         V      Q  |         |
|
    9+45       4.5015     18.24  |         V       Q |         |
|
    9+50       4.6293     18.55  |         V       Q |         |
|
    9+55       4.7604     19.04  |         |V       Q|         |
|
   10+ 0       4.8933     19.30  |         |V       Q|         |
|
   10+ 5       5.0210     18.54  |         |V      Q |         |
|
   10+10       5.1324     16.17  |         |V    Q   |         |
|
   10+15       5.2372     15.22  |         | V  Q    |         |
|
   10+20       5.3383     14.69  |         | V Q     |         |
|
   10+25       5.4371     14.35  |         | V Q     |         |
|
   10+30       5.5343     14.12  |         | V Q     |         |
|
   10+35       5.6349     14.60  |         |  VQ     |         |
|
   10+40       5.7468     16.25  |         |  V  Q   |         |
|
   10+45       5.8632     16.89  |         |  V  Q   |         |
|
   10+50       5.9817     17.21  |         |  V   Q  |         |
|
   10+55       6.1016     17.41  |         |   V  Q  |         |
|
   11+ 0       6.2224     17.55  |         |   V  Q  |         |
|
   11+ 5       6.3429     17.49  |         |   V  Q  |         |
|
   11+10       6.4612     17.18  |         |    V Q  |         |
|
   11+15       6.5787     17.05  |         |    V Q  |         |
|
   11+20       6.6962     17.07  |         |    V Q  |         |
|
   11+25       6.8140     17.10  |         |    V Q  |         |
|
   11+30       6.9319     17.13  |         |     VQ  |         |
|
   11+35       7.0483     16.90  |         |     Q   |         |
```

```
|
   11+40       7.1601     16.23  |         |     Q   |         |
|
   11+45       7.2701     15.98  |         |    QV   |         |
|
   11+50       7.3798     15.93  |         |    Q V  |         |
|
   11+55       7.4911     16.16  |         |     QV  |         |
|
   12+ 0       7.6029     16.23  |         |     QV  |         |
|
   12+ 5       7.7212     17.18  |         |      Q  |         |
|
   12+10       7.8567     19.68  |         |       VQ|         |
|
   12+15       7.9995     20.74  |         |       V Q         |
|
   12+20       8.1474     21.47  |         |       V |Q        |
|
   12+25       8.3005     22.23  |         |        V| Q       |
|
   12+30       8.4566     22.67  |         |        V| Q       |
|
   12+35       8.6166     23.24  |         |         V  Q      |
|
   12+40       8.7832     24.19  |         |         V   Q     |
|
   12+45       8.9531     24.67  |         |         V   Q     |
|
   12+50       9.1264     25.16  |         |         |V   Q    |
|
   12+55       9.3039     25.78  |         |         |V   Q    |
|
   13+ 0       9.4840     26.15  |         |         | V   Q   |
|
   13+ 5       9.6704     27.07  |         |         | V    Q  |
|
   13+10       9.8707     29.07  |         |         | V      Q|
|
   13+15      10.0774     30.03  |         |         |  V      Q
|
   13+20      10.2878     30.54  |         |         |  V      Q
|
   13+25      10.5006     30.90  |         |         |   V     Q
|
   13+30      10.7153     31.17  |         |         |   V     |Q
|
   13+35      10.9213     29.92  |         |         |    V   Q|
|
   13+40      11.1015     26.16  |         |         |    VQ   |
|
   13+45      11.2712     24.64  |         |         |   Q V   |
|
   13+50      11.4353     23.82  |         |         |  Q  V   |
|
   13+55      11.5956     23.28  |         |         |  Q   V  |
|
   14+ 0      11.7534     22.92  |         |         | Q    V  |
|
   14+ 5      11.9130     23.18  |         |         |  Q   V  |
```

```
|
 14+10      12.0810     24.39  |         |         |   Q   V |
|
 14+15      12.2521     24.84  |         |         |   Q   V |
|
 14+20      12.4233     24.85  |         |         |   Q   V |
|
 14+25      12.5924     24.56  |         |         |   Q    V|
|
 14+30      12.7607     24.44  |         |         |   Q    V|
|
 14+35      12.9284     24.35  |         |         |   Q     V
|
 14+40      13.0956     24.27  |         |         |   Q     V
|
 14+45      13.2621     24.17  |         |         |   Q     V
|
 14+50      13.4280     24.09  |         |         |   Q     |V
|
 14+55      13.5917     23.78  |         |         |  Q      |V
|
 15+ 0      13.7547     23.66  |         |         |  Q      | V
|
 15+ 5      13.9164     23.48  |         |         |  Q      | V
|
 15+10      14.0755     23.11  |         |         |  Q      | V
|
 15+15      14.2336     22.96  |         |         | Q       |  V
|
 15+20      14.3900     22.70  |         |         | Q       |  V
|
 15+25      14.5433     22.26  |         |         | Q       |  V
|
 15+30      14.6951     22.04  |         |         | Q       |   V
|
 15+35      14.8423     21.38  |         |         |Q        |   V
|
 15+40      14.9791     19.86  |         |        Q|         |   V
|
 15+45      15.1112     19.18  |         |        Q|         |    V
|
 15+50      15.2406     18.79  |         |       Q |         |    V
|
 15+55      15.3680     18.51  |         |       Q |         |    V
|
 16+ 0      15.4941     18.31  |         |       Q |         |     V
|
 16+ 5      15.6055     16.17  |         |     Q   |         |     V
|
 16+10      15.6790     10.68  |         Q         |         |     V
|
 16+15      15.7362      8.30  |       Q |         |         |     V
|
 16+20      15.7840      6.94  |     Q   |         |         |     V
|
 16+25      15.8254      6.01  |     Q   |         |         |     V
|
 16+30      15.8622      5.34  |    Q    |         |         |     V
|
 16+35      15.8946      4.71  |   Q     |         |         |      V
```

```
|
   16+40      15.9216      3.92  |  Q       |         |         |      V
|
   16+45      15.9451      3.40  |  Q       |         |         |      V
|
   16+50      15.9661      3.05  |  Q       |         |         |      V
|
   16+55      15.9851      2.77  | Q        |         |         |      V
|
   17+ 0      16.0026      2.54  | Q        |         |         |      V
|
   17+ 5      16.0205      2.60  | Q        |         |         |      V
|
   17+10      16.0419      3.11  |  Q       |         |         |      V
|
   17+15      16.0640      3.20  |  Q       |         |         |      V
|
   17+20      16.0871      3.36  |  Q       |         |         |      V
|
   17+25      16.1110      3.47  |  Q       |         |         |      V
|
   17+30      16.1354      3.54  |  Q       |         |         |      V
|
   17+35      16.1601      3.59  |  Q       |         |         |      V
|
   17+40      16.1852      3.64  |  Q       |         |         |      V
|
   17+45      16.2105      3.67  |  Q       |         |         |      V
|
   17+50      16.2351      3.58  |  Q       |         |         |      V
|
   17+55      16.2576      3.26  |  Q       |         |         |      V
|
   18+ 0      16.2792      3.14  |  Q       |         |         |      V
|
   18+ 5      16.3005      3.09  |  Q       |         |         |      V
|
   18+10      16.3215      3.06  |  Q       |         |         |       V
|
   18+15      16.3425      3.05  |  Q       |         |         |       V
|
   18+20      16.3633      3.02  |  Q       |         |         |       V
|
   18+25      16.3840      3.00  |  Q       |         |         |       V
|
   18+30      16.4046      2.99  | Q        |         |         |       V
|
   18+35      16.4241      2.84  | Q        |         |         |       V
|
   18+40      16.4412      2.47  | Q        |         |         |       V
|
   18+45      16.4571      2.31  | Q        |         |         |       V
|
   18+50      16.4715      2.09  | Q        |         |         |       V
|
   18+55      16.4829      1.67  |Q         |         |         |       V
|
   19+ 0      16.4930      1.46  |Q         |         |         |       V
|
   19+ 5      16.5033      1.49  |Q         |         |         |       V
```

```
|
   19+10       16.5154       1.76  |Q        |        |        |       V
|
   19+15       16.5282       1.86  |Q        |        |        |       V
|
   19+20       16.5422       2.03  | Q       |        |        |       V
|
   19+25       16.5589       2.41  | Q       |        |        |       V
|
   19+30       16.5766       2.58  | Q       |        |        |       V
|
   19+35       16.5940       2.53  | Q       |        |        |       V
|
   19+40       16.6094       2.24  | Q       |        |        |       V
|
   19+45       16.6241       2.12  | Q       |        |        |       V
|
   19+50       16.6375       1.95  |Q        |        |        |       V
|
   19+55       16.6482       1.57  |Q        |        |        |       V
|
   20+ 0       16.6579       1.40  |Q        |        |        |       V
|
   20+ 5       16.6679       1.45  |Q        |        |        |       V
|
   20+10       16.6800       1.76  |Q        |        |        |       V
|
   20+15       16.6929       1.88  |Q        |        |        |       V
|
   20+20       16.7062       1.93  |Q        |        |        |       V
|
   20+25       16.7197       1.96  |Q        |        |        |       V
|
   20+30       16.7333       1.99  |Q        |        |        |       V
|
   20+35       16.7470       1.99  |Q        |        |        |
V|
   20+40       16.7608       1.99  |Q        |        |        |
V|
   20+45       16.7745       1.99  |Q        |        |        |
V|
   20+50       16.7873       1.87  |Q        |        |        |
V|
   20+55       16.7978       1.52  |Q        |        |        |
V|
   21+ 0       16.8072       1.37  |Q        |        |        |
V|
   21+ 5       16.8171       1.43  |Q        |        |        |
V|
   21+10       16.8291       1.75  |Q        |        |        |
V|
   21+15       16.8421       1.88  |Q        |        |        |
V|
   21+20       16.8545       1.80  |Q        |        |        |
V|
   21+25       16.8647       1.48  |Q        |        |        |
V|
   21+30       16.8740       1.35  |Q        |        |        |
V|
   21+35       16.8837       1.41  |Q        |        |        |
```

```
V|
   21+40      16.8956      1.73  |Q        |         |         |
V|
   21+45      16.9083      1.85  |Q        |         |         |
V|
   21+50      16.9206      1.78  |Q        |         |         |
V|
   21+55      16.9307      1.46  |Q        |         |         |
V|
   22+ 0      16.9399      1.33  |Q        |         |         |
V|
   22+ 5      16.9496      1.41  |Q        |         |         |
V|
   22+10      16.9615      1.73  |Q        |         |         |
V|
   22+15      16.9744      1.87  |Q        |         |         |
V|
   22+20      16.9868      1.80  |Q        |         |         |
V|
   22+25      16.9970      1.48  |Q        |         |         |
V|
   22+30      17.0063      1.35  |Q        |         |         |
V|
   22+35      17.0152      1.29  |Q        |         |         |
V|
   22+40      17.0238      1.26  |Q        |         |         |
V|
   22+45      17.0324      1.24  |Q        |         |         |
V|
   22+50      17.0408      1.22  |Q        |         |         |
V|
   22+55      17.0491      1.20  |Q        |         |         |
V|
   23+ 0      17.0572      1.18  |Q        |         |         |
V|
   23+ 5      17.0653      1.18  |Q        |         |         |
V|
   23+10      17.0734      1.18  |Q        |         |         |
V|
   23+15      17.0815      1.18  |Q        |         |         |
V|
   23+20      17.0896      1.17  |Q        |         |         |
V|
   23+25      17.0976      1.16  |Q        |         |         |
V|
   23+30      17.1055      1.15  |Q        |         |         |
V|
   23+35      17.1134      1.15  |Q        |         |         |
V|
   23+40      17.1213      1.15  |Q        |         |         |
V|
   23+45      17.1292      1.15  |Q        |         |         |
V|
   23+50      17.1372      1.15  |Q        |         |         |
V|
   23+55      17.1451      1.15  |Q        |         |         |
V|
   24+ 0      17.1531      1.15  |Q        |         |         |
V|
   24+ 5      17.1599      1.00  Q         |         |         |
```

```
V|
   24+10      17.1639      0.58  Q          |          |          |
V|
   24+15      17.1667      0.40  Q          |          |          |
V|
   24+20      17.1688      0.30  Q          |          |          |
V|
   24+25      17.1704      0.24  Q          |          |          |
V|
   24+30      17.1717      0.19  Q          |          |          |
V|
   24+35      17.1728      0.15  Q          |          |          |
V|
   24+40      17.1737      0.12  Q          |          |          |
V|
   24+45      17.1743      0.10  Q          |          |          |
V|
   24+50      17.1749      0.08  Q          |          |          |
V|
   24+55      17.1753      0.06  Q          |          |          |
V|
   25+ 0      17.1756      0.04  Q          |          |          |
V|
   25+ 5      17.1758      0.03  Q          |          |          |
V|
   25+10      17.1759      0.02  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

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6.1
                  Study date  04/03/18 File: nwcynpost24100.out


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      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Northwest Canyon Post Landfill
      24 hour 100 year strom event

      ------------------------------------------------------------------
--
      Drainage Area =      35.70(Ac.)  =      0.056 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      35.70(Ac.)  =
0.056 Sq. Mi.
      Length along longest watercourse =    1711.00(Ft.)
      Length along longest watercourse measured to centroid =     792.00
(Ft.)
      Length along longest watercourse =      0.324 Mi.
      Length along longest watercourse measured to centroid =      0.150
Mi.
      Difference in elevation =     298.00(Ft.)
      Slope along watercourse =    919.6026 Ft./Mi.
      Average Manning's 'N' = 0.040
      Lag time =    0.083 Hr.
      Lag time =     4.99 Min.
      25% of lag time =     1.25 Min.
      40% of lag time =     2.00 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             35.70              2.00                   71.40

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             35.70              5.50                  196.35

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          35.700           93.00         0.000
       Total Area Entered =     35.70(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.000        0.036       1.000
0.036
                                                          Sum (F) =
0.036
      Area averaged mean soil loss (F) (In/Hr) =  0.036
      Minimum soil loss rate ((In/Hr)) =  0.018
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.900
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083       100.157        22.875             8.230
          2   0.167       200.315        38.170            13.733
          3   0.250       300.472        13.517             4.863
          4   0.333       400.629         7.544             2.714
          5   0.417       500.787         4.797             1.726
          6   0.500       600.944         3.598             1.294
          7   0.583       701.101         2.799             1.007
          8   0.667       801.259         2.197             0.790
          9   0.750       901.416         1.827             0.657
         10   0.833      1001.573         2.676             0.963
                                    Sum = 100.000   Sum=      35.979
-----------------------------------------------------------------------
```

```
Unit Time    Pattern   Storm Rain      Loss rate(In./Hr)      Effective
     (Hr.)   Percent   (In/Hr)          Max    |   Low        (In/Hr)
  1  0.08      0.07      0.044          0.065      0.040         0.00
  2  0.17      0.07      0.044          0.064      0.040         0.00
  3  0.25      0.07      0.044          0.064      0.040         0.00
  4  0.33      0.10      0.066          0.064       ---          0.00
  5  0.42      0.10      0.066          0.064       ---          0.00
  6  0.50      0.10      0.066          0.063       ---          0.00
  7  0.58      0.10      0.066          0.063       ---          0.00
  8  0.67      0.10      0.066          0.063       ---          0.00
  9  0.75      0.10      0.066          0.063       ---          0.00
 10  0.83      0.13      0.088          0.062       ---          0.03
 11  0.92      0.13      0.088          0.062       ---          0.03
 12  1.00      0.13      0.088          0.062       ---          0.03
 13  1.08      0.10      0.066          0.062       ---          0.00
 14  1.17      0.10      0.066          0.061       ---          0.00
 15  1.25      0.10      0.066          0.061       ---          0.00
 16  1.33      0.10      0.066          0.061       ---          0.01
 17  1.42      0.10      0.066          0.061       ---          0.01
 18  1.50      0.10      0.066          0.060       ---          0.01
 19  1.58      0.10      0.066          0.060       ---          0.01
 20  1.67      0.10      0.066          0.060       ---          0.01
 21  1.75      0.10      0.066          0.060       ---          0.01
 22  1.83      0.13      0.088          0.059       ---          0.03
 23  1.92      0.13      0.088          0.059       ---          0.03
 24  2.00      0.13      0.088          0.059       ---          0.03
 25  2.08      0.13      0.088          0.059       ---          0.03
 26  2.17      0.13      0.088          0.058       ---          0.03
 27  2.25      0.13      0.088          0.058       ---          0.03
 28  2.33      0.13      0.088          0.058       ---          0.03
 29  2.42      0.13      0.088          0.058       ---          0.03
 30  2.50      0.13      0.088          0.057       ---          0.03
 31  2.58      0.17      0.110          0.057       ---          0.05
 32  2.67      0.17      0.110          0.057       ---          0.05
 33  2.75      0.17      0.110          0.057       ---          0.05
 34  2.83      0.17      0.110          0.057       ---          0.05
 35  2.92      0.17      0.110          0.056       ---          0.05
 36  3.00      0.17      0.110          0.056       ---          0.05
 37  3.08      0.17      0.110          0.056       ---          0.05
 38  3.17      0.17      0.110          0.056       ---          0.05
 39  3.25      0.17      0.110          0.055       ---          0.05
 40  3.33      0.17      0.110          0.055       ---          0.05
 41  3.42      0.17      0.110          0.055       ---          0.06
 42  3.50      0.17      0.110          0.055       ---          0.06
 43  3.58      0.17      0.110          0.054       ---          0.06
 44  3.67      0.17      0.110          0.054       ---          0.06
 45  3.75      0.17      0.110          0.054       ---          0.06
 46  3.83      0.20      0.132          0.054       ---          0.08
 47  3.92      0.20      0.132          0.054       ---          0.08
 48  4.00      0.20      0.132          0.053       ---          0.08
 49  4.08      0.20      0.132          0.053       ---          0.08
 50  4.17      0.20      0.132          0.053       ---          0.08
 51  4.25      0.20      0.132          0.053       ---          0.08
 52  4.33      0.23      0.154          0.052       ---          0.10
 53  4.42      0.23      0.154          0.052       ---          0.10
 54  4.50      0.23      0.154          0.052       ---          0.10
 55  4.58      0.23      0.154          0.052       ---          0.10
 56  4.67      0.23      0.154          0.052       ---          0.10
 57  4.75      0.23      0.154          0.051       ---          0.10
```

58	4.83	0.27	0.176	0.051	---	0.12
59	4.92	0.27	0.176	0.051	---	0.13
60	5.00	0.27	0.176	0.051	---	0.13
61	5.08	0.20	0.132	0.050	---	0.08
62	5.17	0.20	0.132	0.050	---	0.08
63	5.25	0.20	0.132	0.050	---	0.08
64	5.33	0.23	0.154	0.050	---	0.10
65	5.42	0.23	0.154	0.050	---	0.10
66	5.50	0.23	0.154	0.049	---	0.10
67	5.58	0.27	0.176	0.049	---	0.13
68	5.67	0.27	0.176	0.049	---	0.13
69	5.75	0.27	0.176	0.049	---	0.13
70	5.83	0.27	0.176	0.048	---	0.13
71	5.92	0.27	0.176	0.048	---	0.13
72	6.00	0.27	0.176	0.048	---	0.13
73	6.08	0.30	0.198	0.048	---	0.15
74	6.17	0.30	0.198	0.048	---	0.15
75	6.25	0.30	0.198	0.047	---	0.15
76	6.33	0.30	0.198	0.047	---	0.15
77	6.42	0.30	0.198	0.047	---	0.15
78	6.50	0.30	0.198	0.047	---	0.15
79	6.58	0.33	0.220	0.047	---	0.17
80	6.67	0.33	0.220	0.046	---	0.17
81	6.75	0.33	0.220	0.046	---	0.17
82	6.83	0.33	0.220	0.046	---	0.17
83	6.92	0.33	0.220	0.046	---	0.17
84	7.00	0.33	0.220	0.046	---	0.17
85	7.08	0.33	0.220	0.045	---	0.17
86	7.17	0.33	0.220	0.045	---	0.17
87	7.25	0.33	0.220	0.045	---	0.18
88	7.33	0.37	0.242	0.045	---	0.20
89	7.42	0.37	0.242	0.044	---	0.20
90	7.50	0.37	0.242	0.044	---	0.20
91	7.58	0.40	0.264	0.044	---	0.22
92	7.67	0.40	0.264	0.044	---	0.22
93	7.75	0.40	0.264	0.044	---	0.22
94	7.83	0.43	0.286	0.043	---	0.24
95	7.92	0.43	0.286	0.043	---	0.24
96	8.00	0.43	0.286	0.043	---	0.24
97	8.08	0.50	0.330	0.043	---	0.29
98	8.17	0.50	0.330	0.043	---	0.29
99	8.25	0.50	0.330	0.042	---	0.29
100	8.33	0.50	0.330	0.042	---	0.29
101	8.42	0.50	0.330	0.042	---	0.29
102	8.50	0.50	0.330	0.042	---	0.29
103	8.58	0.53	0.352	0.042	---	0.31
104	8.67	0.53	0.352	0.041	---	0.31
105	8.75	0.53	0.352	0.041	---	0.31
106	8.83	0.57	0.374	0.041	---	0.33
107	8.92	0.57	0.374	0.041	---	0.33
108	9.00	0.57	0.374	0.041	---	0.33
109	9.08	0.63	0.418	0.041	---	0.38
110	9.17	0.63	0.418	0.040	---	0.38
111	9.25	0.63	0.418	0.040	---	0.38
112	9.33	0.67	0.440	0.040	---	0.40
113	9.42	0.67	0.440	0.040	---	0.40
114	9.50	0.67	0.440	0.040	---	0.40
115	9.58	0.70	0.462	0.039	---	0.42
116	9.67	0.70	0.462	0.039	---	0.42
117	9.75	0.70	0.462	0.039	---	0.42

```
118   9.83      0.73      0.484          0.039       ---           0.45
119   9.92      0.73      0.484          0.039       ---           0.45
120  10.00      0.73      0.484          0.038       ---           0.45
121  10.08      0.50      0.330          0.038       ---           0.29
122  10.17      0.50      0.330          0.038       ---           0.29
123  10.25      0.50      0.330          0.038       ---           0.29
124  10.33      0.50      0.330          0.038       ---           0.29
125  10.42      0.50      0.330          0.038       ---           0.29
126  10.50      0.50      0.330          0.037       ---           0.29
127  10.58      0.67      0.440          0.037       ---           0.40
128  10.67      0.67      0.440          0.037       ---           0.40
129  10.75      0.67      0.440          0.037       ---           0.40
130  10.83      0.67      0.440          0.037       ---           0.40
131  10.92      0.67      0.440          0.036       ---           0.40
132  11.00      0.67      0.440          0.036       ---           0.40
133  11.08      0.63      0.418          0.036       ---           0.38
134  11.17      0.63      0.418          0.036       ---           0.38
135  11.25      0.63      0.418          0.036       ---           0.38
136  11.33      0.63      0.418          0.036       ---           0.38
137  11.42      0.63      0.418          0.035       ---           0.38
138  11.50      0.63      0.418          0.035       ---           0.38
139  11.58      0.57      0.374          0.035       ---           0.34
140  11.67      0.57      0.374          0.035       ---           0.34
141  11.75      0.57      0.374          0.035       ---           0.34
142  11.83      0.60      0.396          0.034       ---           0.36
143  11.92      0.60      0.396          0.034       ---           0.36
144  12.00      0.60      0.396          0.034       ---           0.36
145  12.08      0.83      0.550          0.034       ---           0.52
146  12.17      0.83      0.550          0.034       ---           0.52
147  12.25      0.83      0.550          0.034       ---           0.52
148  12.33      0.87      0.572          0.033       ---           0.54
149  12.42      0.87      0.572          0.033       ---           0.54
150  12.50      0.87      0.572          0.033       ---           0.54
151  12.58      0.93      0.616          0.033       ---           0.58
152  12.67      0.93      0.616          0.033       ---           0.58
153  12.75      0.93      0.616          0.033       ---           0.58
154  12.83      0.97      0.638          0.032       ---           0.61
155  12.92      0.97      0.638          0.032       ---           0.61
156  13.00      0.97      0.638          0.032       ---           0.61
157  13.08      1.13      0.748          0.032       ---           0.72
158  13.17      1.13      0.748          0.032       ---           0.72
159  13.25      1.13      0.748          0.032       ---           0.72
160  13.33      1.13      0.748          0.031       ---           0.72
161  13.42      1.13      0.748          0.031       ---           0.72
162  13.50      1.13      0.748          0.031       ---           0.72
163  13.58      0.77      0.506          0.031       ---           0.47
164  13.67      0.77      0.506          0.031       ---           0.48
165  13.75      0.77      0.506          0.031       ---           0.48
166  13.83      0.77      0.506          0.031       ---           0.48
167  13.92      0.77      0.506          0.030       ---           0.48
168  14.00      0.77      0.506          0.030       ---           0.48
169  14.08      0.90      0.594          0.030       ---           0.56
170  14.17      0.90      0.594          0.030       ---           0.56
171  14.25      0.90      0.594          0.030       ---           0.56
172  14.33      0.87      0.572          0.030       ---           0.54
173  14.42      0.87      0.572          0.029       ---           0.54
174  14.50      0.87      0.572          0.029       ---           0.54
175  14.58      0.87      0.572          0.029       ---           0.54
176  14.67      0.87      0.572          0.029       ---           0.54
177  14.75      0.87      0.572          0.029       ---           0.54
```

178	14.83	0.83	0.550	0.029	---	0.52
179	14.92	0.83	0.550	0.029	---	0.52
180	15.00	0.83	0.550	0.028	---	0.52
181	15.08	0.80	0.528	0.028	---	0.50
182	15.17	0.80	0.528	0.028	---	0.50
183	15.25	0.80	0.528	0.028	---	0.50
184	15.33	0.77	0.506	0.028	---	0.48
185	15.42	0.77	0.506	0.028	---	0.48
186	15.50	0.77	0.506	0.028	---	0.48
187	15.58	0.63	0.418	0.027	---	0.39
188	15.67	0.63	0.418	0.027	---	0.39
189	15.75	0.63	0.418	0.027	---	0.39
190	15.83	0.63	0.418	0.027	---	0.39
191	15.92	0.63	0.418	0.027	---	0.39
192	16.00	0.63	0.418	0.027	---	0.39
193	16.08	0.13	0.088	0.027	---	0.06
194	16.17	0.13	0.088	0.026	---	0.06
195	16.25	0.13	0.088	0.026	---	0.06
196	16.33	0.13	0.088	0.026	---	0.06
197	16.42	0.13	0.088	0.026	---	0.06
198	16.50	0.13	0.088	0.026	---	0.06
199	16.58	0.10	0.066	0.026	---	0.04
200	16.67	0.10	0.066	0.026	---	0.04
201	16.75	0.10	0.066	0.026	---	0.04
202	16.83	0.10	0.066	0.025	---	0.04
203	16.92	0.10	0.066	0.025	---	0.04
204	17.00	0.10	0.066	0.025	---	0.04
205	17.08	0.17	0.110	0.025	---	0.08
206	17.17	0.17	0.110	0.025	---	0.09
207	17.25	0.17	0.110	0.025	---	0.09
208	17.33	0.17	0.110	0.025	---	0.09
209	17.42	0.17	0.110	0.025	---	0.09
210	17.50	0.17	0.110	0.024	---	0.09
211	17.58	0.17	0.110	0.024	---	0.09
212	17.67	0.17	0.110	0.024	---	0.09
213	17.75	0.17	0.110	0.024	---	0.09
214	17.83	0.13	0.088	0.024	---	0.06
215	17.92	0.13	0.088	0.024	---	0.06
216	18.00	0.13	0.088	0.024	---	0.06
217	18.08	0.13	0.088	0.024	---	0.06
218	18.17	0.13	0.088	0.023	---	0.06
219	18.25	0.13	0.088	0.023	---	0.06
220	18.33	0.13	0.088	0.023	---	0.06
221	18.42	0.13	0.088	0.023	---	0.06
222	18.50	0.13	0.088	0.023	---	0.07
223	18.58	0.10	0.066	0.023	---	0.04
224	18.67	0.10	0.066	0.023	---	0.04
225	18.75	0.10	0.066	0.023	---	0.04
226	18.83	0.07	0.044	0.023	---	0.02
227	18.92	0.07	0.044	0.022	---	0.02
228	19.00	0.07	0.044	0.022	---	0.02
229	19.08	0.10	0.066	0.022	---	0.04
230	19.17	0.10	0.066	0.022	---	0.04
231	19.25	0.10	0.066	0.022	---	0.04
232	19.33	0.13	0.088	0.022	---	0.07
233	19.42	0.13	0.088	0.022	---	0.07
234	19.50	0.13	0.088	0.022	---	0.07
235	19.58	0.10	0.066	0.022	---	0.04
236	19.67	0.10	0.066	0.022	---	0.04
237	19.75	0.10	0.066	0.021	---	0.04

```
238  19.83     0.07      0.044         0.021      ---          0.02
239  19.92     0.07      0.044         0.021      ---          0.02
240  20.00     0.07      0.044         0.021      ---          0.02
241  20.08     0.10      0.066         0.021      ---          0.04
242  20.17     0.10      0.066         0.021      ---          0.05
243  20.25     0.10      0.066         0.021      ---          0.05
244  20.33     0.10      0.066         0.021      ---          0.05
245  20.42     0.10      0.066         0.021      ---          0.05
246  20.50     0.10      0.066         0.021      ---          0.05
247  20.58     0.10      0.066         0.021      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.020      ---          0.05
250  20.83     0.07      0.044         0.020      ---          0.02
251  20.92     0.07      0.044         0.020      ---          0.02
252  21.00     0.07      0.044         0.020      ---          0.02
253  21.08     0.10      0.066         0.020      ---          0.05
254  21.17     0.10      0.066         0.020      ---          0.05
255  21.25     0.10      0.066         0.020      ---          0.05
256  21.33     0.07      0.044         0.020      ---          0.02
257  21.42     0.07      0.044         0.020      ---          0.02
258  21.50     0.07      0.044         0.020      ---          0.02
259  21.58     0.10      0.066         0.020      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.019      ---          0.02
263  21.92     0.07      0.044         0.019      ---          0.02
264  22.00     0.07      0.044         0.019      ---          0.02
265  22.08     0.10      0.066         0.019      ---          0.05
266  22.17     0.10      0.066         0.019      ---          0.05
267  22.25     0.10      0.066         0.019      ---          0.05
268  22.33     0.07      0.044         0.019      ---          0.03
269  22.42     0.07      0.044         0.019      ---          0.03
270  22.50     0.07      0.044         0.019      ---          0.03
271  22.58     0.07      0.044         0.019      ---          0.03
272  22.67     0.07      0.044         0.019      ---          0.03
273  22.75     0.07      0.044         0.019      ---          0.03
274  22.83     0.07      0.044         0.019      ---          0.03
275  22.92     0.07      0.044         0.019      ---          0.03
276  23.00     0.07      0.044         0.019      ---          0.03
277  23.08     0.07      0.044         0.019      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.018      ---          0.03
284  23.67     0.07      0.044         0.018      ---          0.03
285  23.75     0.07      0.044         0.018      ---          0.03
286  23.83     0.07      0.044         0.018      ---          0.03
287  23.92     0.07      0.044         0.018      ---          0.03
288  24.00     0.07      0.044         0.018      ---          0.03
    Sum =     100.0                                   Sum =    55.6
     Flood volume = Effective rainfall      4.63(In)
      times area      35.7(Ac.)/[(In)/(Ft.)] =      13.8(Ac.Ft)
     Total soil loss =      0.87(In)
     Total soil loss =     2.582(Ac.Ft)
     Total rainfall =      5.50(In)
     Flood volume =      600238.5 Cubic Feet
     Total soil loss =      112462.3 Cubic Feet
     ------------------------------------------------------------------
```

```
--
       Peak flow rate of this hydrograph =     25.393(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f    H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0002      0.04  Q         |         |         |
|
    0+10       0.0009      0.10  Q         |         |         |
|
    0+15       0.0017      0.12  Q         |         |         |
|
    0+20       0.0025      0.11  Q         |         |         |
|
    0+25       0.0031      0.09  Q         |         |         |
|
    0+30       0.0038      0.09  Q         |         |         |
|
    0+35       0.0044      0.10  Q         |         |         |
|
    0+40       0.0052      0.10  Q         |         |         |
|
    0+45       0.0059      0.11  Q         |         |         |
|
    0+50       0.0080      0.30  Q         |         |         |
|
    0+55       0.0122      0.61  Q         |         |         |
|
    1+ 0       0.0172      0.73  Q         |         |         |
|
    1+ 5       0.0214      0.61  Q         |         |         |
|
    1+10       0.0239      0.36  Q         |         |         |
|
    1+15       0.0259      0.29  Q         |         |         |
|
    1+20       0.0276      0.26  Q         |         |         |
|
    1+25       0.0293      0.25  Q         |         |         |
|
    1+30       0.0310      0.24  Q         |         |         |
|
    1+35       0.0327      0.25  Q         |         |         |
|
    1+40       0.0343      0.24  Q         |         |         |
|
    1+45       0.0359      0.23  Q         |         |         |
|
```

```
    1+50       0.0387      0.40  Q         |         |         |
|
    1+55       0.0436      0.71  Q         |         |         |
|
    2+ 0       0.0493      0.83  VQ        |         |         |
|
    2+ 5       0.0555      0.90  VQ        |         |         |
|
    2+10       0.0620      0.94  VQ        |         |         |
|
    2+15       0.0688      0.98  VQ        |         |         |
|
    2+20       0.0757      1.01  VQ        |         |         |
|
    2+25       0.0829      1.04  VQ        |         |         |
|
    2+30       0.0902      1.06  VQ        |         |         |
|
    2+35       0.0989      1.27  VQ        |         |         |
|
    2+40       0.1098      1.58  V Q       |         |         |
|
    2+45       0.1215      1.70  V Q       |         |         |
|
    2+50       0.1337      1.77  V Q       |         |         |
|
    2+55       0.1461      1.81  V Q       |         |         |
|
    3+ 0       0.1589      1.85  V Q       |         |         |
|
    3+ 5       0.1718      1.88  V Q       |         |         |
|
    3+10       0.1849      1.91  V Q       |         |         |
|
    3+15       0.1982      1.93  V Q       |         |         |
|
    3+20       0.2117      1.96  V Q       |         |         |
|
    3+25       0.2252      1.97  V Q       |         |         |
|
    3+30       0.2388      1.97  V Q       |         |         |
|
    3+35       0.2525      1.98  V Q       |         |         |
|
    3+40       0.2662      1.99  V Q       |         |         |
|
    3+45       0.2800      2.00  V Q       |         |         |
|
    3+50       0.2950      2.19  V Q       |         |         |
|
    3+55       0.3123      2.50  V  Q      |         |         |
|
    4+ 0       0.3303      2.61  V  Q      |         |         |
|
    4+ 5       0.3487      2.68  |V Q      |         |         |
|
    4+10       0.3675      2.73  |V Q      |         |         |
|
    4+15       0.3866      2.76  |V Q      |         |         |
|
```

```
       4+20       0.4071      2.98  |V Q       |         |         |
|
       4+25       0.4298      3.30  |V  Q      |         |         |
|
       4+30       0.4535      3.43  |V  Q      |         |         |
|
       4+35       0.4777      3.52  |V  Q      |         |         |
|
       4+40       0.5023      3.57  |V  Q      |         |         |
|
       4+45       0.5271      3.61  |V  Q      |         |         |
|
       4+50       0.5534      3.82  |V   Q     |         |         |
|
       4+55       0.5819      4.14  |V   Q     |         |         |
|
       5+ 0       0.6114      4.27  |V   Q     |         |         |
|
       5+ 5       0.6389      4.00  |V   Q     |         |         |
|
       5+10       0.6626      3.44  |V  Q      |         |         |
|
       5+15       0.6851      3.26  |V  Q      |         |         |
|
       5+20       0.7082      3.36  | V Q      |         |         |
|
       5+25       0.7331      3.61  | V Q      |         |         |
|
       5+30       0.7584      3.68  | V Q      |         |         |
|
       5+35       0.7853      3.91  | V  Q     |         |         |
|
       5+40       0.8144      4.22  | V  Q     |         |         |
|
       5+45       0.8442      4.33  | V  Q     |         |         |
|
       5+50       0.8744      4.38  | V  Q     |         |         |
|
       5+55       0.9050      4.44  | V  Q     |         |         |
|
       6+ 0       0.9359      4.49  | V  Q     |         |         |
|
       6+ 5       0.9685      4.73  | V   Q    |         |         |
|
       6+10       1.0033      5.05  | V   Q    |         |         |
|
       6+15       1.0390      5.18  |  V  Q    |         |         |
|
       6+20       1.0753      5.27  |  V   Q   |         |         |
|
       6+25       1.1119      5.32  |  V   Q   |         |         |
|
       6+30       1.1487      5.35  |  V   Q   |         |         |
|
       6+35       1.1871      5.56  |  V   Q   |         |         |
|
       6+40       1.2276      5.89  |  V   Q   |         |         |
|
       6+45       1.2691      6.02  |  V    Q |         |         |
|
```

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    6+50       1.3112      6.11  |  V    Q |         |         |
|
    6+55       1.3536      6.15  |  V    Q |         |         |
|
    7+ 0       1.3962      6.19  |   V   Q |         |         |
|
    7+ 5       1.4390      6.22  |   V   Q |         |         |
|
    7+10       1.4820      6.24  |   V   Q |         |         |
|
    7+15       1.5252      6.27  |   V   Q |         |         |
|
    7+20       1.5698      6.48  |   V   Q |         |         |
|
    7+25       1.6165      6.79  |   V    Q|         |         |
|
    7+30       1.6641      6.90  |   V    Q|         |         |
|
    7+35       1.7133      7.15  |   V    Q|         |         |
|
    7+40       1.7649      7.50  |    V   Q|         |         |
|
    7+45       1.8175      7.64  |    V    Q         |         |
|
    7+50       1.8720      7.91  |    V    Q         |         |
|
    7+55       1.9290      8.27  |    V    |Q        |         |
|
    8+ 0       1.9871      8.43  |    V    |Q        |         |
|
    8+ 5       2.0484      8.90  |    V    |Q        |         |
|
    8+10       2.1143      9.57  |     V   | Q       |         |
|
    8+15       2.1821      9.84  |     V   |  Q      |         |
|
    8+20       2.2510     10.01  |     V   |  Q      |         |
|
    8+25       2.3206     10.11  |     V   |  Q      |         |
|
    8+30       2.3907     10.18  |     V   |  Q      |         |
|
    8+35       2.4626     10.44  |      V  |  Q      |         |
|
    8+40       2.5369     10.78  |      V  |   Q     |         |
|
    8+45       2.6121     10.93  |      V  |   Q     |         |
|
    8+50       2.6894     11.22  |      V  |   Q     |         |
|
    8+55       2.7690     11.56  |       V |    Q    |         |
|
    9+ 0       2.8496     11.71  |       V |    Q    |         |
|
    9+ 5       2.9333     12.16  |       V |     Q   |         |
|
    9+10       3.0217     12.82  |       V |      Q  |         |
|
    9+15       3.1118     13.09  |        V|      Q  |         |
|
```

```
    9+20      3.2044     13.44  |        V|      Q  |         |
|
    9+25      3.2997     13.84  |        V|       Q |         |
|
    9+30      3.3963     14.03  |        V|       Q |         |
|
    9+35      3.4951     14.34  |         V        Q|         |
|
    9+40      3.5964     14.72  |         V        Q|         |
|
    9+45      3.6990     14.89  |         V        Q|         |
|
    9+50      3.8037     15.21  |         |V        Q         |
|
    9+55      3.9110     15.57  |         |V        Q         |
|
   10+ 0      4.0193     15.73  |         |V        Q         |
|
   10+ 5      4.1196     14.57  |         |V       Q|         |
|
   10+10      4.2058     12.51  |         | V   Q   |         |
|
   10+15      4.2872     11.82  |         | V  Q    |         |
|
   10+20      4.3660     11.45  |         | V  Q    |         |
|
   10+25      4.4432     11.21  |         | V Q     |         |
|
   10+30      4.5191     11.03  |         |  VQ     |         |
|
   10+35      4.6004     11.81  |         |  V Q    |         |
|
   10+40      4.6914     13.20  |         |  V   Q  |         |
|
   10+45      4.7853     13.64  |         |  V    Q |         |
|
   10+50      4.8803     13.80  |         |   V   Q |         |
|
   10+55      4.9767     14.00  |         |   V   Q |         |
|
   11+ 0      5.0741     14.14  |         |   V   Q |         |
|
   11+ 5      5.1711     14.08  |         |    V  Q |         |
|
   11+10      5.2666     13.87  |         |    V  Q |         |
|
   11+15      5.3620     13.84  |         |    V  Q |         |
|
   11+20      5.4577     13.90  |         |    V  Q |         |
|
   11+25      5.5532     13.86  |         |     V Q |         |
|
   11+30      5.6485     13.84  |         |     V Q |         |
|
   11+35      5.7412     13.46  |         |     VQ  |         |
|
   11+40      5.8297     12.85  |         |     VQ  |         |
|
   11+45      5.9167     12.63  |         |     QV  |         |
|
```

```
   11+50       6.0039     12.67  |         |     QV  |         |
|
   11+55       6.0928     12.91  |         |      Q  |         |
|
   12+ 0       6.1821     12.96  |         |      Q  |         |
|
   12+ 5       6.2802     14.25  |         |       VQ|         |
|
   12+10       6.3930     16.38  |         |       V |Q        |
|
   12+15       6.5110     17.13  |         |       V | Q       |
|
   12+20       6.6330     17.72  |         |        V|  Q      |
|
   12+25       6.7591     18.31  |         |        V|   Q     |
|
   12+30       6.8875     18.64  |         |        V|   Q     |
|
   12+35       7.0200     19.24  |         |         V    Q    |
|
   12+40       7.1578     20.01  |         |         V     Q   |
|
   12+45       7.2980     20.36  |         |         |V     Q  |
|
   12+50       7.4415     20.84  |         |         |V     Q  |
|
   12+55       7.5878     21.24  |         |         | V     Q |
|
   13+ 0       7.7353     21.42  |         |         | V     Q |
|
   13+ 5       7.8900     22.46  |         |         | V      Q|
|
   13+10       8.0556     24.05  |         |         |  V      | Q
|
   13+15       8.2254     24.65  |         |         |  V      | Q
|
   13+20       8.3977     25.02  |         |         |   V     |  Q
|
   13+25       8.5714     25.23  |         |         |   V     |  Q
|
   13+30       8.7463     25.39  |         |         |    V    |  Q
|
   13+35       8.9084     23.54  |         |         |    V    |Q
|
   13+40       9.0483     20.31  |         |         |     VQ  |
|
   13+45       9.1806     19.21  |         |         |    QV   |
|
   13+50       9.3091     18.66  |         |         |   Q  V  |
|
   13+55       9.4348     18.25  |         |         |   Q  V  |
|
   14+ 0       9.5583     17.94  |         |         |  Q   V  |
|
   14+ 5       9.6852     18.43  |         |         |   Q   V |
|
   14+10       9.8192     19.45  |         |         |    Q  V |
|
   14+15       9.9551     19.73  |         |         |     Q V |
|
```

```
   14+20      10.0897     19.56  |         |         |     Q  V|
|
   14+25      10.2234     19.41  |         |         |    Q   V|
|
   14+30      10.3572     19.42  |         |         |    Q    V
|
   14+35      10.4912     19.46  |         |         |    Q    V
|
   14+40      10.6255     19.49  |         |         |    Q    V
|
   14+45      10.7600     19.53  |         |         |     Q   |V
|
   14+50      10.8937     19.42  |         |         |    Q    |V
|
   14+55      11.0253     19.10  |         |         |    Q    | V
|
   15+ 0      11.1560     18.99  |         |         |    Q    | V
|
   15+ 5      11.2850     18.73  |         |         |   Q     | V
|
   15+10      11.4117     18.39  |         |         |   Q     |  V
|
   15+15      11.5375     18.26  |         |         |   Q     |  V
|
   15+20      11.6615     18.01  |         |         |   Q     |  V
|
   15+25      11.7831     17.65  |         |         |  Q      |   V
|
   15+30      11.9036     17.51  |         |         |  Q      |   V
|
   15+35      12.0186     16.69  |         |         | Q       |   V
|
   15+40      12.1248     15.43  |         |         Q         |    V
|
   15+45      12.2278     14.96  |         |        Q|         |    V
|
   15+50      12.3290     14.68  |         |        Q|         |    V
|
   15+55      12.4290     14.52  |         |        Q|         |     V
|
   16+ 0      12.5281     14.40  |         |        Q|         |     V
|
   16+ 5      12.6078     11.57  |         |    Q    |         |     V
|
   16+10      12.6559      6.98  |        Q|         |         |     V
|
   16+15      12.6925      5.32  |      Q  |         |         |     V
|
   16+20      12.7224      4.34  |    Q    |         |         |     V
|
   16+25      12.7484      3.78  |    Q    |         |         |      V
|
   16+30      12.7715      3.35  |   Q     |         |         |      V
|
   16+35      12.7911      2.84  |  Q      |         |         |      V
|
   16+40      12.8068      2.29  |  Q      |         |         |      V
|
   16+45      12.8204      1.97  | Q       |         |         |      V
|
```

```
   16+50      12.8313      1.59  | Q       |         |         |      V
|
   16+55      12.8421      1.56  | Q       |         |         |      V
|
   17+ 0      12.8527      1.54  | Q       |         |         |      V
|
   17+ 5      12.8656      1.88  | Q       |         |         |      V
|
   17+10      12.8827      2.47  |  Q      |         |         |      V
|
   17+15      12.9011      2.68  |  Q      |         |         |      V
|
   17+20      12.9202      2.78  |  Q      |         |         |      V
|
   17+25      12.9399      2.86  |  Q      |         |         |      V
|
   17+30      12.9601      2.92  |  Q      |         |         |      V
|
   17+35      12.9805      2.97  |  Q      |         |         |      V
|
   17+40      13.0013      3.01  |   Q     |         |         |      V
|
   17+45      13.0222      3.04  |   Q     |         |         |      V
|
   17+50      13.0422      2.91  |  Q      |         |         |      V
|
   17+55      13.0602      2.61  |  Q      |         |         |      V
|
   18+ 0      13.0775      2.51  |  Q      |         |         |      V
|
   18+ 5      13.0944      2.45  |  Q      |         |         |       V
|
   18+10      13.1111      2.42  |  Q      |         |         |       V
|
   18+15      13.1276      2.39  |  Q      |         |         |       V
|
   18+20      13.1439      2.38  |  Q      |         |         |       V
|
   18+25      13.1602      2.36  |  Q      |         |         |       V
|
   18+30      13.1764      2.35  |  Q      |         |         |       V
|
   18+35      13.1912      2.15  | Q       |         |         |       V
|
   18+40      13.2040      1.86  | Q       |         |         |       V
|
   18+45      13.2161      1.75  | Q       |         |         |       V
|
   18+50      13.2266      1.52  | Q       |         |         |       V
|
   18+55      13.2347      1.18  |Q        |         |         |       V
|
   19+ 0      13.2419      1.05  |Q        |         |         |       V
|
   19+ 5      13.2498      1.15  |Q        |         |         |       V
|
   19+10      13.2595      1.40  |Q        |         |         |       V
|
   19+15      13.2696      1.47  |Q        |         |         |       V
|
```

```
      19+20       13.2811      1.67  | Q       |         |         |       V
|
      19+25       13.2949      2.00  | Q       |         |         |       V
|
      19+30       13.3095      2.12  | Q       |         |         |       V
|
      19+35       13.3233      2.01  | Q       |         |         |       V
|
      19+40       13.3355      1.76  | Q       |         |         |       V
|
      19+45       13.3472      1.70  | Q       |         |         |       V
|
      19+50       13.3576      1.51  | Q       |         |         |       V
|
      19+55       13.3658      1.19  |Q        |         |         |       V
|
      20+ 0       13.3732      1.07  |Q        |         |         |       V
|
      20+ 5       13.3814      1.20  |Q        |         |         |       V
|
      20+10       13.3914      1.45  |Q        |         |         |       V
|
      20+15       13.4018      1.51  | Q       |         |         |       V
|
      20+20       13.4123      1.53  | Q       |         |         |       V
|
      20+25       13.4231      1.56  | Q       |         |         |       V
|
      20+30       13.4339      1.57  | Q       |         |         |       V
|
      20+35       13.4448      1.58  | Q       |         |         |
V|
      20+40       13.4558      1.60  | Q       |         |         |
V|
      20+45       13.4669      1.62  | Q       |         |         |
V|
      20+50       13.4770      1.46  |Q        |         |         |
V|
      20+55       13.4850      1.16  |Q        |         |         |
V|
      21+ 0       13.4922      1.06  |Q        |         |         |
V|
      21+ 5       13.5004      1.18  |Q        |         |         |
V|
      21+10       13.5103      1.45  |Q        |         |         |
V|
      21+15       13.5209      1.53  | Q       |         |         |
V|
      21+20       13.5304      1.39  |Q        |         |         |
V|
      21+25       13.5381      1.11  |Q        |         |         |
V|
      21+30       13.5451      1.02  |Q        |         |         |
V|
      21+35       13.5530      1.14  |Q        |         |         |
V|
      21+40       13.5628      1.43  |Q        |         |         |
V|
      21+45       13.5733      1.52  | Q       |         |         |
V|
```

```
   21+50       13.5830       1.40  |Q         |          |          |
V|
   21+55       13.5907       1.13  |Q         |          |          |
V|
   22+ 0       13.5978       1.03  |Q         |          |          |
V|
   22+ 5       13.6058       1.16  |Q         |          |          |
V|
   22+10       13.6158       1.44  |Q         |          |          |
V|
   22+15       13.6264       1.54  | Q        |          |          |
V|
   22+20       13.6361       1.42  |Q         |          |          |
V|
   22+25       13.6440       1.14  |Q         |          |          |
V|
   22+30       13.6512       1.05  |Q         |          |          |
V|
   22+35       13.6580       0.99  |Q         |          |          |
V|
   22+40       13.6647       0.97  |Q         |          |          |
V|
   22+45       13.6713       0.96  |Q         |          |          |
V|
   22+50       13.6780       0.96  |Q         |          |          |
V|
   22+55       13.6845       0.95  |Q         |          |          |
V|
   23+ 0       13.6909       0.93  |Q         |          |          |
V|
   23+ 5       13.6972       0.91  |Q         |          |          |
V|
   23+10       13.7035       0.92  |Q         |          |          |
V|
   23+15       13.7098       0.92  |Q         |          |          |
V|
   23+20       13.7162       0.92  |Q         |          |          |
V|
   23+25       13.7225       0.92  |Q         |          |          |
V|
   23+30       13.7288       0.92  |Q         |          |          |
V|
   23+35       13.7352       0.92  |Q         |          |          |
V|
   23+40       13.7416       0.92  |Q         |          |          |
V|
   23+45       13.7479       0.92  |Q         |          |          |
V|
   23+50       13.7543       0.93  |Q         |          |          |
V|
   23+55       13.7607       0.93  |Q         |          |          |
V|
   24+ 0       13.7671       0.93  |Q         |          |          |
V|
   24+ 5       13.7720       0.72  Q          |          |          |
V|
   24+10       13.7745       0.36  Q          |          |          |
V|
   24+15       13.7761       0.24  Q          |          |          |
V|
```

```
    24+20      13.7772      0.17  Q          |          |          |
V|
    24+25      13.7781      0.12  Q          |          |          |
V|
    24+30      13.7787      0.09  Q          |          |          |
V|
    24+35      13.7791      0.06  Q          |          |          |
V|
    24+40      13.7794      0.04  Q          |          |          |
V|
    24+45      13.7796      0.02  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: ancillaryareapost24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Ancillary Uses Area
      24 hour 100 year storm event

      ------------------------------------------------------------------
--
      Drainage Area =      33.90(Ac.)  =      0.053 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      33.90(Ac.)  =
0.053 Sq. Mi.
      Length along longest watercourse =    2792.00(Ft.)
      Length along longest watercourse measured to centroid =    1364.00
(Ft.)
      Length along longest watercourse =      0.529 Mi.
      Length along longest watercourse measured to centroid =      0.258
Mi.
      Difference in elevation =     207.00(Ft.)
      Slope along watercourse =    391.4613 Ft./Mi.
      Average Manning's 'N' = 0.015
      Lag time =    0.054 Hr.
      Lag time =     3.26 Min.
      25% of lag time =     0.82 Min.
      40% of lag time =     1.30 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             33.90              2.00                   67.80

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             33.90              5.50                  186.45

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          33.900           93.00         0.600
       Total Area Entered =     33.90(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.600        0.017       1.000
0.017
                                                          Sum (F) =
0.017
      Area averaged mean soil loss (F) (In/Hr) =  0.017
      Minimum soil loss rate ((In/Hr)) =  0.008
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.420
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083        153.339         31.456             10.747
          2   0.167        306.677         54.074             18.474
          3   0.250        460.016         11.467              3.918
          4   0.333        613.355          2.227              0.761
          5   0.417        766.693          0.777              0.265
                                    Sum = 100.000   Sum=      34.165
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07     0.044          0.030      ---          0.01
   2   0.17     0.07     0.044          0.030      ---          0.01
```

3	0.25	0.07	0.044	0.029	---	0.01
4	0.33	0.10	0.066	0.029	---	0.04
5	0.42	0.10	0.066	0.029	---	0.04
6	0.50	0.10	0.066	0.029	---	0.04
7	0.58	0.10	0.066	0.029	---	0.04
8	0.67	0.10	0.066	0.029	---	0.04
9	0.75	0.10	0.066	0.029	---	0.04
10	0.83	0.13	0.088	0.029	---	0.06
11	0.92	0.13	0.088	0.029	---	0.06
12	1.00	0.13	0.088	0.028	---	0.06
13	1.08	0.10	0.066	0.028	---	0.04
14	1.17	0.10	0.066	0.028	---	0.04
15	1.25	0.10	0.066	0.028	---	0.04
16	1.33	0.10	0.066	0.028	---	0.04
17	1.42	0.10	0.066	0.028	---	0.04
18	1.50	0.10	0.066	0.028	---	0.04
19	1.58	0.10	0.066	0.028	---	0.04
20	1.67	0.10	0.066	0.028	---	0.04
21	1.75	0.10	0.066	0.027	---	0.04
22	1.83	0.13	0.088	0.027	---	0.06
23	1.92	0.13	0.088	0.027	---	0.06
24	2.00	0.13	0.088	0.027	---	0.06
25	2.08	0.13	0.088	0.027	---	0.06
26	2.17	0.13	0.088	0.027	---	0.06
27	2.25	0.13	0.088	0.027	---	0.06
28	2.33	0.13	0.088	0.027	---	0.06
29	2.42	0.13	0.088	0.027	---	0.06
30	2.50	0.13	0.088	0.026	---	0.06
31	2.58	0.17	0.110	0.026	---	0.08
32	2.67	0.17	0.110	0.026	---	0.08
33	2.75	0.17	0.110	0.026	---	0.08
34	2.83	0.17	0.110	0.026	---	0.08
35	2.92	0.17	0.110	0.026	---	0.08
36	3.00	0.17	0.110	0.026	---	0.08
37	3.08	0.17	0.110	0.026	---	0.08
38	3.17	0.17	0.110	0.026	---	0.08
39	3.25	0.17	0.110	0.025	---	0.08
40	3.33	0.17	0.110	0.025	---	0.08
41	3.42	0.17	0.110	0.025	---	0.08
42	3.50	0.17	0.110	0.025	---	0.08
43	3.58	0.17	0.110	0.025	---	0.08
44	3.67	0.17	0.110	0.025	---	0.09
45	3.75	0.17	0.110	0.025	---	0.09
46	3.83	0.20	0.132	0.025	---	0.11
47	3.92	0.20	0.132	0.025	---	0.11
48	4.00	0.20	0.132	0.025	---	0.11
49	4.08	0.20	0.132	0.024	---	0.11
50	4.17	0.20	0.132	0.024	---	0.11
51	4.25	0.20	0.132	0.024	---	0.11
52	4.33	0.23	0.154	0.024	---	0.13
53	4.42	0.23	0.154	0.024	---	0.13
54	4.50	0.23	0.154	0.024	---	0.13
55	4.58	0.23	0.154	0.024	---	0.13
56	4.67	0.23	0.154	0.024	---	0.13
57	4.75	0.23	0.154	0.024	---	0.13
58	4.83	0.27	0.176	0.024	---	0.15
59	4.92	0.27	0.176	0.023	---	0.15
60	5.00	0.27	0.176	0.023	---	0.15
61	5.08	0.20	0.132	0.023	---	0.11
62	5.17	0.20	0.132	0.023	---	0.11

```
 63   5.25     0.20      0.132         0.023      ---           0.11
 64   5.33     0.23      0.154         0.023      ---           0.13
 65   5.42     0.23      0.154         0.023      ---           0.13
 66   5.50     0.23      0.154         0.023      ---           0.13
 67   5.58     0.27      0.176         0.023      ---           0.15
 68   5.67     0.27      0.176         0.022      ---           0.15
 69   5.75     0.27      0.176         0.022      ---           0.15
 70   5.83     0.27      0.176         0.022      ---           0.15
 71   5.92     0.27      0.176         0.022      ---           0.15
 72   6.00     0.27      0.176         0.022      ---           0.15
 73   6.08     0.30      0.198         0.022      ---           0.18
 74   6.17     0.30      0.198         0.022      ---           0.18
 75   6.25     0.30      0.198         0.022      ---           0.18
 76   6.33     0.30      0.198         0.022      ---           0.18
 77   6.42     0.30      0.198         0.022      ---           0.18
 78   6.50     0.30      0.198         0.022      ---           0.18
 79   6.58     0.33      0.220         0.021      ---           0.20
 80   6.67     0.33      0.220         0.021      ---           0.20
 81   6.75     0.33      0.220         0.021      ---           0.20
 82   6.83     0.33      0.220         0.021      ---           0.20
 83   6.92     0.33      0.220         0.021      ---           0.20
 84   7.00     0.33      0.220         0.021      ---           0.20
 85   7.08     0.33      0.220         0.021      ---           0.20
 86   7.17     0.33      0.220         0.021      ---           0.20
 87   7.25     0.33      0.220         0.021      ---           0.20
 88   7.33     0.37      0.242         0.021      ---           0.22
 89   7.42     0.37      0.242         0.020      ---           0.22
 90   7.50     0.37      0.242         0.020      ---           0.22
 91   7.58     0.40      0.264         0.020      ---           0.24
 92   7.67     0.40      0.264         0.020      ---           0.24
 93   7.75     0.40      0.264         0.020      ---           0.24
 94   7.83     0.43      0.286         0.020      ---           0.27
 95   7.92     0.43      0.286         0.020      ---           0.27
 96   8.00     0.43      0.286         0.020      ---           0.27
 97   8.08     0.50      0.330         0.020      ---           0.31
 98   8.17     0.50      0.330         0.020      ---           0.31
 99   8.25     0.50      0.330         0.020      ---           0.31
100   8.33     0.50      0.330         0.019      ---           0.31
101   8.42     0.50      0.330         0.019      ---           0.31
102   8.50     0.50      0.330         0.019      ---           0.31
103   8.58     0.53      0.352         0.019      ---           0.33
104   8.67     0.53      0.352         0.019      ---           0.33
105   8.75     0.53      0.352         0.019      ---           0.33
106   8.83     0.57      0.374         0.019      ---           0.36
107   8.92     0.57      0.374         0.019      ---           0.36
108   9.00     0.57      0.374         0.019      ---           0.36
109   9.08     0.63      0.418         0.019      ---           0.40
110   9.17     0.63      0.418         0.019      ---           0.40
111   9.25     0.63      0.418         0.018      ---           0.40
112   9.33     0.67      0.440         0.018      ---           0.42
113   9.42     0.67      0.440         0.018      ---           0.42
114   9.50     0.67      0.440         0.018      ---           0.42
115   9.58     0.70      0.462         0.018      ---           0.44
116   9.67     0.70      0.462         0.018      ---           0.44
117   9.75     0.70      0.462         0.018      ---           0.44
118   9.83     0.73      0.484         0.018      ---           0.47
119   9.92     0.73      0.484         0.018      ---           0.47
120  10.00     0.73      0.484         0.018      ---           0.47
121  10.08     0.50      0.330         0.018      ---           0.31
122  10.17     0.50      0.330         0.018      ---           0.31
```

```
123  10.25     0.50      0.330          0.017      ---          0.31
124  10.33     0.50      0.330          0.017      ---          0.31
125  10.42     0.50      0.330          0.017      ---          0.31
126  10.50     0.50      0.330          0.017      ---          0.31
127  10.58     0.67      0.440          0.017      ---          0.42
128  10.67     0.67      0.440          0.017      ---          0.42
129  10.75     0.67      0.440          0.017      ---          0.42
130  10.83     0.67      0.440          0.017      ---          0.42
131  10.92     0.67      0.440          0.017      ---          0.42
132  11.00     0.67      0.440          0.017      ---          0.42
133  11.08     0.63      0.418          0.017      ---          0.40
134  11.17     0.63      0.418          0.017      ---          0.40
135  11.25     0.63      0.418          0.016      ---          0.40
136  11.33     0.63      0.418          0.016      ---          0.40
137  11.42     0.63      0.418          0.016      ---          0.40
138  11.50     0.63      0.418          0.016      ---          0.40
139  11.58     0.57      0.374          0.016      ---          0.36
140  11.67     0.57      0.374          0.016      ---          0.36
141  11.75     0.57      0.374          0.016      ---          0.36
142  11.83     0.60      0.396          0.016      ---          0.38
143  11.92     0.60      0.396          0.016      ---          0.38
144  12.00     0.60      0.396          0.016      ---          0.38
145  12.08     0.83      0.550          0.016      ---          0.53
146  12.17     0.83      0.550          0.016      ---          0.53
147  12.25     0.83      0.550          0.015      ---          0.53
148  12.33     0.87      0.572          0.015      ---          0.56
149  12.42     0.87      0.572          0.015      ---          0.56
150  12.50     0.87      0.572          0.015      ---          0.56
151  12.58     0.93      0.616          0.015      ---          0.60
152  12.67     0.93      0.616          0.015      ---          0.60
153  12.75     0.93      0.616          0.015      ---          0.60
154  12.83     0.97      0.638          0.015      ---          0.62
155  12.92     0.97      0.638          0.015      ---          0.62
156  13.00     0.97      0.638          0.015      ---          0.62
157  13.08     1.13      0.748          0.015      ---          0.73
158  13.17     1.13      0.748          0.015      ---          0.73
159  13.25     1.13      0.748          0.015      ---          0.73
160  13.33     1.13      0.748          0.014      ---          0.73
161  13.42     1.13      0.748          0.014      ---          0.73
162  13.50     1.13      0.748          0.014      ---          0.73
163  13.58     0.77      0.506          0.014      ---          0.49
164  13.67     0.77      0.506          0.014      ---          0.49
165  13.75     0.77      0.506          0.014      ---          0.49
166  13.83     0.77      0.506          0.014      ---          0.49
167  13.92     0.77      0.506          0.014      ---          0.49
168  14.00     0.77      0.506          0.014      ---          0.49
169  14.08     0.90      0.594          0.014      ---          0.58
170  14.17     0.90      0.594          0.014      ---          0.58
171  14.25     0.90      0.594          0.014      ---          0.58
172  14.33     0.87      0.572          0.014      ---          0.56
173  14.42     0.87      0.572          0.014      ---          0.56
174  14.50     0.87      0.572          0.013      ---          0.56
175  14.58     0.87      0.572          0.013      ---          0.56
176  14.67     0.87      0.572          0.013      ---          0.56
177  14.75     0.87      0.572          0.013      ---          0.56
178  14.83     0.83      0.550          0.013      ---          0.54
179  14.92     0.83      0.550          0.013      ---          0.54
180  15.00     0.83      0.550          0.013      ---          0.54
181  15.08     0.80      0.528          0.013      ---          0.51
182  15.17     0.80      0.528          0.013      ---          0.52
```

183	15.25	0.80	0.528	0.013	---	0.52
184	15.33	0.77	0.506	0.013	---	0.49
185	15.42	0.77	0.506	0.013	---	0.49
186	15.50	0.77	0.506	0.013	---	0.49
187	15.58	0.63	0.418	0.013	---	0.41
188	15.67	0.63	0.418	0.013	---	0.41
189	15.75	0.63	0.418	0.012	---	0.41
190	15.83	0.63	0.418	0.012	---	0.41
191	15.92	0.63	0.418	0.012	---	0.41
192	16.00	0.63	0.418	0.012	---	0.41
193	16.08	0.13	0.088	0.012	---	0.08
194	16.17	0.13	0.088	0.012	---	0.08
195	16.25	0.13	0.088	0.012	---	0.08
196	16.33	0.13	0.088	0.012	---	0.08
197	16.42	0.13	0.088	0.012	---	0.08
198	16.50	0.13	0.088	0.012	---	0.08
199	16.58	0.10	0.066	0.012	---	0.05
200	16.67	0.10	0.066	0.012	---	0.05
201	16.75	0.10	0.066	0.012	---	0.05
202	16.83	0.10	0.066	0.012	---	0.05
203	16.92	0.10	0.066	0.012	---	0.05
204	17.00	0.10	0.066	0.012	---	0.05
205	17.08	0.17	0.110	0.012	---	0.10
206	17.17	0.17	0.110	0.011	---	0.10
207	17.25	0.17	0.110	0.011	---	0.10
208	17.33	0.17	0.110	0.011	---	0.10
209	17.42	0.17	0.110	0.011	---	0.10
210	17.50	0.17	0.110	0.011	---	0.10
211	17.58	0.17	0.110	0.011	---	0.10
212	17.67	0.17	0.110	0.011	---	0.10
213	17.75	0.17	0.110	0.011	---	0.10
214	17.83	0.13	0.088	0.011	---	0.08
215	17.92	0.13	0.088	0.011	---	0.08
216	18.00	0.13	0.088	0.011	---	0.08
217	18.08	0.13	0.088	0.011	---	0.08
218	18.17	0.13	0.088	0.011	---	0.08
219	18.25	0.13	0.088	0.011	---	0.08
220	18.33	0.13	0.088	0.011	---	0.08
221	18.42	0.13	0.088	0.011	---	0.08
222	18.50	0.13	0.088	0.011	---	0.08
223	18.58	0.10	0.066	0.011	---	0.06
224	18.67	0.10	0.066	0.010	---	0.06
225	18.75	0.10	0.066	0.010	---	0.06
226	18.83	0.07	0.044	0.010	---	0.03
227	18.92	0.07	0.044	0.010	---	0.03
228	19.00	0.07	0.044	0.010	---	0.03
229	19.08	0.10	0.066	0.010	---	0.06
230	19.17	0.10	0.066	0.010	---	0.06
231	19.25	0.10	0.066	0.010	---	0.06
232	19.33	0.13	0.088	0.010	---	0.08
233	19.42	0.13	0.088	0.010	---	0.08
234	19.50	0.13	0.088	0.010	---	0.08
235	19.58	0.10	0.066	0.010	---	0.06
236	19.67	0.10	0.066	0.010	---	0.06
237	19.75	0.10	0.066	0.010	---	0.06
238	19.83	0.07	0.044	0.010	---	0.03
239	19.92	0.07	0.044	0.010	---	0.03
240	20.00	0.07	0.044	0.010	---	0.03
241	20.08	0.10	0.066	0.010	---	0.06
242	20.17	0.10	0.066	0.010	---	0.06

```
 243  20.25     0.10      0.066         0.010      ---          0.06
 244  20.33     0.10      0.066         0.010      ---          0.06
 245  20.42     0.10      0.066         0.010      ---          0.06
 246  20.50     0.10      0.066         0.009      ---          0.06
 247  20.58     0.10      0.066         0.009      ---          0.06
 248  20.67     0.10      0.066         0.009      ---          0.06
 249  20.75     0.10      0.066         0.009      ---          0.06
 250  20.83     0.07      0.044         0.009      ---          0.03
 251  20.92     0.07      0.044         0.009      ---          0.03
 252  21.00     0.07      0.044         0.009      ---          0.03
 253  21.08     0.10      0.066         0.009      ---          0.06
 254  21.17     0.10      0.066         0.009      ---          0.06
 255  21.25     0.10      0.066         0.009      ---          0.06
 256  21.33     0.07      0.044         0.009      ---          0.03
 257  21.42     0.07      0.044         0.009      ---          0.03
 258  21.50     0.07      0.044         0.009      ---          0.03
 259  21.58     0.10      0.066         0.009      ---          0.06
 260  21.67     0.10      0.066         0.009      ---          0.06
 261  21.75     0.10      0.066         0.009      ---          0.06
 262  21.83     0.07      0.044         0.009      ---          0.04
 263  21.92     0.07      0.044         0.009      ---          0.04
 264  22.00     0.07      0.044         0.009      ---          0.04
 265  22.08     0.10      0.066         0.009      ---          0.06
 266  22.17     0.10      0.066         0.009      ---          0.06
 267  22.25     0.10      0.066         0.009      ---          0.06
 268  22.33     0.07      0.044         0.009      ---          0.04
 269  22.42     0.07      0.044         0.009      ---          0.04
 270  22.50     0.07      0.044         0.009      ---          0.04
 271  22.58     0.07      0.044         0.009      ---          0.04
 272  22.67     0.07      0.044         0.009      ---          0.04
 273  22.75     0.07      0.044         0.009      ---          0.04
 274  22.83     0.07      0.044         0.009      ---          0.04
 275  22.92     0.07      0.044         0.009      ---          0.04
 276  23.00     0.07      0.044         0.009      ---          0.04
 277  23.08     0.07      0.044         0.009      ---          0.04
 278  23.17     0.07      0.044         0.008      ---          0.04
 279  23.25     0.07      0.044         0.008      ---          0.04
 280  23.33     0.07      0.044         0.008      ---          0.04
 281  23.42     0.07      0.044         0.008      ---          0.04
 282  23.50     0.07      0.044         0.008      ---          0.04
 283  23.58     0.07      0.044         0.008      ---          0.04
 284  23.67     0.07      0.044         0.008      ---          0.04
 285  23.75     0.07      0.044         0.008      ---          0.04
 286  23.83     0.07      0.044         0.008      ---          0.04
 287  23.92     0.07      0.044         0.008      ---          0.04
 288  24.00     0.07      0.044         0.008      ---          0.04
     Sum =     100.0                                   Sum =    61.2
      Flood volume = Effective rainfall      5.10(In)
       times area      33.9(Ac.)/[(In)/(Ft.)] =      14.4(Ac.Ft)
      Total soil loss =      0.40(In)
      Total soil loss =     1.136(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      627295.1 Cubic Feet
      Total soil loss =       49473.6 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     25.074(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
++
                          24 - H O U R    S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0011      0.15  Q         |         |         |
|
    0+10       0.0040      0.42  Q         |         |         |
|
    0+15       0.0073      0.48  Q         |         |         |
|
    0+20       0.0123      0.73  Q         |         |         |
|
    0+25       0.0202      1.14  VQ        |         |         |
|
    0+30       0.0287      1.23  VQ        |         |         |
|
    0+35       0.0373      1.26  VQ        |         |         |
|
    0+40       0.0460      1.27  VQ        |         |         |
|
    0+45       0.0548      1.27  VQ        |         |         |
|
    0+50       0.0652      1.51  V Q       |         |         |
|
    0+55       0.0784      1.92  V Q       |         |         |
|
    1+ 0       0.0922      2.01  V Q       |         |         |
|
    1+ 5       0.1046      1.79  V Q       |         |         |
|
    1+10       0.1142      1.40  VQ        |         |         |
|
    1+15       0.1233      1.31  VQ        |         |         |
|
    1+20       0.1322      1.30  VQ        |         |         |
|
    1+25       0.1412      1.30  VQ        |         |         |
|
    1+30       0.1502      1.30  VQ        |         |         |
|
    1+35       0.1592      1.31  VQ        |         |         |
|
    1+40       0.1682      1.31  VQ        |         |         |
|
    1+45       0.1773      1.32  VQ        |         |         |
|
    1+50       0.1880      1.56  V Q       |         |         |
|
    1+55       0.2015      1.97  V Q       |         |         |
|
    2+ 0       0.2157      2.06  V Q       |         |         |
```

```
|
   2+ 5        0.2300       2.08  V Q        |          |          |
|
   2+10        0.2443       2.09  V Q        |          |          |
|
   2+15        0.2587       2.09  V Q        |          |          |
|
   2+20        0.2731       2.09  V Q        |          |          |
|
   2+25        0.2876       2.10  V Q        |          |          |
|
   2+30        0.3020       2.10  V Q        |          |          |
|
   2+35        0.3182       2.34  V  Q       |          |          |
|
   2+40        0.3371       2.75  V  Q       |          |          |
|
   2+45        0.3567       2.84  V  Q       |          |          |
|
   2+50        0.3764       2.86  |V Q       |          |          |
|
   2+55        0.3962       2.87  |V Q       |          |          |
|
   3+ 0        0.4160       2.87  |V Q       |          |          |
|
   3+ 5        0.4358       2.88  |V Q       |          |          |
|
   3+10        0.4556       2.88  |V Q       |          |          |
|
   3+15        0.4755       2.89  |V Q       |          |          |
|
   3+20        0.4954       2.89  |V Q       |          |          |
|
   3+25        0.5153       2.89  |V Q       |          |          |
|
   3+30        0.5353       2.90  |V Q       |          |          |
|
   3+35        0.5553       2.90  |V Q       |          |          |
|
   3+40        0.5753       2.90  |V Q       |          |          |
|
   3+45        0.5953       2.91  |V Q       |          |          |
|
   3+50        0.6170       3.15  |V  Q      |          |          |
|
   3+55        0.6415       3.56  |V  Q      |          |          |
|
   4+ 0        0.6666       3.65  |V  Q      |          |          |
|
   4+ 5        0.6918       3.67  |V  Q      |          |          |
|
   4+10        0.7172       3.68  |V  Q      |          |          |
|
   4+15        0.7425       3.68  | V Q      |          |          |
|
   4+20        0.7695       3.92  | V  Q     |          |          |
|
   4+25        0.7993       4.33  | V  Q     |          |          |
|
   4+30        0.8298       4.42  | V  Q     |          |          |
```

```
|
    4+35       0.8604      4.44  | V  Q    |         |         |
|
    4+40       0.8910      4.45  | V  Q    |         |         |
|
    4+45       0.9217      4.45  | V  Q    |         |         |
|
    4+50       0.9540      4.69  | V   Q   |         |         |
|
    4+55       0.9892      5.10  | V   Q   |         |         |
|
    5+ 0       1.0249      5.19  | V   Q   |         |         |
|
    5+ 5       1.0576      4.74  | V   Q   |         |         |
|
    5+10       1.0847      3.94  |  V Q    |         |         |
|
    5+15       1.1107      3.77  |  V Q    |         |         |
|
    5+20       1.1380      3.97  |  V Q    |         |         |
|
    5+25       1.1681      4.37  |  V Q    |         |         |
|
    5+30       1.1989      4.46  |  V Q    |         |         |
|
    5+35       1.2314      4.72  |  V  Q   |         |         |
|
    5+40       1.2667      5.13  |  V  Q   |         |         |
|
    5+45       1.3027      5.22  |  V  Q   |         |         |
|
    5+50       1.3389      5.24  |  V  Q   |         |         |
|
    5+55       1.3750      5.25  |  V   Q  |         |         |
|
    6+ 0       1.4112      5.26  |  V   Q  |         |         |
|
    6+ 5       1.4491      5.50  |   V  Q  |         |         |
|
    6+10       1.4898      5.91  |   V  Q  |         |         |
|
    6+15       1.5311      6.00  |   V  Q  |         |         |
|
    6+20       1.5725      6.02  |   V   Q |         |         |
|
    6+25       1.6140      6.03  |   V   Q |         |         |
|
    6+30       1.6555      6.03  |   V   Q |         |         |
|
    6+35       1.6987      6.27  |   V   Q |         |         |
|
    6+40       1.7447      6.68  |   V   Q |         |         |
|
    6+45       1.7913      6.77  |   V    Q|         |         |
|
    6+50       1.8381      6.79  |    V   Q|         |         |
|
    6+55       1.8849      6.80  |    V   Q|         |         |
|
    7+ 0       1.9317      6.80  |    V   Q|         |         |
```

```
|
    7+ 5       1.9786      6.80  |    V   Q|         |         |
|
    7+10       2.0255      6.81  |    V   Q|         |         |
|
    7+15       2.0724      6.81  |    V   Q|         |         |
|
    7+20       2.1210      7.05  |    V   Q|         |         |
|
    7+25       2.1723      7.46  |     V  Q|         |         |
|
    7+30       2.2243      7.55  |     V   Q         |         |
|
    7+35       2.2781      7.81  |     V   Q         |         |
|
    7+40       2.3347      8.22  |     V   Q         |         |
|
    7+45       2.3920      8.31  |     V   |Q        |         |
|
    7+50       2.4510      8.57  |     V   |Q        |         |
|
    7+55       2.5128      8.98  |     V   |Q        |         |
|
    8+ 0       2.5753      9.07  |      V  | Q       |         |
|
    8+ 5       2.6412      9.57  |      V  | Q       |         |
|
    8+10       2.7127     10.39  |      V  |  Q      |         |
|
    8+15       2.7855     10.56  |      V  |   Q     |         |
|
    8+20       2.8585     10.60  |      V  |   Q     |         |
|
    8+25       2.9316     10.62  |       V |   Q     |         |
|
    8+30       3.0047     10.62  |       V |   Q     |         |
|
    8+35       3.0795     10.86  |       V |   Q     |         |
|
    8+40       3.1571     11.27  |       V |    Q    |         |
|
    8+45       3.2353     11.36  |       V |    Q    |         |
|
    8+50       3.3153     11.61  |        V|    Q    |         |
|
    8+55       3.3982     12.03  |        V|     Q   |         |
|
    9+ 0       3.4816     12.12  |        V|     Q   |         |
|
    9+ 5       3.5685     12.61  |        V|     Q   |         |
|
    9+10       3.6610     13.43  |         V      Q  |         |
|
    9+15       3.7547     13.61  |         V       Q |         |
|
    9+20       3.8503     13.88  |         V       Q |         |
|
    9+25       3.9488     14.30  |         V        Q|         |
|
    9+30       4.0479     14.39  |         |V       Q|         |
```

```
|
    9+35     4.1488     15.65  |         |V       Q|         |
|
    9+40     4.2526     15.06  |         |V        Q         |
|
    9+45     4.3569     15.15  |         | V       Q         |
|
    9+50     4.4630     15.41  |         | V       Q         |
|
    9+55     4.5720     15.82  |         | V       |Q        |
|
   10+ 0     4.6816     15.91  |         |  V      |Q        |
|
   10+ 5     4.7799     14.28  |         |  V     Q|         |
|
   10+10     4.8587     11.44  |         |  V Q    |         |
|
   10+15     4.9334     10.84  |         |  VQ     |         |
|
   10+20     5.0073     10.73  |         |  VQ     |         |
|
   10+25     5.0809     10.69  |         |   Q     |         |
|
   10+30     5.1545     10.69  |         |   Q     |         |
|
   10+35     5.2363     11.88  |         |   VQ    |         |
|
   10+40     5.3321     13.91  |         |   V   Q |         |
|
   10+45     5.4309     14.35  |         |    V   Q|         |
|
   10+50     5.5303     14.43  |         |    V   Q|         |
|
   10+55     5.6299     14.46  |         |    V   Q|         |
|
   11+ 0     5.7295     14.47  |         |    V   Q|         |
|
   11+ 5     5.8275     14.23  |         |     V Q |         |
|
   11+10     5.9228     13.83  |         |     V Q |         |
|
   11+15     6.0174     13.75  |         |     V Q |         |
|
   11+20     6.1120     13.73  |         |     V Q |         |
|
   11+25     6.2066     13.73  |         |      VQ |         |
|
   11+30     6.3011     13.73  |         |      VQ |         |
|
   11+35     6.3925     13.26  |         |      Q  |         |
|
   11+40     6.4782     12.45  |         |     QV  |         |
|
   11+45     6.5628     12.28  |         |     Q V |         |
|
   11+50     6.6488     12.49  |         |     Q V |         |
|
   11+55     6.7375     12.88  |         |      QV |         |
|
   12+ 0     6.8269     12.97  |         |      QV |         |
```

```
|
   12+ 5       6.9278     14.65  |         |        Q|         |
|
   12+10       7.0483     17.50  |         |        V|  Q      |
|
   12+15       7.1730     18.11  |         |        V|   Q     |
|
   12+20       7.3002     18.47  |         |         V   Q     |
|
   12+25       7.4305     18.92  |         |         V    Q    |
|
   12+30       7.5614     19.01  |         |         |V   Q    |
|
   12+35       7.6957     19.50  |         |         |V   Q    |
|
   12+40       7.8356     20.32  |         |         |V     Q  |
|
   12+45       7.9768     20.49  |         |         | V    Q  |
|
   12+50       8.1198     20.77  |         |         | V    Q  |
|
   12+55       8.2657     21.19  |         |         | V     Q |
|
   13+ 0       8.4122     21.28  |         |         |  V    Q |
|
   13+ 5       8.5671     22.48  |         |         |  V     Q|
|
   13+10       8.7359     24.52  |         |         |   V     | Q
|
   13+15       8.9078     24.95  |         |         |   V     |  Q
|
   13+20       9.0802     25.04  |         |         |    V    |  Q
|
   13+25       9.2529     25.07  |         |         |    V    |  Q
|
   13+30       9.4256     25.07  |         |         |     V   |  Q
|
   13+35       9.5804     22.48  |         |         |     V  Q|
|
   13+40       9.7044     18.00  |         |         |   Q V   |
|
   13+45       9.8219     17.06  |         |         | Q    V  |
|
   13+50       9.9381     16.88  |         |         | Q    V  |
|
   13+55      10.0539     16.82  |         |         | Q    V  |
|
   14+ 0      10.1697     16.82  |         |         | Q     V |
|
   14+ 5      10.2921     17.77  |         |         |  Q    V |
|
   14+10      10.4257     19.40  |         |         |    Q  V |
|
   14+15      10.5616     19.74  |         |         |     Q  V|
|
   14+20      10.6964     19.58  |         |         |     Q  V|
|
   14+25      10.8286     19.19  |         |         |    Q    V
|
   14+30      10.9603     19.11  |         |         |    Q    V
```

```
|
   14+35      11.0918     19.10  |         |         |    Q    V
|
   14+40      11.2233     19.09  |         |         |    Q    |V
|
   14+45      11.3548     19.10  |         |         |    Q    |V
|
   14+50      11.4847     18.86  |         |         |    Q    |V
|
   14+55      11.6118     18.46  |         |         |   Q     | V
|
   15+ 0      11.7383     18.37  |         |         |   Q     | V
|
   15+ 5      11.8631     18.12  |         |         |   Q     | V
|
   15+10      11.9851     17.71  |         |         |  Q      |  V
|
   15+15      12.1065     17.63  |         |         |  Q      |  V
|
   15+20      12.2262     17.38  |         |         |  Q      |  V
|
   15+25      12.3430     16.97  |         |         | Q       |   V
|
   15+30      12.4593     16.88  |         |         | Q       |   V
|
   15+35      12.5689     15.92  |         |         |Q        |   V
|
   15+40      12.6674     14.29  |         |        Q|         |    V
|
   15+45      12.7634     13.95  |         |       Q |         |    V
|
   15+50      12.8591     13.88  |         |       Q |         |    V
|
   15+55      12.9545     13.86  |         |       Q |         |    V
|
   16+ 0      13.0500     13.87  |         |       Q |         |     V
|
   16+ 5      13.1211     10.32  |         |  Q      |         |     V
|
   16+10      13.1502      4.22  |    Q    |         |         |     V
|
   16+15      13.1704      2.93  |  Q      |         |         |     V
|
   16+20      13.1888      2.68  |  Q      |         |         |     V
|
   16+25      13.2067      2.60  |  Q      |         |         |     V
|
   16+30      13.2246      2.60  |  Q      |         |         |     V
|
   16+35      13.2409      2.36  |  Q      |         |         |     V
|
   16+40      13.2544      1.96  | Q       |         |         |     V
|
   16+45      13.2673      1.88  | Q       |         |         |     V
|
   16+50      13.2801      1.86  | Q       |         |         |     V
|
   16+55      13.2929      1.86  | Q       |         |         |     V
|
   17+ 0      13.3057      1.86  | Q       |         |         |     V
```

```
|
   17+ 5      13.3218      2.33  |  Q      |         |         |      V
|
   17+10      13.3435      3.15  |   Q     |         |         |      V
|
   17+15      13.3664      3.32  |   Q     |         |         |      V
|
   17+20      13.3895      3.36  |   Q     |         |         |      V
|
   17+25      13.4127      3.37  |   Q     |         |         |      V
|
   17+30      13.4360      3.37  |   Q     |         |         |      V
|
   17+35      13.4592      3.38  |   Q     |         |         |      V
|
   17+40      13.4825      3.38  |   Q     |         |         |      V
|
   17+45      13.5058      3.38  |   Q     |         |         |      V
|
   17+50      13.5274      3.15  |   Q     |         |         |      V
|
   17+55      13.5463      2.74  |  Q      |         |         |      V
|
   18+ 0      13.5646      2.66  |  Q      |         |         |      V
|
   18+ 5      13.5828      2.64  |  Q      |         |         |      V
|
   18+10      13.6010      2.64  |  Q      |         |         |      V
|
   18+15      13.6191      2.64  |  Q      |         |         |      V
|
   18+20      13.6373      2.64  |  Q      |         |         |      V
|
   18+25      13.6555      2.64  |  Q      |         |         |      V
|
   18+30      13.6737      2.64  |  Q      |         |         |      V
|
   18+35      13.6903      2.41  |  Q      |         |         |       V
|
   18+40      13.7041      2.01  | Q       |         |         |       V
|
   18+45      13.7174      1.92  | Q       |         |         |       V
|
   18+50      13.7289      1.67  | Q       |         |         |       V
|
   18+55      13.7375      1.26  |Q        |         |         |       V
|
   19+ 0      13.7456      1.17  |Q        |         |         |       V
|
   19+ 5      13.7552      1.40  |Q        |         |         |       V
|
   19+10      13.7676      1.80  | Q       |         |         |       V
|
   19+15      13.7806      1.89  | Q       |         |         |       V
|
   19+20      13.7953      2.14  | Q       |         |         |       V
|
   19+25      13.8129      2.55  |  Q      |         |         |       V
|
   19+30      13.8311      2.64  |  Q      |         |         |       V
```

```
|
    19+35       13.8478       2.42  |  Q       |         |         |       V
|
    19+40       13.8618       2.02  | Q        |         |         |       V
|
    19+45       13.8751       1.94  | Q        |         |         |       V
|
    19+50       13.8868       1.69  | Q        |         |         |       V
|
    19+55       13.8956       1.28  |Q         |         |         |       V
|
    20+ 0       13.9038       1.19  |Q         |         |         |       V
|
    20+ 5       13.9135       1.41  |Q         |         |         |       V
|
    20+10       13.9260       1.82  | Q        |         |         |       V
|
    20+15       13.9391       1.90  | Q        |         |         |       V
|
    20+20       13.9524       1.92  | Q        |         |         |       V
|
    20+25       13.9657       1.93  | Q        |         |         |       V
|
    20+30       13.9790       1.93  | Q        |         |         |       V
|
    20+35       13.9923       1.93  | Q        |         |         |       V
|
    20+40       14.0056       1.93  | Q        |         |         |       V
|
    20+45       14.0189       1.93  | Q        |         |         |       V
|
    20+50       14.0306       1.70  | Q        |         |         |       V
|
    20+55       14.0395       1.29  |Q         |         |         |       V
|
    21+ 0       14.0479       1.21  |Q         |         |         |
V|
    21+ 5       14.0577       1.43  |Q         |         |         |
V|
    21+10       14.0703       1.83  | Q        |         |         |
V|
    21+15       14.0836       1.92  | Q        |         |         |
V|
    21+20       14.0953       1.70  | Q        |         |         |
V|
    21+25       14.1043       1.30  |Q         |         |         |
V|
    21+30       14.1126       1.22  |Q         |         |         |
V|
    21+35       14.1225       1.44  |Q         |         |         |
V|
    21+40       14.1352       1.84  | Q        |         |         |
V|
    21+45       14.1485       1.93  | Q        |         |         |
V|
    21+50       14.1602       1.71  | Q        |         |         |
V|
    21+55       14.1693       1.31  |Q         |         |         |
V|
    22+ 0       14.1777       1.22  |Q         |         |         |
```

```
V|
   22+ 5       14.1876      1.44  |Q         |          |          |
V|
   22+10       14.2003      1.85  | Q        |          |          |
V|
   22+15       14.2137      1.93  | Q        |          |          |
V|
   22+20       14.2255      1.71  | Q        |          |          |
V|
   22+25       14.2345      1.31  |Q         |          |          |
V|
   22+30       14.2430      1.23  |Q         |          |          |
V|
   22+35       14.2513      1.21  |Q         |          |          |
V|
   22+40       14.2597      1.21  |Q         |          |          |
V|
   22+45       14.2680      1.21  |Q         |          |          |
V|
   22+50       14.2763      1.21  |Q         |          |          |
V|
   22+55       14.2847      1.21  |Q         |          |          |
V|
   23+ 0       14.2930      1.21  |Q         |          |          |
V|
   23+ 5       14.3013      1.21  |Q         |          |          |
V|
   23+10       14.3097      1.21  |Q         |          |          |
V|
   23+15       14.3181      1.21  |Q         |          |          |
V|
   23+20       14.3264      1.21  |Q         |          |          |
V|
   23+25       14.3348      1.21  |Q         |          |          |
V|
   23+30       14.3432      1.22  |Q         |          |          |
V|
   23+35       14.3515      1.22  |Q         |          |          |
V|
   23+40       14.3599      1.22  |Q         |          |          |
V|
   23+45       14.3683      1.22  |Q         |          |          |
V|
   23+50       14.3767      1.22  |Q         |          |          |
V|
   23+55       14.3851      1.22  |Q         |          |          |
V|
   24+ 0       14.3934      1.22  |Q         |          |          |
V|
   24+ 5       14.3992      0.83  |Q         |          |          |
V|
   24+10       14.4004      0.18  Q          |          |          |
V|
   24+15       14.4006      0.04  Q          |          |          |
V|
   24+20       14.4007      0.01  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: feeboothareapost24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Badlands Landfill
      Fee Booth Area Post Landfill
      24 hour 100 years storm event

      ------------------------------------------------------------------
--
      Drainage Area =       4.00(Ac.)  =      0.006 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =       4.00(Ac.)  =
0.006 Sq. Mi.
      Length along longest watercourse =    1009.00(Ft.)
      Length along longest watercourse measured to centroid =     295.00
(Ft.)
      Length along longest watercourse =      0.191 Mi.
      Length along longest watercourse measured to centroid =      0.056
Mi.
      Difference in elevation =      56.00(Ft.)
      Slope along watercourse =    293.0426 Ft./Mi.
      Average Manning's 'N' = 0.015
      Lag time =    0.022 Hr.
      Lag time =     1.31 Min.
      25% of lag time =     0.33 Min.
      40% of lag time =     0.52 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
              4.00              2.00                    8.00

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
              4.00              5.50                   22.00

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =  100.00 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
           4.000           93.00         0.800
       Total Area Entered =      4.00(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.800        0.010       1.000
0.010
                                                          Sum (F) =
0.010
      Area averaged mean soil loss (F) (In/Hr) =  0.010
      Minimum soil loss rate ((In/Hr)) =  0.005
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.260
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083        382.317         65.882              2.656
          2   0.167        764.634         34.118              1.375
                                    Sum = 100.000   Sum=       4.031
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07     0.044         0.018      ---           0.03
   2   0.17     0.07     0.044         0.018      ---           0.03
   3   0.25     0.07     0.044         0.018      ---           0.03
   4   0.33     0.10     0.066         0.018      ---           0.05
   5   0.42     0.10     0.066         0.018      ---           0.05
```

```
  6   0.50     0.10      0.066          0.018       ---          0.05
  7   0.58     0.10      0.066          0.018       ---          0.05
  8   0.67     0.10      0.066          0.018       ---          0.05
  9   0.75     0.10      0.066          0.018       ---          0.05
 10   0.83     0.13      0.088          0.017       ---          0.07
 11   0.92     0.13      0.088          0.017       ---          0.07
 12   1.00     0.13      0.088          0.017       ---          0.07
 13   1.08     0.10      0.066          0.017       ---          0.05
 14   1.17     0.10      0.066          0.017       ---          0.05
 15   1.25     0.10      0.066          0.017       ---          0.05
 16   1.33     0.10      0.066          0.017       ---          0.05
 17   1.42     0.10      0.066          0.017       ---          0.05
 18   1.50     0.10      0.066          0.017       ---          0.05
 19   1.58     0.10      0.066          0.017       ---          0.05
 20   1.67     0.10      0.066          0.017       ---          0.05
 21   1.75     0.10      0.066          0.017       ---          0.05
 22   1.83     0.13      0.088          0.017       ---          0.07
 23   1.92     0.13      0.088          0.017       ---          0.07
 24   2.00     0.13      0.088          0.016       ---          0.07
 25   2.08     0.13      0.088          0.016       ---          0.07
 26   2.17     0.13      0.088          0.016       ---          0.07
 27   2.25     0.13      0.088          0.016       ---          0.07
 28   2.33     0.13      0.088          0.016       ---          0.07
 29   2.42     0.13      0.088          0.016       ---          0.07
 30   2.50     0.13      0.088          0.016       ---          0.07
 31   2.58     0.17      0.110          0.016       ---          0.09
 32   2.67     0.17      0.110          0.016       ---          0.09
 33   2.75     0.17      0.110          0.016       ---          0.09
 34   2.83     0.17      0.110          0.016       ---          0.09
 35   2.92     0.17      0.110          0.016       ---          0.09
 36   3.00     0.17      0.110          0.016       ---          0.09
 37   3.08     0.17      0.110          0.016       ---          0.09
 38   3.17     0.17      0.110          0.016       ---          0.09
 39   3.25     0.17      0.110          0.016       ---          0.09
 40   3.33     0.17      0.110          0.015       ---          0.09
 41   3.42     0.17      0.110          0.015       ---          0.09
 42   3.50     0.17      0.110          0.015       ---          0.09
 43   3.58     0.17      0.110          0.015       ---          0.09
 44   3.67     0.17      0.110          0.015       ---          0.09
 45   3.75     0.17      0.110          0.015       ---          0.09
 46   3.83     0.20      0.132          0.015       ---          0.12
 47   3.92     0.20      0.132          0.015       ---          0.12
 48   4.00     0.20      0.132          0.015       ---          0.12
 49   4.08     0.20      0.132          0.015       ---          0.12
 50   4.17     0.20      0.132          0.015       ---          0.12
 51   4.25     0.20      0.132          0.015       ---          0.12
 52   4.33     0.23      0.154          0.015       ---          0.14
 53   4.42     0.23      0.154          0.015       ---          0.14
 54   4.50     0.23      0.154          0.015       ---          0.14
 55   4.58     0.23      0.154          0.014       ---          0.14
 56   4.67     0.23      0.154          0.014       ---          0.14
 57   4.75     0.23      0.154          0.014       ---          0.14
 58   4.83     0.27      0.176          0.014       ---          0.16
 59   4.92     0.27      0.176          0.014       ---          0.16
 60   5.00     0.27      0.176          0.014       ---          0.16
 61   5.08     0.20      0.132          0.014       ---          0.12
 62   5.17     0.20      0.132          0.014       ---          0.12
 63   5.25     0.20      0.132          0.014       ---          0.12
 64   5.33     0.23      0.154          0.014       ---          0.14
 65   5.42     0.23      0.154          0.014       ---          0.14
```

66	5.50	0.23	0.154	0.014	---	0.14
67	5.58	0.27	0.176	0.014	---	0.16
68	5.67	0.27	0.176	0.014	---	0.16
69	5.75	0.27	0.176	0.014	---	0.16
70	5.83	0.27	0.176	0.014	---	0.16
71	5.92	0.27	0.176	0.014	---	0.16
72	6.00	0.27	0.176	0.013	---	0.16
73	6.08	0.30	0.198	0.013	---	0.18
74	6.17	0.30	0.198	0.013	---	0.18
75	6.25	0.30	0.198	0.013	---	0.18
76	6.33	0.30	0.198	0.013	---	0.18
77	6.42	0.30	0.198	0.013	---	0.18
78	6.50	0.30	0.198	0.013	---	0.18
79	6.58	0.33	0.220	0.013	---	0.21
80	6.67	0.33	0.220	0.013	---	0.21
81	6.75	0.33	0.220	0.013	---	0.21
82	6.83	0.33	0.220	0.013	---	0.21
83	6.92	0.33	0.220	0.013	---	0.21
84	7.00	0.33	0.220	0.013	---	0.21
85	7.08	0.33	0.220	0.013	---	0.21
86	7.17	0.33	0.220	0.013	---	0.21
87	7.25	0.33	0.220	0.013	---	0.21
88	7.33	0.37	0.242	0.013	---	0.23
89	7.42	0.37	0.242	0.012	---	0.23
90	7.50	0.37	0.242	0.012	---	0.23
91	7.58	0.40	0.264	0.012	---	0.25
92	7.67	0.40	0.264	0.012	---	0.25
93	7.75	0.40	0.264	0.012	---	0.25
94	7.83	0.43	0.286	0.012	---	0.27
95	7.92	0.43	0.286	0.012	---	0.27
96	8.00	0.43	0.286	0.012	---	0.27
97	8.08	0.50	0.330	0.012	---	0.32
98	8.17	0.50	0.330	0.012	---	0.32
99	8.25	0.50	0.330	0.012	---	0.32
100	8.33	0.50	0.330	0.012	---	0.32
101	8.42	0.50	0.330	0.012	---	0.32
102	8.50	0.50	0.330	0.012	---	0.32
103	8.58	0.53	0.352	0.012	---	0.34
104	8.67	0.53	0.352	0.012	---	0.34
105	8.75	0.53	0.352	0.012	---	0.34
106	8.83	0.57	0.374	0.012	---	0.36
107	8.92	0.57	0.374	0.011	---	0.36
108	9.00	0.57	0.374	0.011	---	0.36
109	9.08	0.63	0.418	0.011	---	0.41
110	9.17	0.63	0.418	0.011	---	0.41
111	9.25	0.63	0.418	0.011	---	0.41
112	9.33	0.67	0.440	0.011	---	0.43
113	9.42	0.67	0.440	0.011	---	0.43
114	9.50	0.67	0.440	0.011	---	0.43
115	9.58	0.70	0.462	0.011	---	0.45
116	9.67	0.70	0.462	0.011	---	0.45
117	9.75	0.70	0.462	0.011	---	0.45
118	9.83	0.73	0.484	0.011	---	0.47
119	9.92	0.73	0.484	0.011	---	0.47
120	10.00	0.73	0.484	0.011	---	0.47
121	10.08	0.50	0.330	0.011	---	0.32
122	10.17	0.50	0.330	0.011	---	0.32
123	10.25	0.50	0.330	0.011	---	0.32
124	10.33	0.50	0.330	0.011	---	0.32
125	10.42	0.50	0.330	0.011	---	0.32

```
126  10.50     0.50     0.330         0.010      ---          0.32
127  10.58     0.67     0.440         0.010      ---          0.43
128  10.67     0.67     0.440         0.010      ---          0.43
129  10.75     0.67     0.440         0.010      ---          0.43
130  10.83     0.67     0.440         0.010      ---          0.43
131  10.92     0.67     0.440         0.010      ---          0.43
132  11.00     0.67     0.440         0.010      ---          0.43
133  11.08     0.63     0.418         0.010      ---          0.41
134  11.17     0.63     0.418         0.010      ---          0.41
135  11.25     0.63     0.418         0.010      ---          0.41
136  11.33     0.63     0.418         0.010      ---          0.41
137  11.42     0.63     0.418         0.010      ---          0.41
138  11.50     0.63     0.418         0.010      ---          0.41
139  11.58     0.57     0.374         0.010      ---          0.36
140  11.67     0.57     0.374         0.010      ---          0.36
141  11.75     0.57     0.374         0.010      ---          0.36
142  11.83     0.60     0.396         0.010      ---          0.39
143  11.92     0.60     0.396         0.010      ---          0.39
144  12.00     0.60     0.396         0.010      ---          0.39
145  12.08     0.83     0.550         0.010      ---          0.54
146  12.17     0.83     0.550         0.009      ---          0.54
147  12.25     0.83     0.550         0.009      ---          0.54
148  12.33     0.87     0.572         0.009      ---          0.56
149  12.42     0.87     0.572         0.009      ---          0.56
150  12.50     0.87     0.572         0.009      ---          0.56
151  12.58     0.93     0.616         0.009      ---          0.61
152  12.67     0.93     0.616         0.009      ---          0.61
153  12.75     0.93     0.616         0.009      ---          0.61
154  12.83     0.97     0.638         0.009      ---          0.63
155  12.92     0.97     0.638         0.009      ---          0.63
156  13.00     0.97     0.638         0.009      ---          0.63
157  13.08     1.13     0.748         0.009      ---          0.74
158  13.17     1.13     0.748         0.009      ---          0.74
159  13.25     1.13     0.748         0.009      ---          0.74
160  13.33     1.13     0.748         0.009      ---          0.74
161  13.42     1.13     0.748         0.009      ---          0.74
162  13.50     1.13     0.748         0.009      ---          0.74
163  13.58     0.77     0.506         0.009      ---          0.50
164  13.67     0.77     0.506         0.009      ---          0.50
165  13.75     0.77     0.506         0.009      ---          0.50
166  13.83     0.77     0.506         0.009      ---          0.50
167  13.92     0.77     0.506         0.009      ---          0.50
168  14.00     0.77     0.506         0.008      ---          0.50
169  14.08     0.90     0.594         0.008      ---          0.59
170  14.17     0.90     0.594         0.008      ---          0.59
171  14.25     0.90     0.594         0.008      ---          0.59
172  14.33     0.87     0.572         0.008      ---          0.56
173  14.42     0.87     0.572         0.008      ---          0.56
174  14.50     0.87     0.572         0.008      ---          0.56
175  14.58     0.87     0.572         0.008      ---          0.56
176  14.67     0.87     0.572         0.008      ---          0.56
177  14.75     0.87     0.572         0.008      ---          0.56
178  14.83     0.83     0.550         0.008      ---          0.54
179  14.92     0.83     0.550         0.008      ---          0.54
180  15.00     0.83     0.550         0.008      ---          0.54
181  15.08     0.80     0.528         0.008      ---          0.52
182  15.17     0.80     0.528         0.008      ---          0.52
183  15.25     0.80     0.528         0.008      ---          0.52
184  15.33     0.77     0.506         0.008      ---          0.50
185  15.42     0.77     0.506         0.008      ---          0.50
```

```
186  15.50      0.77       0.506          0.008       ---           0.50
187  15.58      0.63       0.418          0.008       ---           0.41
188  15.67      0.63       0.418          0.008       ---           0.41
189  15.75      0.63       0.418          0.008       ---           0.41
190  15.83      0.63       0.418          0.008       ---           0.41
191  15.92      0.63       0.418          0.008       ---           0.41
192  16.00      0.63       0.418          0.007       ---           0.41
193  16.08      0.13       0.088          0.007       ---           0.08
194  16.17      0.13       0.088          0.007       ---           0.08
195  16.25      0.13       0.088          0.007       ---           0.08
196  16.33      0.13       0.088          0.007       ---           0.08
197  16.42      0.13       0.088          0.007       ---           0.08
198  16.50      0.13       0.088          0.007       ---           0.08
199  16.58      0.10       0.066          0.007       ---           0.06
200  16.67      0.10       0.066          0.007       ---           0.06
201  16.75      0.10       0.066          0.007       ---           0.06
202  16.83      0.10       0.066          0.007       ---           0.06
203  16.92      0.10       0.066          0.007       ---           0.06
204  17.00      0.10       0.066          0.007       ---           0.06
205  17.08      0.17       0.110          0.007       ---           0.10
206  17.17      0.17       0.110          0.007       ---           0.10
207  17.25      0.17       0.110          0.007       ---           0.10
208  17.33      0.17       0.110          0.007       ---           0.10
209  17.42      0.17       0.110          0.007       ---           0.10
210  17.50      0.17       0.110          0.007       ---           0.10
211  17.58      0.17       0.110          0.007       ---           0.10
212  17.67      0.17       0.110          0.007       ---           0.10
213  17.75      0.17       0.110          0.007       ---           0.10
214  17.83      0.13       0.088          0.007       ---           0.08
215  17.92      0.13       0.088          0.007       ---           0.08
216  18.00      0.13       0.088          0.007       ---           0.08
217  18.08      0.13       0.088          0.007       ---           0.08
218  18.17      0.13       0.088          0.007       ---           0.08
219  18.25      0.13       0.088          0.007       ---           0.08
220  18.33      0.13       0.088          0.007       ---           0.08
221  18.42      0.13       0.088          0.006       ---           0.08
222  18.50      0.13       0.088          0.006       ---           0.08
223  18.58      0.10       0.066          0.006       ---           0.06
224  18.67      0.10       0.066          0.006       ---           0.06
225  18.75      0.10       0.066          0.006       ---           0.06
226  18.83      0.07       0.044          0.006       ---           0.04
227  18.92      0.07       0.044          0.006       ---           0.04
228  19.00      0.07       0.044          0.006       ---           0.04
229  19.08      0.10       0.066          0.006       ---           0.06
230  19.17      0.10       0.066          0.006       ---           0.06
231  19.25      0.10       0.066          0.006       ---           0.06
232  19.33      0.13       0.088          0.006       ---           0.08
233  19.42      0.13       0.088          0.006       ---           0.08
234  19.50      0.13       0.088          0.006       ---           0.08
235  19.58      0.10       0.066          0.006       ---           0.06
236  19.67      0.10       0.066          0.006       ---           0.06
237  19.75      0.10       0.066          0.006       ---           0.06
238  19.83      0.07       0.044          0.006       ---           0.04
239  19.92      0.07       0.044          0.006       ---           0.04
240  20.00      0.07       0.044          0.006       ---           0.04
241  20.08      0.10       0.066          0.006       ---           0.06
242  20.17      0.10       0.066          0.006       ---           0.06
243  20.25      0.10       0.066          0.006       ---           0.06
244  20.33      0.10       0.066          0.006       ---           0.06
245  20.42      0.10       0.066          0.006       ---           0.06
```

```
 246  20.50     0.10      0.066        0.006      ---         0.06
 247  20.58     0.10      0.066        0.006      ---         0.06
 248  20.67     0.10      0.066        0.006      ---         0.06
 249  20.75     0.10      0.066        0.006      ---         0.06
 250  20.83     0.07      0.044        0.006      ---         0.04
 251  20.92     0.07      0.044        0.006      ---         0.04
 252  21.00     0.07      0.044        0.006      ---         0.04
 253  21.08     0.10      0.066        0.006      ---         0.06
 254  21.17     0.10      0.066        0.006      ---         0.06
 255  21.25     0.10      0.066        0.006      ---         0.06
 256  21.33     0.07      0.044        0.006      ---         0.04
 257  21.42     0.07      0.044        0.006      ---         0.04
 258  21.50     0.07      0.044        0.005      ---         0.04
 259  21.58     0.10      0.066        0.005      ---         0.06
 260  21.67     0.10      0.066        0.005      ---         0.06
 261  21.75     0.10      0.066        0.005      ---         0.06
 262  21.83     0.07      0.044        0.005      ---         0.04
 263  21.92     0.07      0.044        0.005      ---         0.04
 264  22.00     0.07      0.044        0.005      ---         0.04
 265  22.08     0.10      0.066        0.005      ---         0.06
 266  22.17     0.10      0.066        0.005      ---         0.06
 267  22.25     0.10      0.066        0.005      ---         0.06
 268  22.33     0.07      0.044        0.005      ---         0.04
 269  22.42     0.07      0.044        0.005      ---         0.04
 270  22.50     0.07      0.044        0.005      ---         0.04
 271  22.58     0.07      0.044        0.005      ---         0.04
 272  22.67     0.07      0.044        0.005      ---         0.04
 273  22.75     0.07      0.044        0.005      ---         0.04
 274  22.83     0.07      0.044        0.005      ---         0.04
 275  22.92     0.07      0.044        0.005      ---         0.04
 276  23.00     0.07      0.044        0.005      ---         0.04
 277  23.08     0.07      0.044        0.005      ---         0.04
 278  23.17     0.07      0.044        0.005      ---         0.04
 279  23.25     0.07      0.044        0.005      ---         0.04
 280  23.33     0.07      0.044        0.005      ---         0.04
 281  23.42     0.07      0.044        0.005      ---         0.04
 282  23.50     0.07      0.044        0.005      ---         0.04
 283  23.58     0.07      0.044        0.005      ---         0.04
 284  23.67     0.07      0.044        0.005      ---         0.04
 285  23.75     0.07      0.044        0.005      ---         0.04
 286  23.83     0.07      0.044        0.005      ---         0.04
 287  23.92     0.07      0.044        0.005      ---         0.04
 288  24.00     0.07      0.044        0.005      ---         0.04
     Sum =     100.0                                   Sum =    63.1
      Flood volume = Effective rainfall      5.26(In)
       times area       4.0(Ac.)/[(In)/(Ft.)] =       1.8(Ac.Ft)
      Total soil loss =      0.24(In)
      Total soil loss =     0.082(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =       76306.1 Cubic Feet
      Total soil loss =        3553.3 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =      2.982(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
```

```
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0         2.5       5.0       7.5
10.0

-----------------------------------------------------------------------
    0+ 5       0.0005      0.07  Q         |         |         |
|
    0+10       0.0012      0.10  Q         |         |         |
|
    0+15       0.0019      0.11  Q         |         |         |
|
    0+20       0.0030      0.16  Q         |         |         |
|
    0+25       0.0044      0.19  Q         |         |         |
|
    0+30       0.0057      0.19  Q         |         |         |
|
    0+35       0.0071      0.19  Q         |         |         |
|
    0+40       0.0084      0.20  Q         |         |         |
|
    0+45       0.0098      0.20  Q         |         |         |
|
    0+50       0.0115      0.25  VQ        |         |         |
|
    0+55       0.0135      0.28  VQ        |         |         |
|
    1+ 0       0.0154      0.29  VQ        |         |         |
|
    1+ 5       0.0170      0.23  Q         |         |         |
|
    1+10       0.0184      0.20  Q         |         |         |
|
    1+15       0.0197      0.20  Q         |         |         |
|
    1+20       0.0211      0.20  Q         |         |         |
|
    1+25       0.0224      0.20  Q         |         |         |
|
    1+30       0.0238      0.20  Q         |         |         |
|
    1+35       0.0252      0.20  Q         |         |         |
|
    1+40       0.0265      0.20  Q         |         |         |
|
    1+45       0.0279      0.20  Q         |         |         |
|
    1+50       0.0297      0.26  VQ        |         |         |
|
    1+55       0.0317      0.29  VQ        |         |         |
|
    2+ 0       0.0336      0.29  VQ        |         |         |
|
    2+ 5       0.0356      0.29  VQ        |         |         |
|
```

```
    2+10       0.0376      0.29  VQ        |         |         |
|
    2+15       0.0396      0.29  VQ        |         |         |
|
    2+20       0.0416      0.29  VQ        |         |         |
|
    2+25       0.0436      0.29  VQ        |         |         |
|
    2+30       0.0456      0.29  |Q        |         |         |
|
    2+35       0.0480      0.35  |Q        |         |         |
|
    2+40       0.0506      0.38  |Q        |         |         |
|
    2+45       0.0532      0.38  |Q        |         |         |
|
    2+50       0.0558      0.38  |Q        |         |         |
|
    2+55       0.0584      0.38  |Q        |         |         |
|
    3+ 0       0.0611      0.38  |Q        |         |         |
|
    3+ 5       0.0637      0.38  |Q        |         |         |
|
    3+10       0.0663      0.38  |Q        |         |         |
|
    3+15       0.0689      0.38  |Q        |         |         |
|
    3+20       0.0716      0.38  |Q        |         |         |
|
    3+25       0.0742      0.38  |Q        |         |         |
|
    3+30       0.0768      0.38  |Q        |         |         |
|
    3+35       0.0794      0.38  |Q        |         |         |
|
    3+40       0.0821      0.38  |Q        |         |         |
|
    3+45       0.0847      0.38  |Q        |         |         |
|
    3+50       0.0878      0.44  |QV       |         |         |
|
    3+55       0.0910      0.47  |QV       |         |         |
|
    4+ 0       0.0943      0.47  |QV       |         |         |
|
    4+ 5       0.0975      0.47  |QV       |         |         |
|
    4+10       0.1008      0.47  |QV       |         |         |
|
    4+15       0.1040      0.47  |QV       |         |         |
|
    4+20       0.1077      0.53  | Q       |         |         |
|
    4+25       0.1116      0.56  | Q       |         |         |
|
    4+30       0.1154      0.56  | Q       |         |         |
|
    4+35       0.1193      0.56  | Q       |         |         |
|
```

```
    4+40      0.1232      0.56  | Q        |         |         |
|
    4+45      0.1271      0.56  | Q        |         |         |
|
    4+50      0.1313      0.62  | Q        |         |         |
|
    4+55      0.1358      0.65  | QV       |         |         |
|
    5+ 0      0.1403      0.65  | QV       |         |         |
|
    5+ 5      0.1440      0.54  | QV       |         |         |
|
    5+10      0.1473      0.48  |Q V       |         |         |
|
    5+15      0.1506      0.48  |Q V       |         |         |
|
    5+20      0.1542      0.53  | QV       |         |         |
|
    5+25      0.1581      0.57  | QV       |         |         |
|
    5+30      0.1620      0.57  | QV       |         |         |
|
    5+35      0.1663      0.62  | QV       |         |         |
|
    5+40      0.1708      0.65  | QV       |         |         |
|
    5+45      0.1753      0.65  | Q V      |         |         |
|
    5+50      0.1799      0.66  | Q V      |         |         |
|
    5+55      0.1844      0.66  | Q V      |         |         |
|
    6+ 0      0.1889      0.66  | Q V      |         |         |
|
    6+ 5      0.1938      0.71  | Q V      |         |         |
|
    6+10      0.1989      0.74  | Q V      |         |         |
|
    6+15      0.2041      0.74  | Q V      |         |         |
|
    6+20      0.2092      0.75  | Q V      |         |         |
|
    6+25      0.2143      0.75  | Q V      |         |         |
|
    6+30      0.2195      0.75  | Q  V     |         |         |
|
    6+35      0.2250      0.80  |  Q V     |         |         |
|
    6+40      0.2308      0.83  |  Q V     |         |         |
|
    6+45      0.2365      0.84  |  Q V     |         |         |
|
    6+50      0.2423      0.84  |  Q V     |         |         |
|
    6+55      0.2480      0.84  |  Q V     |         |         |
|
    7+ 0      0.2538      0.84  |  Q V     |         |         |
|
    7+ 5      0.2595      0.84  |  Q V     |         |         |
|
```

```
    7+10       0.2653      0.84  |  Q  V   |         |         |
|
    7+15       0.2711      0.84  |  Q  V   |         |         |
|
    7+20       0.2772      0.90  |  Q  V   |         |         |
|
    7+25       0.2836      0.93  |  Q  V   |         |         |
|
    7+30       0.2900      0.93  |  Q  V   |         |         |
|
    7+35       0.2968      0.98  |  Q  V   |         |         |
|
    7+40       0.3037      1.02  |   Q V   |         |         |
|
    7+45       0.3107      1.02  |   Q  V  |         |         |
|
    7+50       0.3181      1.07  |   Q  V  |         |         |
|
    7+55       0.3257      1.10  |   Q  V  |         |         |
|
    8+ 0       0.3334      1.10  |   Q  V  |         |         |
|
    8+ 5       0.3418      1.22  |   Q  V  |         |         |
|
    8+10       0.3506      1.28  |    Q  V |         |         |
|
    8+15       0.3594      1.28  |    Q  V |         |         |
|
    8+20       0.3683      1.28  |    Q  V |         |         |
|
    8+25       0.3771      1.28  |    Q  V |         |         |
|
    8+30       0.3860      1.28  |    Q  V |         |         |
|
    8+35       0.3952      1.34  |    Q   V|         |         |
|
    8+40       0.4047      1.37  |    Q   V|         |         |
|
    8+45       0.4141      1.37  |    Q   V|         |         |
|
    8+50       0.4240      1.43  |    Q   V|         |         |
|
    8+55       0.4340      1.46  |    Q   V|         |         |
|
    9+ 0       0.4441      1.46  |    Q    V         |         |
|
    9+ 5       0.4550      1.58  |     Q   V         |         |
|
    9+10       0.4663      1.64  |     Q   V         |         |
|
    9+15       0.4776      1.64  |     Q   V         |         |
|
    9+20       0.4893      1.70  |     Q   |V        |         |
|
    9+25       0.5012      1.73  |     Q   |V        |         |
|
    9+30       0.5131      1.73  |     Q   |V        |         |
|
    9+35       0.5254      1.79  |      Q  |V        |         |
|
```

```
    9+40       0.5380      1.82  |      Q  | V       |         |
|
    9+45       0.5505      1.82  |      Q  | V       |         |
|
    9+50       0.5634      1.88  |      Q  | V       |         |
|
    9+55       0.5766      1.91  |      Q  |  V      |         |
|
   10+ 0       0.5897      1.91  |      Q  |  V      |         |
|
   10+ 5       0.6000      1.50  |    Q    |  V      |         |
|
   10+10       0.6089      1.29  |    Q    |  V      |         |
|
   10+15       0.6178      1.29  |    Q    |   V     |         |
|
   10+20       0.6267      1.29  |    Q    |   V     |         |
|
   10+25       0.6355      1.29  |    Q    |   V     |         |
|
   10+30       0.6444      1.29  |    Q    |   V     |         |
|
   10+35       0.6553      1.58  |     Q   |   V     |         |
|
   10+40       0.6672      1.73  |     Q   |    V    |         |
|
   10+45       0.6792      1.73  |     Q   |    V    |         |
|
   10+50       0.6911      1.73  |     Q   |    V    |         |
|
   10+55       0.7030      1.73  |     Q   |     V   |         |
|
   11+ 0       0.7150      1.73  |     Q   |     V   |         |
|
   11+ 5       0.7265      1.68  |     Q   |     V   |         |
|
   11+10       0.7378      1.65  |     Q   |     V   |         |
|
   11+15       0.7492      1.65  |     Q   |      V  |         |
|
   11+20       0.7605      1.65  |     Q   |      V  |         |
|
   11+25       0.7718      1.65  |     Q   |      V  |         |
|
   11+30       0.7832      1.65  |     Q   |      V  |         |
|
   11+35       0.7937      1.53  |     Q   |       V |         |
|
   11+40       0.8038      1.47  |    Q    |       V |         |
|
   11+45       0.8140      1.47  |    Q    |       V |         |
|
   11+50       0.8245      1.53  |     Q   |       V |         |
|
   11+55       0.8352      1.56  |     Q   |        V|         |
|
   12+ 0       0.8459      1.56  |     Q   |        V|         |
|
   12+ 5       0.8595      1.97  |      Q  |        V|         |
|
```

```
  12+10       0.8745      2.18  |       Q |        V|         |
|
  12+15       0.8895      2.18  |       Q |         V         |
|
  12+20       0.9049      2.24  |       Q |         V         |
|
  12+25       0.9206      2.27  |        Q|         |V        |
|
  12+30       0.9362      2.27  |        Q|         |V        |
|
  12+35       0.9526      2.39  |        Q|         |V        |
|
  12+40       0.9695      2.45  |        Q|         | V       |
|
  12+45       0.9864      2.45  |        Q|         | V       |
|
  12+50       1.0036      2.51  |         Q         | V       |
|
  12+55       1.0211      2.54  |         Q         |  V      |
|
  13+ 0       1.0386      2.54  |         Q         |  V      |
|
  13+ 5       1.0580      2.83  |         |Q        |   V     |
|
  13+10       1.0786      2.98  |         |Q        |   V     |
|
  13+15       1.0991      2.98  |         |Q        |    V    |
|
  13+20       1.1196      2.98  |         |Q        |    V    |
|
  13+25       1.1402      2.98  |         |Q        |     V   |
|
  13+30       1.1607      2.98  |         |Q        |     V   |
|
  13+35       1.1768      2.34  |        Q|         |     V   |
|
  13+40       1.1906      2.01  |       Q |         |      V  |
|
  13+45       1.2044      2.01  |       Q |         |      V  |
|
  13+50       1.2183      2.01  |       Q |         |      V  |
|
  13+55       1.2321      2.01  |       Q |         |       V |
|
  14+ 0       1.2459      2.01  |       Q |         |       V |
|
  14+ 5       1.2613      2.24  |       Q |         |       V |
|
  14+10       1.2776      2.36  |        Q|         |        V|
|
  14+15       1.2939      2.36  |        Q|         |        V|
|
  14+20       1.3097      2.30  |        Q|         |        V|
|
  14+25       1.3254      2.27  |        Q|         |         V
|
  14+30       1.3411      2.27  |        Q|         |         V
|
  14+35       1.3567      2.27  |        Q|         |         V
|
```

```
   14+40       1.3724      2.27  |        Q|         |         |V
|
   14+45       1.3880      2.27  |        Q|         |         |V
|
   14+50       1.4033      2.22  |       Q |         |         | V
|
   14+55       1.4184      2.19  |       Q |         |         | V
|
   15+ 0       1.4334      2.19  |       Q |         |         | V
|
   15+ 5       1.4481      2.13  |       Q |         |         |  V
|
   15+10       1.4625      2.10  |       Q |         |         |  V
|
   15+15       1.4770      2.10  |       Q |         |         |  V
|
   15+20       1.4910      2.04  |       Q |         |         |   V
|
   15+25       1.5048      2.01  |       Q |         |         |   V
|
   15+30       1.5187      2.01  |       Q |         |         |   V
|
   15+35       1.5309      1.78  |      Q  |         |         |   V
|
   15+40       1.5423      1.66  |     Q   |         |         |    V
|
   15+45       1.5537      1.66  |     Q   |         |         |    V
|
   15+50       1.5651      1.66  |     Q   |         |         |    V
|
   15+55       1.5765      1.66  |     Q   |         |         |    V
|
   16+ 0       1.5879      1.66  |     Q   |         |         |     V
|
   16+ 5       1.5933      0.78  |  Q      |         |         |     V
|
   16+10       1.5955      0.32  |Q        |         |         |     V
|
   16+15       1.5978      0.33  |Q        |         |         |     V
|
   16+20       1.6000      0.33  |Q        |         |         |     V
|
   16+25       1.6022      0.33  |Q        |         |         |     V
|
   16+30       1.6045      0.33  |Q        |         |         |     V
|
   16+35       1.6063      0.27  |Q        |         |         |     V
|
   16+40       1.6080      0.24  Q         |         |         |     V
|
   16+45       1.6096      0.24  Q         |         |         |     V
|
   16+50       1.6112      0.24  Q         |         |         |     V
|
   16+55       1.6129      0.24  Q         |         |         |     V
|
   17+ 0       1.6145      0.24  Q         |         |         |     V
|
   17+ 5       1.6170      0.35  |Q        |         |         |     V
|
```

```
   17+10       1.6198      0.42  |Q        |         |         |     V
|
   17+15       1.6227      0.42  |Q        |         |         |      V
|
   17+20       1.6255      0.42  |Q        |         |         |      V
|
   17+25       1.6284      0.42  |Q        |         |         |      V
|
   17+30       1.6313      0.42  |Q        |         |         |      V
|
   17+35       1.6341      0.42  |Q        |         |         |      V
|
   17+40       1.6370      0.42  |Q        |         |         |      V
|
   17+45       1.6399      0.42  |Q        |         |         |      V
|
   17+50       1.6423      0.36  |Q        |         |         |      V
|
   17+55       1.6446      0.33  |Q        |         |         |      V
|
   18+ 0       1.6469      0.33  |Q        |         |         |      V
|
   18+ 5       1.6491      0.33  |Q        |         |         |      V
|
   18+10       1.6514      0.33  |Q        |         |         |      V
|
   18+15       1.6536      0.33  |Q        |         |         |      V
|
   18+20       1.6559      0.33  |Q        |         |         |      V
|
   18+25       1.6582      0.33  |Q        |         |         |      V
|
   18+30       1.6604      0.33  |Q        |         |         |      V
|
   18+35       1.6623      0.27  |Q        |         |         |      V
|
   18+40       1.6640      0.24  Q         |         |         |      V
|
   18+45       1.6656      0.24  Q         |         |         |       V
|
   18+50       1.6669      0.18  Q         |         |         |       V
|
   18+55       1.6679      0.15  Q         |         |         |       V
|
   19+ 0       1.6690      0.15  Q         |         |         |       V
|
   19+ 5       1.6704      0.21  Q         |         |         |       V
|
   19+10       1.6721      0.24  Q         |         |         |       V
|
   19+15       1.6737      0.24  Q         |         |         |       V
|
   19+20       1.6758      0.30  |Q        |         |         |       V
|
   19+25       1.6781      0.33  |Q        |         |         |       V
|
   19+30       1.6804      0.33  |Q        |         |         |       V
|
   19+35       1.6822      0.27  |Q        |         |         |       V
|
```

```
       19+40          1.6839          0.24  Q           |           |           |         V
|
       19+45          1.6856          0.24  Q           |           |           |         V
|
       19+50          1.6868          0.18  Q           |           |           |         V
|
       19+55          1.6879          0.15  Q           |           |           |         V
|
       20+ 0          1.6889          0.15  Q           |           |           |         V
|
       20+ 5          1.6904          0.21  Q           |           |           |         V
|
       20+10          1.6921          0.24  Q           |           |           |         V
|
       20+15          1.6937          0.24  Q           |           |           |         V
|
       20+20          1.6954          0.24  Q           |           |           |         V
|
       20+25          1.6971          0.24  Q           |           |           |         V
|
       20+30          1.6988          0.24  Q           |           |           |         V
|
       20+35          1.7004          0.24  Q           |           |           |         V
|
       20+40          1.7021          0.24  Q           |           |           |         V
|
       20+45          1.7038          0.24  Q           |           |           |         V
|
       20+50          1.7051          0.18  Q           |           |           |         V
|
       20+55          1.7061          0.15  Q           |           |           |         V
|
       21+ 0          1.7072          0.15  Q           |           |           |         V
|
       21+ 5          1.7087          0.21  Q           |           |           |
V|
       21+10          1.7103          0.24  Q           |           |           |
V|
       21+15          1.7120          0.24  Q           |           |           |
V|
       21+20          1.7133          0.19  Q           |           |           |
V|
       21+25          1.7144          0.16  Q           |           |           |
V|
       21+30          1.7154          0.16  Q           |           |           |
V|
       21+35          1.7169          0.21  Q           |           |           |
V|
       21+40          1.7186          0.24  Q           |           |           |
V|
       21+45          1.7203          0.24  Q           |           |           |
V|
       21+50          1.7215          0.19  Q           |           |           |
V|
       21+55          1.7226          0.16  Q           |           |           |
V|
       22+ 0          1.7237          0.16  Q           |           |           |
V|
       22+ 5          1.7252          0.21  Q           |           |           |
V|
```

```
      22+10       1.7268      0.24  Q          |          |          |
   V|
      22+15       1.7285      0.24  Q          |          |          |
   V|
      22+20       1.7298      0.19  Q          |          |          |
   V|
      22+25       1.7309      0.16  Q          |          |          |
   V|
      22+30       1.7320      0.16  Q          |          |          |
   V|
      22+35       1.7330      0.16  Q          |          |          |
   V|
      22+40       1.7341      0.16  Q          |          |          |
   V|
      22+45       1.7352      0.16  Q          |          |          |
   V|
      22+50       1.7363      0.16  Q          |          |          |
   V|
      22+55       1.7373      0.16  Q          |          |          |
   V|
      23+ 0       1.7384      0.16  Q          |          |          |
   V|
      23+ 5       1.7395      0.16  Q          |          |          |
   V|
      23+10       1.7406      0.16  Q          |          |          |
   V|
      23+15       1.7417      0.16  Q          |          |          |
   V|
      23+20       1.7427      0.16  Q          |          |          |
   V|
      23+25       1.7438      0.16  Q          |          |          |
   V|
      23+30       1.7449      0.16  Q          |          |          |
   V|
      23+35       1.7460      0.16  Q          |          |          |
   V|
      23+40       1.7471      0.16  Q          |          |          |
   V|
      23+45       1.7481      0.16  Q          |          |          |
   V|
      23+50       1.7492      0.16  Q          |          |          |
   V|
      23+55       1.7503      0.16  Q          |          |          |
   V|
      24+ 0       1.7514      0.16  Q          |          |          |
   V|
      24+ 5       1.7517      0.05  Q          |          |          |
   V
   -----------------------------------------------------------------------
```

```
          U n i t   H y d r o g r a p h   A n a l y s i s

          Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                Study date  04/03/18 File: southwestcynpost24100.out

      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      -----------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      -----------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      -----------------------------------------------------------------
---
      Badlands Landfill
      Southwestern Cyn post Landfill
      24 hour 100 year storm event

      -----------------------------------------------------------------
--
      Drainage Area =      27.20(Ac.)  =      0.043 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      27.20(Ac.)  =
0.043 Sq. Mi.
      Length along longest watercourse =    2067.00(Ft.)
      Length along longest watercourse measured to centroid =     998.00
(Ft.)
      Length along longest watercourse =      0.391 Mi.
      Length along longest watercourse measured to centroid =      0.189
Mi.
      Difference in elevation =     250.00(Ft.)
      Slope along watercourse =    638.6067 Ft./Mi.
      Average Manning's 'N' = 0.030
      Lag time =    0.078 Hr.
      Lag time =     4.71 Min.
      25% of lag time =     1.18 Min.
      40% of lag time =     1.88 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
           27.20              2.00                    54.40

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             27.20              5.50                   149.60

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =     2.000(In)
      Area Averaged 100-Year Rainfall =     5.500(In)

      Point rain (area averaged) =     5.500(In)
      Areal adjustment factor =    99.99 %
      Adjusted average point rain =     5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          27.200           93.00         0.050
       Total Area Entered =      27.20(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.050        0.035       1.000
0.035
                                                           Sum (F) =
0.035
      Area averaged mean soil loss (F) (In/Hr) =  0.035
      Minimum soil loss rate ((In/Hr)) =  0.017
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.860
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        MOUNTAIN S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                            Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083        106.214         24.473              6.709
          2   0.167        212.429         38.169             10.463
          3   0.250        318.643         13.316              3.650
          4   0.333        424.858          7.306              2.003
          5   0.417        531.072          4.713              1.292
          6   0.500        637.286          3.520              0.965
          7   0.583        743.501          2.736              0.750
          8   0.667        849.715          2.106              0.577
          9   0.750        955.930          1.912              0.524
         10   0.833       1062.144          1.749              0.479
                                      Sum = 100.000   Sum=      27.412
----------------------------------------------------------------------
```

Unit	Time	Pattern	Storm Rain	Loss rate(In./Hr)		Effective
	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.07	0.044	0.062	0.038	0.01
2	0.17	0.07	0.044	0.061	0.038	0.01
3	0.25	0.07	0.044	0.061	0.038	0.01
4	0.33	0.10	0.066	0.061	---	0.01
5	0.42	0.10	0.066	0.061	---	0.01
6	0.50	0.10	0.066	0.060	---	0.01
7	0.58	0.10	0.066	0.060	---	0.01
8	0.67	0.10	0.066	0.060	---	0.01
9	0.75	0.10	0.066	0.060	---	0.01
10	0.83	0.13	0.088	0.059	---	0.03
11	0.92	0.13	0.088	0.059	---	0.03
12	1.00	0.13	0.088	0.059	---	0.03
13	1.08	0.10	0.066	0.059	---	0.01
14	1.17	0.10	0.066	0.059	---	0.01
15	1.25	0.10	0.066	0.058	---	0.01
16	1.33	0.10	0.066	0.058	---	0.01
17	1.42	0.10	0.066	0.058	---	0.01
18	1.50	0.10	0.066	0.058	---	0.01
19	1.58	0.10	0.066	0.057	---	0.01
20	1.67	0.10	0.066	0.057	---	0.01
21	1.75	0.10	0.066	0.057	---	0.01
22	1.83	0.13	0.088	0.057	---	0.03
23	1.92	0.13	0.088	0.056	---	0.03
24	2.00	0.13	0.088	0.056	---	0.03
25	2.08	0.13	0.088	0.056	---	0.03
26	2.17	0.13	0.088	0.056	---	0.03
27	2.25	0.13	0.088	0.056	---	0.03
28	2.33	0.13	0.088	0.055	---	0.03
29	2.42	0.13	0.088	0.055	---	0.03
30	2.50	0.13	0.088	0.055	---	0.03
31	2.58	0.17	0.110	0.055	---	0.06
32	2.67	0.17	0.110	0.054	---	0.06
33	2.75	0.17	0.110	0.054	---	0.06
34	2.83	0.17	0.110	0.054	---	0.06
35	2.92	0.17	0.110	0.054	---	0.06
36	3.00	0.17	0.110	0.054	---	0.06
37	3.08	0.17	0.110	0.053	---	0.06
38	3.17	0.17	0.110	0.053	---	0.06
39	3.25	0.17	0.110	0.053	---	0.06
40	3.33	0.17	0.110	0.053	---	0.06
41	3.42	0.17	0.110	0.052	---	0.06
42	3.50	0.17	0.110	0.052	---	0.06
43	3.58	0.17	0.110	0.052	---	0.06
44	3.67	0.17	0.110	0.052	---	0.06
45	3.75	0.17	0.110	0.052	---	0.06
46	3.83	0.20	0.132	0.051	---	0.08
47	3.92	0.20	0.132	0.051	---	0.08
48	4.00	0.20	0.132	0.051	---	0.08
49	4.08	0.20	0.132	0.051	---	0.08
50	4.17	0.20	0.132	0.050	---	0.08
51	4.25	0.20	0.132	0.050	---	0.08
52	4.33	0.23	0.154	0.050	---	0.10
53	4.42	0.23	0.154	0.050	---	0.10
54	4.50	0.23	0.154	0.050	---	0.10
55	4.58	0.23	0.154	0.049	---	0.10
56	4.67	0.23	0.154	0.049	---	0.10
57	4.75	0.23	0.154	0.049	---	0.10

```
 58   4.83     0.27      0.176          0.049       ---          0.13
 59   4.92     0.27      0.176          0.049       ---          0.13
 60   5.00     0.27      0.176          0.048       ---          0.13
 61   5.08     0.20      0.132          0.048       ---          0.08
 62   5.17     0.20      0.132          0.048       ---          0.08
 63   5.25     0.20      0.132          0.048       ---          0.08
 64   5.33     0.23      0.154          0.048       ---          0.11
 65   5.42     0.23      0.154          0.047       ---          0.11
 66   5.50     0.23      0.154          0.047       ---          0.11
 67   5.58     0.27      0.176          0.047       ---          0.13
 68   5.67     0.27      0.176          0.047       ---          0.13
 69   5.75     0.27      0.176          0.046       ---          0.13
 70   5.83     0.27      0.176          0.046       ---          0.13
 71   5.92     0.27      0.176          0.046       ---          0.13
 72   6.00     0.27      0.176          0.046       ---          0.13
 73   6.08     0.30      0.198          0.046       ---          0.15
 74   6.17     0.30      0.198          0.045       ---          0.15
 75   6.25     0.30      0.198          0.045       ---          0.15
 76   6.33     0.30      0.198          0.045       ---          0.15
 77   6.42     0.30      0.198          0.045       ---          0.15
 78   6.50     0.30      0.198          0.045       ---          0.15
 79   6.58     0.33      0.220          0.044       ---          0.18
 80   6.67     0.33      0.220          0.044       ---          0.18
 81   6.75     0.33      0.220          0.044       ---          0.18
 82   6.83     0.33      0.220          0.044       ---          0.18
 83   6.92     0.33      0.220          0.044       ---          0.18
 84   7.00     0.33      0.220          0.043       ---          0.18
 85   7.08     0.33      0.220          0.043       ---          0.18
 86   7.17     0.33      0.220          0.043       ---          0.18
 87   7.25     0.33      0.220          0.043       ---          0.18
 88   7.33     0.37      0.242          0.043       ---          0.20
 89   7.42     0.37      0.242          0.042       ---          0.20
 90   7.50     0.37      0.242          0.042       ---          0.20
 91   7.58     0.40      0.264          0.042       ---          0.22
 92   7.67     0.40      0.264          0.042       ---          0.22
 93   7.75     0.40      0.264          0.042       ---          0.22
 94   7.83     0.43      0.286          0.042       ---          0.24
 95   7.92     0.43      0.286          0.041       ---          0.24
 96   8.00     0.43      0.286          0.041       ---          0.24
 97   8.08     0.50      0.330          0.041       ---          0.29
 98   8.17     0.50      0.330          0.041       ---          0.29
 99   8.25     0.50      0.330          0.041       ---          0.29
100   8.33     0.50      0.330          0.040       ---          0.29
101   8.42     0.50      0.330          0.040       ---          0.29
102   8.50     0.50      0.330          0.040       ---          0.29
103   8.58     0.53      0.352          0.040       ---          0.31
104   8.67     0.53      0.352          0.040       ---          0.31
105   8.75     0.53      0.352          0.039       ---          0.31
106   8.83     0.57      0.374          0.039       ---          0.33
107   8.92     0.57      0.374          0.039       ---          0.33
108   9.00     0.57      0.374          0.039       ---          0.34
109   9.08     0.63      0.418          0.039       ---          0.38
110   9.17     0.63      0.418          0.039       ---          0.38
111   9.25     0.63      0.418          0.038       ---          0.38
112   9.33     0.67      0.440          0.038       ---          0.40
113   9.42     0.67      0.440          0.038       ---          0.40
114   9.50     0.67      0.440          0.038       ---          0.40
115   9.58     0.70      0.462          0.038       ---          0.42
116   9.67     0.70      0.462          0.037       ---          0.42
117   9.75     0.70      0.462          0.037       ---          0.42
```

```
118   9.83     0.73     0.484        0.037      ---          0.45
119   9.92     0.73     0.484        0.037      ---          0.45
120  10.00     0.73     0.484        0.037      ---          0.45
121  10.08     0.50     0.330        0.037      ---          0.29
122  10.17     0.50     0.330        0.036      ---          0.29
123  10.25     0.50     0.330        0.036      ---          0.29
124  10.33     0.50     0.330        0.036      ---          0.29
125  10.42     0.50     0.330        0.036      ---          0.29
126  10.50     0.50     0.330        0.036      ---          0.29
127  10.58     0.67     0.440        0.035      ---          0.40
128  10.67     0.67     0.440        0.035      ---          0.40
129  10.75     0.67     0.440        0.035      ---          0.40
130  10.83     0.67     0.440        0.035      ---          0.41
131  10.92     0.67     0.440        0.035      ---          0.41
132  11.00     0.67     0.440        0.035      ---          0.41
133  11.08     0.63     0.418        0.034      ---          0.38
134  11.17     0.63     0.418        0.034      ---          0.38
135  11.25     0.63     0.418        0.034      ---          0.38
136  11.33     0.63     0.418        0.034      ---          0.38
137  11.42     0.63     0.418        0.034      ---          0.38
138  11.50     0.63     0.418        0.034      ---          0.38
139  11.58     0.57     0.374        0.033      ---          0.34
140  11.67     0.57     0.374        0.033      ---          0.34
141  11.75     0.57     0.374        0.033      ---          0.34
142  11.83     0.60     0.396        0.033      ---          0.36
143  11.92     0.60     0.396        0.033      ---          0.36
144  12.00     0.60     0.396        0.033      ---          0.36
145  12.08     0.83     0.550        0.032      ---          0.52
146  12.17     0.83     0.550        0.032      ---          0.52
147  12.25     0.83     0.550        0.032      ---          0.52
148  12.33     0.87     0.572        0.032      ---          0.54
149  12.42     0.87     0.572        0.032      ---          0.54
150  12.50     0.87     0.572        0.032      ---          0.54
151  12.58     0.93     0.616        0.031      ---          0.58
152  12.67     0.93     0.616        0.031      ---          0.58
153  12.75     0.93     0.616        0.031      ---          0.58
154  12.83     0.97     0.638        0.031      ---          0.61
155  12.92     0.97     0.638        0.031      ---          0.61
156  13.00     0.97     0.638        0.031      ---          0.61
157  13.08     1.13     0.748        0.031      ---          0.72
158  13.17     1.13     0.748        0.030      ---          0.72
159  13.25     1.13     0.748        0.030      ---          0.72
160  13.33     1.13     0.748        0.030      ---          0.72
161  13.42     1.13     0.748        0.030      ---          0.72
162  13.50     1.13     0.748        0.030      ---          0.72
163  13.58     0.77     0.506        0.030      ---          0.48
164  13.67     0.77     0.506        0.029      ---          0.48
165  13.75     0.77     0.506        0.029      ---          0.48
166  13.83     0.77     0.506        0.029      ---          0.48
167  13.92     0.77     0.506        0.029      ---          0.48
168  14.00     0.77     0.506        0.029      ---          0.48
169  14.08     0.90     0.594        0.029      ---          0.57
170  14.17     0.90     0.594        0.029      ---          0.57
171  14.25     0.90     0.594        0.028      ---          0.57
172  14.33     0.87     0.572        0.028      ---          0.54
173  14.42     0.87     0.572        0.028      ---          0.54
174  14.50     0.87     0.572        0.028      ---          0.54
175  14.58     0.87     0.572        0.028      ---          0.54
176  14.67     0.87     0.572        0.028      ---          0.54
177  14.75     0.87     0.572        0.028      ---          0.54
```

```
178  14.83     0.83      0.550         0.027       ---          0.52
179  14.92     0.83      0.550         0.027       ---          0.52
180  15.00     0.83      0.550         0.027       ---          0.52
181  15.08     0.80      0.528         0.027       ---          0.50
182  15.17     0.80      0.528         0.027       ---          0.50
183  15.25     0.80      0.528         0.027       ---          0.50
184  15.33     0.77      0.506         0.027       ---          0.48
185  15.42     0.77      0.506         0.026       ---          0.48
186  15.50     0.77      0.506         0.026       ---          0.48
187  15.58     0.63      0.418         0.026       ---          0.39
188  15.67     0.63      0.418         0.026       ---          0.39
189  15.75     0.63      0.418         0.026       ---          0.39
190  15.83     0.63      0.418         0.026       ---          0.39
191  15.92     0.63      0.418         0.026       ---          0.39
192  16.00     0.63      0.418         0.026       ---          0.39
193  16.08     0.13      0.088         0.025       ---          0.06
194  16.17     0.13      0.088         0.025       ---          0.06
195  16.25     0.13      0.088         0.025       ---          0.06
196  16.33     0.13      0.088         0.025       ---          0.06
197  16.42     0.13      0.088         0.025       ---          0.06
198  16.50     0.13      0.088         0.025       ---          0.06
199  16.58     0.10      0.066         0.025       ---          0.04
200  16.67     0.10      0.066         0.025       ---          0.04
201  16.75     0.10      0.066         0.024       ---          0.04
202  16.83     0.10      0.066         0.024       ---          0.04
203  16.92     0.10      0.066         0.024       ---          0.04
204  17.00     0.10      0.066         0.024       ---          0.04
205  17.08     0.17      0.110         0.024       ---          0.09
206  17.17     0.17      0.110         0.024       ---          0.09
207  17.25     0.17      0.110         0.024       ---          0.09
208  17.33     0.17      0.110         0.024       ---          0.09
209  17.42     0.17      0.110         0.023       ---          0.09
210  17.50     0.17      0.110         0.023       ---          0.09
211  17.58     0.17      0.110         0.023       ---          0.09
212  17.67     0.17      0.110         0.023       ---          0.09
213  17.75     0.17      0.110         0.023       ---          0.09
214  17.83     0.13      0.088         0.023       ---          0.07
215  17.92     0.13      0.088         0.023       ---          0.07
216  18.00     0.13      0.088         0.023       ---          0.07
217  18.08     0.13      0.088         0.022       ---          0.07
218  18.17     0.13      0.088         0.022       ---          0.07
219  18.25     0.13      0.088         0.022       ---          0.07
220  18.33     0.13      0.088         0.022       ---          0.07
221  18.42     0.13      0.088         0.022       ---          0.07
222  18.50     0.13      0.088         0.022       ---          0.07
223  18.58     0.10      0.066         0.022       ---          0.04
224  18.67     0.10      0.066         0.022       ---          0.04
225  18.75     0.10      0.066         0.022       ---          0.04
226  18.83     0.07      0.044         0.022       ---          0.02
227  18.92     0.07      0.044         0.021       ---          0.02
228  19.00     0.07      0.044         0.021       ---          0.02
229  19.08     0.10      0.066         0.021       ---          0.04
230  19.17     0.10      0.066         0.021       ---          0.04
231  19.25     0.10      0.066         0.021       ---          0.04
232  19.33     0.13      0.088         0.021       ---          0.07
233  19.42     0.13      0.088         0.021       ---          0.07
234  19.50     0.13      0.088         0.021       ---          0.07
235  19.58     0.10      0.066         0.021       ---          0.05
236  19.67     0.10      0.066         0.021       ---          0.05
237  19.75     0.10      0.066         0.020       ---          0.05
```

```
238  19.83     0.07      0.044         0.020      ---          0.02
239  19.92     0.07      0.044         0.020      ---          0.02
240  20.00     0.07      0.044         0.020      ---          0.02
241  20.08     0.10      0.066         0.020      ---          0.05
242  20.17     0.10      0.066         0.020      ---          0.05
243  20.25     0.10      0.066         0.020      ---          0.05
244  20.33     0.10      0.066         0.020      ---          0.05
245  20.42     0.10      0.066         0.020      ---          0.05
246  20.50     0.10      0.066         0.020      ---          0.05
247  20.58     0.10      0.066         0.020      ---          0.05
248  20.67     0.10      0.066         0.020      ---          0.05
249  20.75     0.10      0.066         0.019      ---          0.05
250  20.83     0.07      0.044         0.019      ---          0.02
251  20.92     0.07      0.044         0.019      ---          0.02
252  21.00     0.07      0.044         0.019      ---          0.02
253  21.08     0.10      0.066         0.019      ---          0.05
254  21.17     0.10      0.066         0.019      ---          0.05
255  21.25     0.10      0.066         0.019      ---          0.05
256  21.33     0.07      0.044         0.019      ---          0.03
257  21.42     0.07      0.044         0.019      ---          0.03
258  21.50     0.07      0.044         0.019      ---          0.03
259  21.58     0.10      0.066         0.019      ---          0.05
260  21.67     0.10      0.066         0.019      ---          0.05
261  21.75     0.10      0.066         0.019      ---          0.05
262  21.83     0.07      0.044         0.018      ---          0.03
263  21.92     0.07      0.044         0.018      ---          0.03
264  22.00     0.07      0.044         0.018      ---          0.03
265  22.08     0.10      0.066         0.018      ---          0.05
266  22.17    0.10       0.066         0.018      ---          0.05
267  22.25     0.10      0.066         0.018      ---          0.05
268  22.33     0.07      0.044         0.018      ---          0.03
269  22.42     0.07      0.044         0.018      ---          0.03
270  22.50     0.07      0.044         0.018      ---          0.03
271  22.58     0.07      0.044         0.018      ---          0.03
272  22.67     0.07      0.044         0.018      ---          0.03
273  22.75     0.07      0.044         0.018      ---          0.03
274  22.83     0.07      0.044         0.018      ---          0.03
275  22.92     0.07      0.044         0.018      ---          0.03
276  23.00     0.07      0.044         0.018      ---          0.03
277  23.08     0.07      0.044         0.018      ---          0.03
278  23.17     0.07      0.044         0.018      ---          0.03
279  23.25     0.07      0.044         0.018      ---          0.03
280  23.33     0.07      0.044         0.018      ---          0.03
281  23.42     0.07      0.044         0.018      ---          0.03
282  23.50     0.07      0.044         0.018      ---          0.03
283  23.58     0.07      0.044         0.017      ---          0.03
284  23.67     0.07      0.044         0.017      ---          0.03
285  23.75     0.07      0.044         0.017      ---          0.03
286  23.83     0.07      0.044         0.017      ---          0.03
287  23.92     0.07      0.044         0.017      ---          0.03
288  24.00     0.07      0.044         0.017      ---          0.03
    Sum =     100.0                                   Sum =    56.1
     Flood volume = Effective rainfall      4.67(In)
      times area      27.2(Ac.)/[(In)/(Ft.)] =      10.6(Ac.Ft)
     Total soil loss =      0.83(In)
     Total soil loss =     1.879(Ac.Ft)
     Total rainfall =      5.50(In)
     Flood volume =      461188.9 Cubic Feet
     Total soil loss =       81830.3 Cubic Feet
     ------------------------------------------------------------------
```

```
--
       Peak flow rate of this hydrograph =     19.423(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        5.0      10.0      15.0
20.0

-----------------------------------------------------------------------
    0+ 5       0.0003      0.04  Q         |         |         |
|
    0+10       0.0010      0.11  Q         |         |         |
|
    0+15       0.0019      0.13  Q         |         |         |
|
    0+20       0.0028      0.13  Q         |         |         |
|
    0+25       0.0037      0.13  Q         |         |         |
|
    0+30       0.0047      0.14  Q         |         |         |
|
    0+35       0.0057      0.15  Q         |         |         |
|
    0+40       0.0067      0.15  Q         |         |         |
|
    0+45       0.0078      0.16  Q         |         |         |
|
    0+50       0.0100      0.32  Q         |         |         |
|
    0+55       0.0138      0.55  VQ        |         |         |
|
    1+ 0       0.0182      0.64  VQ        |         |         |
|
    1+ 5       0.0219      0.54  VQ        |         |         |
|
    1+10       0.0243      0.34  Q         |         |         |
|
    1+15       0.0263      0.29  Q         |         |         |
|
    1+20       0.0282      0.27  Q         |         |         |
|
    1+25       0.0300      0.26  Q         |         |         |
|
    1+30       0.0318      0.26  Q         |         |         |
|
    1+35       0.0335      0.26  Q         |         |         |
|
    1+40       0.0353      0.25  Q         |         |         |
|
    1+45       0.0370      0.25  Q         |         |         |
|
```

```
    1+50       0.0397     0.39  Q         |         |         |
|
    1+55       0.0440     0.63  VQ        |         |         |
|
    2+ 0       0.0489     0.71  VQ        |         |         |
|
    2+ 5       0.0542     0.76  VQ        |         |         |
|
    2+10       0.0597     0.80  VQ        |         |         |
|
    2+15       0.0654     0.83  VQ        |         |         |
|
    2+20       0.0712     0.85  VQ        |         |         |
|
    2+25       0.0772     0.87  VQ        |         |         |
|
    2+30       0.0833     0.89  VQ        |         |         |
|
    2+35       0.0905     1.05  V Q       |         |         |
|
    2+40       0.0994     1.29  V Q       |         |         |
|
    2+45       0.1088     1.37  V Q       |         |         |
|
    2+50       0.1186     1.42  V Q       |         |         |
|
    2+55       0.1287     1.46  V Q       |         |         |
|
    3+ 0       0.1389     1.49  V Q       |         |         |
|
    3+ 5       0.1493     1.51  V  Q      |         |         |
|
    3+10       0.1598     1.53  V  Q      |         |         |
|
    3+15       0.1704     1.54  V  Q      |         |         |
|
    3+20       0.1812     1.56  V  Q      |         |         |
|
    3+25       0.1920     1.57  V  Q      |         |         |
|
    3+30       0.2028     1.57  V  Q      |         |         |
|
    3+35       0.2137     1.58  V  Q      |         |         |
|
    3+40       0.2246     1.58  V  Q      |         |         |
|
    3+45       0.2356     1.59  V  Q      |         |         |
|
    3+50       0.2476     1.74  V  Q      |         |         |
|
    3+55       0.2612     1.98  V  Q      |         |         |
|
    4+ 0       0.2755     2.07  |V  Q     |         |         |
|
    4+ 5       0.2900     2.12  |V  Q     |         |         |
|
    4+10       0.3049     2.15  |V  Q     |         |         |
|
    4+15       0.3199     2.18  |V  Q     |         |         |
|
```

```
    4+20       0.3360      2.35  |V  Q     |         |         |
|
    4+25       0.3539      2.60  |V   Q    |         |         |
|
    4+30       0.3725      2.70  |V   Q    |         |         |
|
    4+35       0.3915      2.76  |V   Q    |         |         |
|
    4+40       0.4107      2.79  |V   Q    |         |         |
|
    4+45       0.4301      2.82  |V   Q    |         |         |
|
    4+50       0.4507      2.99  |V   Q    |         |         |
|
    4+55       0.4730      3.24  |V    Q   |         |         |
|
    5+ 0       0.4959      3.33  |V    Q   |         |         |
|
    5+ 5       0.5173      3.10  |V    Q   |         |         |
|
    5+10       0.5357      2.67  | V  Q    |         |         |
|
    5+15       0.5531      2.54  | V  Q    |         |         |
|
    5+20       0.5712      2.62  | V  Q    |         |         |
|
    5+25       0.5906      2.81  | V  Q    |         |         |
|
    5+30       0.6103      2.87  | V  Q    |         |         |
|
    5+35       0.6313      3.04  | V   Q   |         |         |
|
    5+40       0.6539      3.28  | V   Q   |         |         |
|
    5+45       0.6770      3.37  | V   Q   |         |         |
|
    5+50       0.7005      3.41  | V   Q   |         |         |
|
    5+55       0.7243      3.46  | V   Q   |         |         |
|
    6+ 0       0.7484      3.50  | V   Q   |         |         |
|
    6+ 5       0.7737      3.68  | V    Q  |         |         |
|
    6+10       0.8008      3.93  |  V   Q  |         |         |
|
    6+15       0.8285      4.02  |  V    Q |         |         |
|
    6+20       0.8566      4.08  |  V    Q |         |         |
|
    6+25       0.8850      4.12  |  V    Q |         |         |
|
    6+30       0.9135      4.14  |  V    Q |         |         |
|
    6+35       0.9432      4.31  |  V    Q |         |         |
|
    6+40       0.9746      4.56  |  V     Q|         |         |
|
    6+45       1.0067      4.66  |  V     Q|         |         |
|
```

```
    6+50       1.0392      4.72  |  V     Q|         |         |
|
    6+55       1.0719      4.75  |   V    Q|         |         |
|
    7+ 0       1.1048      4.78  |   V    Q|         |         |
|
    7+ 5       1.1379      4.80  |   V    Q|         |         |
|
    7+10       1.1711      4.82  |   V    Q|         |         |
|
    7+15       1.2044      4.84  |   V    Q|         |         |
|
    7+20       1.2389      5.00  |   V     Q         |         |
|
    7+25       1.2749      5.24  |   V     Q         |         |
|
    7+30       1.3116      5.32  |   V     Q         |         |
|
    7+35       1.3496      5.52  |    V    |Q        |         |
|
    7+40       1.3894      5.78  |    V    |Q        |         |
|
    7+45       1.4300      5.89  |    V    |Q        |         |
|
    7+50       1.4720      6.10  |    V    | Q       |         |
|
    7+55       1.5160      6.38  |    V    | Q       |         |
|
    8+ 0       1.5607      6.50  |    V    | Q       |         |
|
    8+ 5       1.6080      6.87  |     V   |  Q      |         |
|
    8+10       1.6588      7.38  |     V   |   Q     |         |
|
    8+15       1.7110      7.58  |     V   |    Q    |         |
|
    8+20       1.7640      7.70  |     V   |    Q    |         |
|
    8+25       1.8175      7.77  |     V   |    Q    |         |
|
    8+30       1.8715      7.83  |      V  |    Q    |         |
|
    8+35       1.9267      8.03  |      V  |     Q   |         |
|
    8+40       1.9838      8.29  |      V  |     Q   |         |
|
    8+45       2.0416      8.40  |      V  |     Q   |         |
|
    8+50       2.1010      8.61  |      V  |      Q  |         |
|
    8+55       2.1621      8.88  |       V |      Q  |         |
|
    9+ 0       2.2240      8.98  |       V |      Q  |         |
|
    9+ 5       2.2884      9.35  |       V |       Q |         |
|
    9+10       2.3562      9.85  |       V |        Q|         |
|
    9+15       2.4254     10.05  |        V|         Q         |
|
```

```
    9+20       2.4965     10.32  |        V|         Q         |
|
    9+25       2.5697     10.62  |        V|         |Q        |
|
    9+30       2.6438     10.76  |        V|         |Q        |
|
    9+35       2.7196     11.00  |         V         | Q       |
|
    9+40       2.7974     11.29  |         V         | Q       |
|
    9+45       2.8760     11.42  |         V         | Q       |
|
    9+50       2.9563     11.66  |         |V        |  Q      |
|
    9+55       3.0385     11.93  |         |V        |  Q      |
|
   10+ 0       3.1215     12.05  |         |V        |   Q     |
|
   10+ 5       3.1979     11.09  |         | V       | Q       |
|
   10+10       3.2635      9.53  |         | V      Q|         |
|
   10+15       3.3255      9.00  |         | V     Q |         |
|
   10+20       3.3856      8.73  |         | V    Q  |         |
|
   10+25       3.4444      8.54  |         |  V   Q  |         |
|
   10+30       3.5024      8.41  |         |  V  Q   |         |
|
   10+35       3.5647      9.05  |         |  V    Q |         |
|
   10+40       3.6344     10.12  |         |  V      Q         |
|
   10+45       3.7063     10.44  |         |   V     Q         |
|
   10+50       3.7793     10.59  |         |   V     |Q        |
|
   10+55       3.8533     10.74  |         |   V     |Q        |
|
   11+ 0       3.9280     10.85  |         |   V     |Q        |
|
   11+ 5       4.0023     10.79  |         |    V    |Q        |
|
   11+10       4.0755     10.63  |         |    V    |Q        |
|
   11+15       4.1486     10.61  |         |    V    |Q        |
|
   11+20       4.2218     10.63  |         |    V    |Q        |
|
   11+25       4.2948     10.60  |         |     V   |Q        |
|
   11+30       4.3677     10.58  |         |     V   |Q        |
|
   11+35       4.4385     10.28  |         |     V   Q         |
|
   11+40       4.5060      9.81  |         |      V Q|         |
|
   11+45       4.5724      9.64  |         |      V Q|         |
|
```

```
   11+50       4.6392      9.69  |         |      V Q|         |
|
   11+55       4.7072      9.87  |         |      V Q|         |
|
   12+ 0       4.7755      9.92  |         |       VQ|         |
|
   12+ 5       4.8510     10.96  |         |       V |Q        |
|
   12+10       4.9377     12.58  |         |       V |    Q    |
|
   12+15       5.0282     13.15  |         |       V |     Q   |
|
   12+20       5.1219     13.60  |         |        V|      Q  |
|
   12+25       5.2187     14.05  |         |        V|       Q |
|
   12+30       5.3171     14.30  |         |         V       Q |
|
   12+35       5.4188     14.77  |         |         V        Q|
|
   12+40       5.5246     15.35  |         |         V         Q
|
   12+45       5.6321     15.62  |         |         |V        |Q
|
   12+50       5.7419     15.95  |         |         |V        |Q
|
   12+55       5.8538     16.25  |         |         | V       | Q
|
   13+ 0       5.9667     16.39  |         |         | V       | Q
|
   13+ 5       6.0853     17.22  |         |         | V       |   Q
|
   13+10       6.2122     18.43  |         |         |  V      |     Q
|
   13+15       6.3422     18.88  |         |         |  V      |      Q
|
   13+20       6.4741     19.14  |         |         |   V     |       Q
|
   13+25       6.6070     19.30  |         |         |   V     |       Q
|
   13+30       6.7408     19.42  |         |         |    V    |       Q
|
   13+35       6.8640     17.90  |         |         |    V    |    Q
|
   13+40       6.9703     15.43  |         |         |     V   Q
|
   13+45       7.0709     14.61  |         |         |     V  Q|
|
   13+50       7.1685     14.18  |         |         |      VQ |
|
   13+55       7.2641     13.87  |         |         |      Q  |
|
   14+ 0       7.3580     13.64  |         |         |      Q  |
|
   14+ 5       7.4548     14.06  |         |         |       Q |
|
   14+10       7.5570     14.84  |         |         |       VQ|
|
   14+15       7.6606     15.04  |         |         |       V Q
|
```

```
   14+20       7.7636     14.96  |         |         |        Q|
|
   14+25       7.8658     14.84  |         |         |        Q|
|
   14+30       7.9681     14.85  |         |         |        QV
|
   14+35       8.0706     14.88  |         |         |        QV
|
   14+40       8.1732     14.90  |         |         |        QV
|
   14+45       8.2761     14.93  |         |         |        Q|V
|
   14+50       8.3781     14.81  |         |         |        Q|V
|
   14+55       8.4785     14.58  |         |         |        Q| V
|
   15+ 0       8.5783     14.49  |         |         |       Q | V
|
   15+ 5       8.6767     14.29  |         |         |       Q | V
|
   15+10       8.7733     14.03  |         |         |       Q |  V
|
   15+15       8.8693     13.94  |         |         |      Q  |  V
|
   15+20       8.9639     13.73  |         |         |      Q  |  V
|
   15+25       9.0566     13.46  |         |         |     Q   |   V
|
   15+30       9.1486     13.36  |         |         |     Q   |   V
|
   15+35       9.2360     12.70  |         |         |    Q    |   V
|
   15+40       9.3169     11.74  |         |         |  Q      |    V
|
   15+45       9.3953     11.39  |         |         | Q       |    V
|
   15+50       9.4724     11.19  |         |         | Q       |    V
|
   15+55       9.5486     11.07  |         |         | Q       |     V
|
   16+ 0       9.6241     10.97  |         |         |Q        |     V
|
   16+ 5       9.6840      8.68  |         |      Q  |         |     V
|
   16+10       9.7197      5.18  |         Q         |         |     V
|
   16+15       9.7468      3.94  |      Q  |         |         |     V
|
   16+20       9.7690      3.24  |     Q   |         |         |     V
|
   16+25       9.7884      2.81  |    Q    |         |         |     V
|
   16+30       9.8056      2.50  |   Q     |         |         |      V
|
   16+35       9.8201      2.11  |   Q     |         |         |      V
|
   16+40       9.8317      1.69  |  Q      |         |         |      V
|
   16+45       9.8417      1.44  | Q       |         |         |      V
|
```

```
   16+50       9.8502      1.24  | Q       |         |         |      V
|
   16+55       9.8586      1.21  | Q       |         |         |      V
|
   17+ 0       9.8668      1.20  | Q       |         |         |      V
|
   17+ 5       9.8770      1.48  | Q       |         |         |      V
|
   17+10       9.8903      1.93  |  Q      |         |         |      V
|
   17+15       9.9046      2.08  |   Q     |         |         |      V
|
   17+20       9.9195      2.16  |   Q     |         |         |      V
|
   17+25       9.9348      2.22  |   Q     |         |         |      V
|
   17+30       9.9504      2.27  |   Q     |         |         |      V
|
   17+35       9.9663      2.31  |   Q     |         |         |      V
|
   17+40       9.9824      2.33  |   Q     |         |         |      V
|
   17+45       9.9987      2.36  |   Q     |         |         |      V
|
   17+50      10.0141      2.24  |   Q     |         |         |      V
|
   17+55      10.0279      2.01  |   Q     |         |         |      V
|
   18+ 0      10.0412      1.93  |  Q      |         |         |      V
|
   18+ 5      10.0542      1.89  |  Q      |         |         |      V
|
   18+10      10.0671      1.87  |  Q      |         |         |       V
|
   18+15      10.0798      1.85  |  Q      |         |         |       V
|
   18+20      10.0925      1.83  |  Q      |         |         |       V
|
   18+25      10.1050      1.82  |  Q      |         |         |       V
|
   18+30      10.1175      1.82  |  Q      |         |         |       V
|
   18+35      10.1290      1.66  |  Q      |         |         |       V
|
   18+40      10.1388      1.43  | Q       |         |         |       V
|
   18+45      10.1482      1.36  | Q       |         |         |       V
|
   18+50      10.1562      1.17  | Q       |         |         |       V
|
   18+55      10.1625      0.91  |Q        |         |         |       V
|
   19+ 0      10.1681      0.81  |Q        |         |         |       V
|
   19+ 5      10.1743      0.90  |Q        |         |         |       V
|
   19+10      10.1819      1.09  | Q       |         |         |       V
|
   19+15      10.1897      1.14  | Q       |         |         |       V
|
```

```
     19+20      10.1988      1.31  | Q        |         |         |       V
|
     19+25      10.2095      1.56  |  Q       |         |         |       V
|
     19+30      10.2209      1.65  |  Q       |         |         |       V
|
     19+35      10.2317      1.56  |  Q       |         |         |       V
|
     19+40      10.2411      1.37  | Q        |         |         |       V
|
     19+45      10.2502      1.33  | Q        |         |         |       V
|
     19+50      10.2583      1.17  | Q        |         |         |       V
|
     19+55      10.2646      0.92  |Q         |         |         |       V
|
     20+ 0      10.2704      0.83  |Q         |         |         |       V
|
     20+ 5      10.2768      0.93  |Q         |         |         |       V
|
     20+10      10.2846      1.13  | Q        |         |         |       V
|
     20+15      10.2927      1.18  | Q        |         |         |       V
|
     20+20      10.3009      1.20  | Q        |         |         |       V
|
     20+25      10.3092      1.21  | Q        |         |         |       V
|
     20+30      10.3177      1.23  | Q        |         |         |       V
|
     20+35      10.3262      1.23  | Q        |         |         |
V|
     20+40      10.3348      1.25  | Q        |         |         |
V|
     20+45      10.3435      1.26  | Q        |         |         |
V|
     20+50      10.3512      1.13  | Q        |         |         |
V|
     20+55      10.3574      0.90  |Q         |         |         |
V|
     21+ 0      10.3631      0.82  |Q         |         |         |
V|
     21+ 5      10.3695      0.93  |Q         |         |         |
V|
     21+10      10.3773      1.13  | Q        |         |         |
V|
     21+15      10.3855      1.19  | Q        |         |         |
V|
     21+20      10.3929      1.07  | Q        |         |         |
V|
     21+25      10.3988      0.86  |Q         |         |         |
V|
     21+30      10.4043      0.79  |Q         |         |         |
V|
     21+35      10.4105      0.90  |Q         |         |         |
V|
     21+40      10.4182      1.12  | Q        |         |         |
V|
     21+45      10.4265      1.19  | Q        |         |         |
V|
```

```
   21+50      10.4339      1.09  | Q       |         |         |
V|
   21+55      10.4400      0.87  |Q        |         |         |
V|
   22+ 0      10.4455      0.80  |Q        |         |         |
V|
   22+ 5      10.4518      0.92  |Q        |         |         |
V|
   22+10      10.4596      1.13  | Q       |         |         |
V|
   22+15      10.4679      1.20  | Q       |         |         |
V|
   22+20      10.4754      1.10  | Q       |         |         |
V|
   22+25      10.4815      0.88  |Q        |         |         |
V|
   22+30      10.4871      0.81  |Q        |         |         |
V|
   22+35      10.4925      0.78  |Q        |         |         |
V|
   22+40      10.4977      0.76  |Q        |         |         |
V|
   22+45      10.5029      0.76  |Q        |         |         |
V|
   22+50      10.5081      0.75  |Q        |         |         |
V|
   22+55      10.5132      0.74  |Q        |         |         |
V|
   23+ 0      10.5182      0.73  |Q        |         |         |
V|
   23+ 5      10.5232      0.72  |Q        |         |         |
V|
   23+10      10.5281      0.72  |Q        |         |         |
V|
   23+15      10.5331      0.72  |Q        |         |         |
V|
   23+20      10.5381      0.72  |Q        |         |         |
V|
   23+25      10.5431      0.72  |Q        |         |         |
V|
   23+30      10.5481      0.72  |Q        |         |         |
V|
   23+35      10.5531      0.73  |Q        |         |         |
V|
   23+40      10.5581      0.73  |Q        |         |         |
V|
   23+45      10.5631      0.73  |Q        |         |         |
V|
   23+50      10.5681      0.73  |Q        |         |         |
V|
   23+55      10.5731      0.73  |Q        |         |         |
V|
   24+ 0      10.5781      0.73  |Q        |         |         |
V|
   24+ 5      10.5819      0.55  |Q        |         |         |
V|
   24+10      10.5838      0.27  Q         |         |         |
V|
   24+15      10.5850      0.18  Q         |         |         |
V|
```

```
    24+20      10.5858      0.12  Q          |          |          |
V|
    24+25      10.5865      0.09  Q          |          |          |
V|
    24+30      10.5869      0.06  Q          |          |          |
V|
    24+35      10.5872      0.04  Q          |          |          |
V|
    24+40      10.5874      0.03  Q          |          |          |
V|
    24+45      10.5874      0.01  Q          |          |          |
V|
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: area1post24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Area 1 Post Landfill
      Badlands Landfill
      100 Year 24 Hour Storm Event

      ------------------------------------------------------------------
--
      Drainage Area =     102.40(Ac.)  =      0.160 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =     102.40(Ac.)  =
0.160 Sq. Mi.
      Length along longest watercourse =    4764.00(Ft.)
      Length along longest watercourse measured to centroid =    2286.00
(Ft.)
      Length along longest watercourse =      0.902 Mi.
      Length along longest watercourse measured to centroid =      0.433
Mi.
      Difference in elevation =     480.00(Ft.)
      Slope along watercourse =    531.9899 Ft./Mi.
      Average Manning's 'N' = 0.020
      Lag time =    0.102 Hr.
      Lag time =     6.11 Min.
      25% of lag time =     1.53 Min.
      40% of lag time =     2.45 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
            102.40              2.00                  204.80

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
            102.40              5.50                  563.20

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.98 %
      Adjusted average point rain =    5.499(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
         102.400           93.00         0.100
       Total Area Entered =    102.40(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.100        0.033       1.000
0.033
                                                          Sum (F) =
0.033
      Area averaged mean soil loss (F) (In/Hr) =  0.033
      Minimum soil loss rate ((In/Hr)) =  0.017
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.820
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %          (CFS)
      ------------------------------------------------------------------
---
          1   0.083          81.775          9.380              9.680
          2   0.167         163.551         49.451             51.034
          3   0.250         245.326         23.781             24.542
          4   0.333         327.102          9.524              9.828
          5   0.417         408.877          4.667              4.816
          6   0.500         490.652          1.675              1.729
          7   0.583         572.428          0.716              0.739
          8   0.667         654.203          0.541              0.559
          9   0.750         735.979          0.266              0.274
                                    Sum = 100.000   Sum=     103.200
-----------------------------------------------------------------------
```

```
Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
     (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
 1   0.08     0.07      0.044         0.059     0.036         0.01
 2   0.17     0.07      0.044         0.058     0.036         0.01
 3   0.25     0.07      0.044         0.058     0.036         0.01
 4   0.33     0.10      0.066         0.058      ---          0.01
 5   0.42     0.10      0.066         0.058      ---          0.01
 6   0.50     0.10      0.066         0.058      ---          0.01
 7   0.58     0.10      0.066         0.057      ---          0.01
 8   0.67     0.10      0.066         0.057      ---          0.01
 9   0.75     0.10      0.066         0.057      ---          0.01
10   0.83     0.13      0.088         0.057      ---          0.03
11   0.92     0.13      0.088         0.056      ---          0.03
12   1.00     0.13      0.088         0.056      ---          0.03
13   1.08     0.10      0.066         0.056      ---          0.01
14   1.17     0.10      0.066         0.056      ---          0.01
15   1.25     0.10      0.066         0.056      ---          0.01
16   1.33     0.10      0.066         0.055      ---          0.01
17   1.42     0.10      0.066         0.055      ---          0.01
18   1.50     0.10      0.066         0.055      ---          0.01
19   1.58     0.10      0.066         0.055      ---          0.01
20   1.67     0.10      0.066         0.054      ---          0.01
21   1.75     0.10      0.066         0.054      ---          0.01
22   1.83     0.13      0.088         0.054      ---          0.03
23   1.92     0.13      0.088         0.054      ---          0.03
24   2.00     0.13      0.088         0.054      ---          0.03
25   2.08     0.13      0.088         0.053      ---          0.03
26   2.17     0.13      0.088         0.053      ---          0.03
27   2.25     0.13      0.088         0.053      ---          0.04
28   2.33     0.13      0.088         0.053      ---          0.04
29   2.42     0.13      0.088         0.053      ---          0.04
30   2.50     0.13      0.088         0.052      ---          0.04
31   2.58     0.17      0.110         0.052      ---          0.06
32   2.67     0.17      0.110         0.052      ---          0.06
33   2.75     0.17      0.110         0.052      ---          0.06
34   2.83     0.17      0.110         0.051      ---          0.06
35   2.92     0.17      0.110         0.051      ---          0.06
36   3.00     0.17      0.110         0.051      ---          0.06
37   3.08     0.17      0.110         0.051      ---          0.06
38   3.17     0.17      0.110         0.051      ---          0.06
39   3.25     0.17      0.110         0.050      ---          0.06
40   3.33     0.17      0.110         0.050      ---          0.06
41   3.42     0.17      0.110         0.050      ---          0.06
42   3.50     0.17      0.110         0.050      ---          0.06
43   3.58     0.17      0.110         0.050      ---          0.06
44   3.67     0.17      0.110         0.049      ---          0.06
45   3.75     0.17      0.110         0.049      ---          0.06
46   3.83     0.20      0.132         0.049      ---          0.08
47   3.92     0.20      0.132         0.049      ---          0.08
48   4.00     0.20      0.132         0.049      ---          0.08
49   4.08     0.20      0.132         0.048      ---          0.08
50   4.17     0.20      0.132         0.048      ---          0.08
51   4.25     0.20      0.132         0.048      ---          0.08
52   4.33     0.23      0.154         0.048      ---          0.11
53   4.42     0.23      0.154         0.048      ---          0.11
54   4.50     0.23      0.154         0.047      ---          0.11
55   4.58     0.23      0.154         0.047      ---          0.11
56   4.67     0.23      0.154         0.047      ---          0.11
57   4.75     0.23      0.154         0.047      ---          0.11
58   4.83     0.27      0.176         0.046      ---          0.13
```

59	4.92	0.27	0.176	0.046	---	0.13
60	5.00	0.27	0.176	0.046	---	0.13
61	5.08	0.20	0.132	0.046	---	0.09
62	5.17	0.20	0.132	0.046	---	0.09
63	5.25	0.20	0.132	0.045	---	0.09
64	5.33	0.23	0.154	0.045	---	0.11
65	5.42	0.23	0.154	0.045	---	0.11
66	5.50	0.23	0.154	0.045	---	0.11
67	5.58	0.27	0.176	0.045	---	0.13
68	5.67	0.27	0.176	0.045	---	0.13
69	5.75	0.27	0.176	0.044	---	0.13
70	5.83	0.27	0.176	0.044	---	0.13
71	5.92	0.27	0.176	0.044	---	0.13
72	6.00	0.27	0.176	0.044	---	0.13
73	6.08	0.30	0.198	0.044	---	0.15
74	6.17	0.30	0.198	0.043	---	0.15
75	6.25	0.30	0.198	0.043	---	0.15
76	6.33	0.30	0.198	0.043	---	0.16
77	6.42	0.30	0.198	0.043	---	0.16
78	6.50	0.30	0.198	0.043	---	0.16
79	6.58	0.33	0.220	0.042	---	0.18
80	6.67	0.33	0.220	0.042	---	0.18
81	6.75	0.33	0.220	0.042	---	0.18
82	6.83	0.33	0.220	0.042	---	0.18
83	6.92	0.33	0.220	0.042	---	0.18
84	7.00	0.33	0.220	0.041	---	0.18
85	7.08	0.33	0.220	0.041	---	0.18
86	7.17	0.33	0.220	0.041	---	0.18
87	7.25	0.33	0.220	0.041	---	0.18
88	7.33	0.37	0.242	0.041	---	0.20
89	7.42	0.37	0.242	0.040	---	0.20
90	7.50	0.37	0.242	0.040	---	0.20
91	7.58	0.40	0.264	0.040	---	0.22
92	7.67	0.40	0.264	0.040	---	0.22
93	7.75	0.40	0.264	0.040	---	0.22
94	7.83	0.43	0.286	0.040	---	0.25
95	7.92	0.43	0.286	0.039	---	0.25
96	8.00	0.43	0.286	0.039	---	0.25
97	8.08	0.50	0.330	0.039	---	0.29
98	8.17	0.50	0.330	0.039	---	0.29
99	8.25	0.50	0.330	0.039	---	0.29
100	8.33	0.50	0.330	0.038	---	0.29
101	8.42	0.50	0.330	0.038	---	0.29
102	8.50	0.50	0.330	0.038	---	0.29
103	8.58	0.53	0.352	0.038	---	0.31
104	8.67	0.53	0.352	0.038	---	0.31
105	8.75	0.53	0.352	0.038	---	0.31
106	8.83	0.57	0.374	0.037	---	0.34
107	8.92	0.57	0.374	0.037	---	0.34
108	9.00	0.57	0.374	0.037	---	0.34
109	9.08	0.63	0.418	0.037	---	0.38
110	9.17	0.63	0.418	0.037	---	0.38
111	9.25	0.63	0.418	0.037	---	0.38
112	9.33	0.67	0.440	0.036	---	0.40
113	9.42	0.67	0.440	0.036	---	0.40
114	9.50	0.67	0.440	0.036	---	0.40
115	9.58	0.70	0.462	0.036	---	0.43
116	9.67	0.70	0.462	0.036	---	0.43
117	9.75	0.70	0.462	0.035	---	0.43
118	9.83	0.73	0.484	0.035	---	0.45

```
119   9.92     0.73      0.484         0.035      ---          0.45
120  10.00     0.73      0.484         0.035      ---          0.45
121  10.08     0.50      0.330         0.035      ---          0.30
122  10.17     0.50      0.330         0.035      ---          0.30
123  10.25     0.50      0.330         0.034      ---          0.30
124  10.33     0.50      0.330         0.034      ---          0.30
125  10.42     0.50      0.330         0.034      ---          0.30
126  10.50     0.50      0.330         0.034      ---          0.30
127  10.58     0.67      0.440         0.034      ---          0.41
128  10.67     0.67      0.440         0.034      ---          0.41
129  10.75     0.67      0.440         0.033      ---          0.41
130  10.83     0.67      0.440         0.033      ---          0.41
131  10.92     0.67      0.440         0.033      ---          0.41
132  11.00     0.67      0.440         0.033      ---          0.41
133  11.08     0.63      0.418         0.033      ---          0.39
134  11.17     0.63      0.418         0.033      ---          0.39
135  11.25     0.63      0.418         0.033      ---          0.39
136  11.33     0.63      0.418         0.032      ---          0.39
137  11.42     0.63      0.418         0.032      ---          0.39
138  11.50     0.63      0.418         0.032      ---          0.39
139  11.58     0.57      0.374         0.032      ---          0.34
140  11.67     0.57      0.374         0.032      ---          0.34
141  11.75     0.57      0.374         0.032      ---          0.34
142  11.83     0.60      0.396         0.031      ---          0.36
143  11.92     0.60      0.396         0.031      ---          0.36
144  12.00     0.60      0.396         0.031      ---          0.36
145  12.08     0.83      0.550         0.031      ---          0.52
146  12.17     0.83      0.550         0.031      ---          0.52
147  12.25     0.83      0.550         0.031      ---          0.52
148  12.33     0.87      0.572         0.030      ---          0.54
149  12.42     0.87      0.572         0.030      ---          0.54
150  12.50     0.87      0.572         0.030      ---          0.54
151  12.58     0.93      0.616         0.030      ---          0.59
152  12.67     0.93      0.616         0.030      ---          0.59
153  12.75     0.93      0.616         0.030      ---          0.59
154  12.83     0.97      0.638         0.030      ---          0.61
155  12.92     0.97      0.638         0.029      ---          0.61
156  13.00     0.97      0.638         0.029      ---          0.61
157  13.08     1.13      0.748         0.029      ---          0.72
158  13.17     1.13      0.748         0.029      ---          0.72
159  13.25     1.13      0.748         0.029      ---          0.72
160  13.33     1.13      0.748         0.029      ---          0.72
161  13.42     1.13      0.748         0.029      ---          0.72
162  13.50     1.13      0.748         0.028      ---          0.72
163  13.58     0.77      0.506         0.028      ---          0.48
164  13.67     0.77      0.506         0.028      ---          0.48
165  13.75     0.77      0.506         0.028      ---          0.48
166  13.83     0.77      0.506         0.028      ---          0.48
167  13.92     0.77      0.506         0.028      ---          0.48
168  14.00     0.77      0.506         0.028      ---          0.48
169  14.08     0.90      0.594         0.027      ---          0.57
170  14.17     0.90      0.594         0.027      ---          0.57
171  14.25     0.90      0.594         0.027      ---          0.57
172  14.33     0.87      0.572         0.027      ---          0.54
173  14.42     0.87      0.572         0.027      ---          0.55
174  14.50     0.87      0.572         0.027      ---          0.55
175  14.58     0.87      0.572         0.027      ---          0.55
176  14.67     0.87      0.572         0.026      ---          0.55
177  14.75     0.87      0.572         0.026      ---          0.55
178  14.83     0.83      0.550         0.026      ---          0.52
```

```
179  14.92     0.83      0.550         0.026       ---          0.52
180  15.00     0.83      0.550         0.026       ---          0.52
181  15.08     0.80      0.528         0.026       ---          0.50
182  15.17     0.80      0.528         0.026       ---          0.50
183  15.25     0.80      0.528         0.025       ---          0.50
184  15.33     0.77      0.506         0.025       ---          0.48
185  15.42     0.77      0.506         0.025       ---          0.48
186  15.50     0.77      0.506         0.025       ---          0.48
187  15.58     0.63      0.418         0.025       ---          0.39
188  15.67     0.63      0.418         0.025       ---          0.39
189  15.75     0.63      0.418         0.025       ---          0.39
190  15.83     0.63      0.418         0.025       ---          0.39
191  15.92     0.63      0.418         0.024       ---          0.39
192  16.00     0.63      0.418         0.024       ---          0.39
193  16.08     0.13      0.088         0.024       ---          0.06
194  16.17     0.13      0.088         0.024       ---          0.06
195  16.25     0.13      0.088         0.024       ---          0.06
196  16.33     0.13      0.088         0.024       ---          0.06
197  16.42     0.13      0.088         0.024       ---          0.06
198  16.50     0.13      0.088         0.024       ---          0.06
199  16.58     0.10      0.066         0.023       ---          0.04
200  16.67     0.10      0.066         0.023       ---          0.04
201  16.75     0.10      0.066         0.023       ---          0.04
202  16.83     0.10      0.066         0.023       ---          0.04
203  16.92     0.10      0.066         0.023       ---          0.04
204  17.00     0.10      0.066         0.023       ---          0.04
205  17.08     0.17      0.110         0.023       ---          0.09
206  17.17     0.17      0.110         0.023       ---          0.09
207  17.25     0.17      0.110         0.023       ---          0.09
208  17.33     0.17      0.110         0.022       ---          0.09
209  17.42     0.17      0.110         0.022       ---          0.09
210  17.50     0.17      0.110         0.022       ---          0.09
211  17.58     0.17      0.110         0.022       ---          0.09
212  17.67     0.17      0.110         0.022       ---          0.09
213  17.75     0.17      0.110         0.022       ---          0.09
214  17.83     0.13      0.088         0.022       ---          0.07
215  17.92     0.13      0.088         0.022       ---          0.07
216  18.00     0.13      0.088         0.022       ---          0.07
217  18.08     0.13      0.088         0.021       ---          0.07
218  18.17     0.13      0.088         0.021       ---          0.07
219  18.25     0.13      0.088         0.021       ---          0.07
220  18.33     0.13      0.088         0.021       ---          0.07
221  18.42     0.13      0.088         0.021       ---          0.07
222  18.50     0.13      0.088         0.021       ---          0.07
223  18.58     0.10      0.066         0.021       ---          0.05
224  18.67     0.10      0.066         0.021       ---          0.05
225  18.75     0.10      0.066         0.021       ---          0.05
226  18.83     0.07      0.044         0.021       ---          0.02
227  18.92     0.07      0.044         0.020       ---          0.02
228  19.00     0.07      0.044         0.020       ---          0.02
229  19.08     0.10      0.066         0.020       ---          0.05
230  19.17     0.10      0.066         0.020       ---          0.05
231  19.25     0.10      0.066         0.020       ---          0.05
232  19.33     0.13      0.088         0.020       ---          0.07
233  19.42     0.13      0.088         0.020       ---          0.07
234  19.50     0.13      0.088         0.020       ---          0.07
235  19.58     0.10      0.066         0.020       ---          0.05
236  19.67     0.10      0.066         0.020       ---          0.05
237  19.75     0.10      0.066         0.019       ---          0.05
238  19.83     0.07      0.044         0.019       ---          0.02
```

```
 239  19.92     0.07      0.044         0.019      ---          0.02
 240  20.00     0.07      0.044         0.019      ---          0.02
 241  20.08     0.10      0.066         0.019      ---          0.05
 242  20.17     0.10      0.066         0.019      ---          0.05
 243  20.25     0.10      0.066         0.019      ---          0.05
 244  20.33     0.10      0.066         0.019      ---          0.05
 245  20.42     0.10      0.066         0.019      ---          0.05
 246  20.50     0.10      0.066         0.019      ---          0.05
 247  20.58     0.10      0.066         0.019      ---          0.05
 248  20.67     0.10      0.066         0.019      ---          0.05
 249  20.75     0.10      0.066         0.019      ---          0.05
 250  20.83     0.07      0.044         0.018      ---          0.03
 251  20.92     0.07      0.044         0.018      ---          0.03
 252  21.00     0.07      0.044         0.018      ---          0.03
 253  21.08     0.10      0.066         0.018      ---          0.05
 254  21.17     0.10      0.066         0.018      ---          0.05
 255  21.25     0.10      0.066         0.018      ---          0.05
 256  21.33     0.07      0.044         0.018      ---          0.03
 257  21.42     0.07      0.044         0.018      ---          0.03
 258  21.50     0.07      0.044         0.018      ---          0.03
 259  21.58     0.10      0.066         0.018      ---          0.05
 260  21.67     0.10      0.066         0.018      ---          0.05
 261  21.75     0.10      0.066         0.018      ---          0.05
 262  21.83     0.07      0.044         0.018      ---          0.03
 263  21.92     0.07      0.044         0.018      ---          0.03
 264  22.00     0.07      0.044         0.017      ---          0.03
 265  22.08     0.10      0.066         0.017      ---          0.05
 266  22.17     0.10      0.066         0.017      ---          0.05
 267  22.25     0.10      0.066         0.017      ---          0.05
 268  22.33     0.07      0.044         0.017      ---          0.03
 269  22.42     0.07      0.044         0.017      ---          0.03
 270  22.50     0.07      0.044         0.017      ---          0.03
 271  22.58     0.07      0.044         0.017      ---          0.03
 272  22.67     0.07      0.044         0.017      ---          0.03
 273  22.75     0.07      0.044         0.017      ---          0.03
 274  22.83     0.07      0.044         0.017      ---          0.03
 275  22.92     0.07      0.044         0.017      ---          0.03
 276  23.00     0.07      0.044         0.017      ---          0.03
 277  23.08     0.07      0.044         0.017      ---          0.03
 278  23.17     0.07      0.044         0.017      ---          0.03
 279  23.25     0.07      0.044         0.017      ---          0.03
 280  23.33     0.07      0.044         0.017      ---          0.03
 281  23.42     0.07      0.044         0.017      ---          0.03
 282  23.50     0.07      0.044         0.017      ---          0.03
 283  23.58     0.07      0.044         0.017      ---          0.03
 284  23.67     0.07      0.044         0.017      ---          0.03
 285  23.75     0.07      0.044         0.017      ---          0.03
 286  23.83     0.07      0.044         0.017      ---          0.03
 287  23.92     0.07      0.044         0.017      ---          0.03
 288  24.00     0.07      0.044         0.017      ---          0.03
     Sum =     100.0                                 Sum =    56.5
      Flood volume = Effective rainfall      4.71(In)
       times area     102.4(Ac.)/[(In)/(Ft.)] =      40.2(Ac.Ft)
      Total soil loss =      0.79(In)
      Total soil loss =     6.739(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     1750454.8 Cubic Feet
      Total soil loss =      293552.3 Cubic Feet
      ------------------------------------------------------------------
--
```

```
       Peak flow rate of this hydrograph =     74.091(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R   S T O R M
                     R u n o f f     H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       20.0      40.0      60.0
80.0

-----------------------------------------------------------------------
    0+ 5       0.0005      0.08  Q          |         |         |
|
    0+10       0.0038      0.48  Q          |         |         |
|
    0+15       0.0085      0.68  Q          |         |         |
|
    0+20       0.0137      0.75  Q          |         |         |
|
    0+25       0.0192      0.80  Q          |         |         |
|
    0+30       0.0248      0.82  Q          |         |         |
|
    0+35       0.0307      0.85  Q          |         |         |
|
    0+40       0.0367      0.87  Q          |         |         |
|
    0+45       0.0429      0.90  Q          |         |         |
|
    0+50       0.0507      1.14  Q          |         |         |
|
    0+55       0.0664      2.28  VQ         |         |         |
|
    1+ 0       0.0860      2.84  VQ         |         |         |
|
    1+ 5       0.1058      2.87  VQ         |         |         |
|
    1+10       0.1187      1.88  Q          |         |         |
|
    1+15       0.1283      1.40  Q          |         |         |
|
    1+20       0.1367      1.22  Q          |         |         |
|
    1+25       0.1447      1.15  Q          |         |         |
|
    1+30       0.1525      1.14  Q          |         |         |
|
    1+35       0.1604      1.15  Q          |         |         |
|
    1+40       0.1684      1.16  Q          |         |         |
|
    1+45       0.1765      1.17  Q          |         |         |
|
    1+50       0.1862      1.41  Q          |         |         |
```

```
|
    1+55       0.2038      2.56  VQ         |         |         |
|
    2+ 0       0.2252      3.12  VQ         |         |         |
|
    2+ 5       0.2484      3.36  VQ         |         |         |
|
    2+10       0.2724      3.48  VQ         |         |         |
|
    2+15       0.2968      3.55  VQ         |         |         |
|
    2+20       0.3215      3.58  VQ         |         |         |
|
    2+25       0.3464      3.62  VQ         |         |         |
|
    2+30       0.3715      3.65  VQ         |         |         |
|
    2+35       0.3982      3.88  VQ         |         |         |
|
    2+40       0.4329      5.03  V Q        |         |         |
|
    2+45       0.4713      5.59  V Q        |         |         |
|
    2+50       0.5115      5.83  V Q        |         |         |
|
    2+55       0.5525      5.96  V Q        |         |         |
|
    3+ 0       0.5939      6.02  V  Q       |         |         |
|
    3+ 5       0.6356      6.05  V  Q       |         |         |
|
    3+10       0.6775      6.09  V  Q       |         |         |
|
    3+15       0.7197      6.12  V  Q       |         |         |
|
    3+20       0.7619      6.14  V  Q       |         |         |
|
    3+25       0.8044      6.16  V  Q       |         |         |
|
    3+30       0.8469      6.18  V  Q       |         |         |
|
    3+35       0.8896      6.20  V  Q       |         |         |
|
    3+40       0.9325      6.22  V  Q       |         |         |
|
    3+45       0.9755      6.25  V  Q       |         |         |
|
    3+50       1.0202      6.48  |V Q       |         |         |
|
    3+55       1.0727      7.62  |V Q       |         |         |
|
    4+ 0       1.1290      8.19  |V  Q      |         |         |
|
    4+ 5       1.1871      8.42  |V  Q      |         |         |
|
    4+10       1.2460      8.55  |V  Q      |         |         |
|
    4+15       1.3053      8.61  |V  Q      |         |         |
|
    4+20       1.3663      8.86  |V  Q      |         |         |
```

```
|
    4+25       1.4353     10.02  |V   Q    |         |         |
|
    4+30       1.5082     10.58  |V   Q    |         |         |
|
    4+35       1.5827     10.82  |V   Q    |         |         |
|
    4+40       1.6581     10.95  |V   Q    |         |         |
|
    4+45       1.7339     11.01  |V   Q    |         |         |
|
    4+50       1.8114     11.26  |V   Q    |         |         |
|
    4+55       1.8969     12.41  |V    Q   |         |         |
|
    5+ 0       1.9863     12.98  |V    Q   |         |         |
|
    5+ 5       2.0744     12.79  | V   Q   |         |         |
|
    5+10       2.1479     10.67  | V  Q    |         |         |
|
    5+15       2.2144      9.65  | V Q     |         |         |
|
    5+20       2.2796      9.47  | V Q     |         |         |
|
    5+25       2.3513     10.41  | V  Q    |         |         |
|
    5+30       2.4264     10.90  | V  Q    |         |         |
|
    5+35       2.5044     11.32  | V  Q    |         |         |
|
    5+40       2.5908     12.54  | V   Q   |         |         |
|
    5+45       2.6812     13.13  | V   Q   |         |         |
|
    5+50       2.7734     13.38  | V   Q   |         |         |
|
    5+55       2.8665     13.52  | V   Q   |         |         |
|
    6+ 0       2.9601     13.59  | V   Q   |         |         |
|
    6+ 5       3.0554     13.84  |  V  Q   |         |         |
|
    6+10       3.1586     14.99  |  V   Q  |         |         |
|
    6+15       3.2658     15.56  |  V   Q  |         |         |
|
    6+20       3.3746     15.79  |  V   Q  |         |         |
|
    6+25       3.4842     15.92  |  V   Q  |         |         |
|
    6+30       3.5943     15.98  |  V   Q  |         |         |
|
    6+35       3.7060     16.23  |  V    Q |         |         |
|
    6+40       3.8257     17.38  |  V    Q |         |         |
|
    6+45       3.9493     17.95  |  V    Q |         |         |
|
    6+50       4.0746     18.18  |   V    Q|         |         |
```

```
|
    6+55       4.2007     18.31  |   V    Q|         |         |
|
    7+ 0       4.3272     18.37  |   V    Q|         |         |
|
    7+ 5       4.4539     18.40  |   V    Q|         |         |
|
    7+10       4.5809     18.44  |   V    Q|         |         |
|
    7+15       4.7080     18.46  |   V    Q|         |         |
|
    7+20       4.8368     18.69  |   V    Q|         |         |
|
    7+25       4.9734     19.84  |   V    Q|         |         |
|
    7+30       5.1138     20.39  |    V    Q         |         |
|
    7+35       5.2574     20.84  |    V    Q         |         |
|
    7+40       5.4095     22.09  |    V    |Q        |         |
|
    7+45       5.5658     22.69  |    V    |Q        |         |
|
    7+50       5.7252     23.15  |    V    |Q        |         |
|
    7+55       5.8934     24.41  |    V    | Q       |         |
|
    8+ 0       6.0657     25.02  |     V   | Q       |         |
|
    8+ 5       6.2426     25.69  |     V   | Q       |         |
|
    8+10       6.4360     28.08  |     V   |   Q     |         |
|
    8+15       6.6372     29.22  |     V   |   Q     |         |
|
    8+20       6.8417     29.69  |     V   |   Q     |         |
|
    8+25       7.0478     29.93  |      V  |   Q     |         |
|
    8+30       7.2547     30.03  |      V  |    Q    |         |
|
    8+35       7.4633     30.30  |      V  |    Q    |         |
|
    8+40       7.6800     31.46  |      V  |    Q    |         |
|
    8+45       7.9006     32.03  |      V  |     Q   |         |
|
    8+50       8.1243     32.48  |       V |     Q   |         |
|
    8+55       8.3566     33.73  |       V |     Q   |         |
|
    9+ 0       8.5930     34.32  |       V |      Q  |         |
|
    9+ 5       8.8340     35.00  |       V |      Q  |         |
|
    9+10       9.0915     37.38  |        V|       Q |         |
|
    9+15       9.3568     38.53  |        V|        Q|         |
|
    9+20       9.6268     39.21  |        V|        Q|         |
```

```
|
    9+25       9.9062     40.57  |        V|         Q         |
|
    9+30      10.1901     41.21  |         V         Q         |
|
    9+35      10.4772     41.69  |         V         Q         |
|
    9+40      10.7731     42.96  |         V         |Q        |
|
    9+45      11.0732     43.57  |         |V        |Q        |
|
    9+50      11.3764     44.03  |         |V        | Q       |
|
    9+55      11.6884     45.29  |         |V        | Q       |
|
   10+ 0      12.0044     45.89  |         |V        | Q       |
|
   10+ 5      12.3120     44.65  |         | V       | Q       |
|
   10+10      12.5663     36.93  |         | V     Q |         |
|
   10+15      12.7950     33.21  |         | V   Q   |         |
|
   10+20      13.0135     31.73  |         | V  Q    |         |
|
   10+25      13.2271     31.02  |         |  V Q    |         |
|
   10+30      13.4391     30.77  |         |  V Q    |         |
|
   10+35      13.6577     31.74  |         |  V Q    |         |
|
   10+40      13.9145     37.29  |         |  V    Q |         |
|
   10+45      14.1897     39.96  |         |   V    Q|         |
|
   10+50      14.4725     41.06  |         |   V     Q         |
|
   10+55      14.7591     41.61  |         |   V     Q         |
|
   11+ 0      15.0471     41.82  |         |   V     Q         |
|
   11+ 5      15.3343     41.70  |         |    V    Q         |
|
   11+10      15.6143     40.66  |         |    V    Q         |
|
   11+15      15.8909     40.16  |         |    V    Q         |
|
   11+20      16.1661     39.96  |         |     V  Q|         |
|
   11+25      16.4407     39.87  |         |     V  Q|         |
|
   11+30      16.7152     39.85  |         |     V  Q|         |
|
   11+35      16.9867     39.43  |         |     V  Q|         |
|
   11+40      17.2428     37.18  |         |      VQ |         |
|
   11+45      17.4915     36.12  |         |      VQ |         |
|
   11+50      17.7389     35.91  |         |      Q  |         |
```

```
|
   11+55      17.9926     36.84  |         |      VQ |         |
|
   12+ 0      18.2496     37.32  |         |       Q |         |
|
   12+ 5      18.5183     39.01  |         |       VQ|         |
|
   12+10      18.8417     46.97  |         |       V |  Q      |
|
   12+15      19.1916     50.79  |         |        V|    Q    |
|
   12+20      19.5535     52.55  |         |        V|     Q   |
|
   12+25      19.9284     54.44  |         |        V|      Q  |
|
   12+30      20.3091     55.27  |         |         V      Q  |
|
   12+35      20.6951     56.05  |         |         V       Q |
|
   12+40      21.0980     58.50  |         |         |V       Q|
|
   12+45      21.5090     59.68  |         |         |V       Q|
|
   12+50      21.9246     60.35  |         |         |V        Q
|
   12+55      22.3497     61.72  |         |         | V       Q
|
   13+ 0      22.7791     62.35  |         |         | V       |Q
|
   13+ 5      23.2177     63.68  |         |         |  V      |Q
|
   13+10      23.6959     69.44  |         |         |  V      |   Q
|
   13+15      24.1932     72.21  |         |         |   V     |     Q
|
   13+20      24.6982     73.32  |         |         |   V     |     Q
|
   13+25      25.2070     73.88  |         |         |    V    |     Q
|
   13+30      25.7173     74.09  |         |         |    V    |      Q
|
   13+35      26.2121     71.84  |         |         |     V   |    Q
|
   13+40      26.6223     59.57  |         |         |     V  Q|
|
   13+45      26.9920     53.67  |         |         |     Q   |
|
   13+50      27.3453     51.31  |         |         |    Q V  |
|
   13+55      27.6907     50.16  |         |         |    Q V  |
|
   14+ 0      28.0334     49.75  |         |         |   Q  V  |
|
   14+ 5      28.3808     50.44  |         |         |    Q  V |
|
   14+10      28.7582     54.81  |         |         |      QV |
|
   14+15      29.1503     56.92  |         |         |       QV|
|
   14+20      29.5469     57.59  |         |         |       QV|
```

```
|
   14+25      29.9387     56.90  |         |         |       QV|
|
   14+30      30.3280     56.53  |         |         |       Q V
|
   14+35      30.7164     56.39  |         |         |       Q V
|
   14+40      31.1045     56.35  |         |         |       Q V
|
   14+45      31.4925     56.35  |         |         |       Q |V
|
   14+50      31.8791     56.13  |         |         |       Q |V
|
   14+55      32.2580     55.01  |         |         |      Q  | V
|
   15+ 0      32.6332     54.48  |         |         |      Q  | V
|
   15+ 5      33.0055     54.06  |         |         |      Q  | V
|
   15+10      33.3695     52.85  |         |         |     Q   |  V
|
   15+15      33.7296     52.28  |         |         |     Q   |  V
|
   15+20      34.0867     51.85  |         |         |    Q    |  V
|
   15+25      34.4353     50.62  |         |         |    Q    |   V
|
   15+30      34.7801     50.05  |         |         |    Q    |   V
|
   15+35      35.1174     48.98  |         |         |   Q     |   V
|
   15+40      35.4231     44.38  |         |         | Q       |    V
|
   15+45      35.7137     42.19  |         |         |Q        |    V
|
   15+50      35.9983     41.33  |         |         Q         |    V
|
   15+55      36.2800     40.90  |         |         Q         |     V
|
   16+ 0      36.5607     40.76  |         |         Q         |     V
|
   16+ 5      36.8190     37.51  |         |       Q |         |     V
|
   16+10      36.9611     20.63  |         Q         |         |     V
|
   16+15      37.0472     12.51  |     Q   |         |         |     V
|
   16+20      37.1112      9.28  |   Q     |         |         |     V
|
   16+25      37.1642      7.71  |  Q      |         |         |     V
|
   16+30      37.2135      7.15  |  Q      |         |         |      V
|
   16+35      37.2596      6.70  |  Q      |         |         |      V
|
   16+40      37.2969      5.41  | Q       |         |         |      V
|
   16+45      37.3299      4.79  | Q       |         |         |      V
|
   16+50      37.3614      4.59  | Q       |         |         |      V
```

```
|
   16+55      37.3924      4.49  | Q       |         |         |      V
|
   17+ 0      37.4231      4.47  | Q       |         |         |      V
|
   17+ 5      37.4568      4.89  | Q       |         |         |      V
|
   17+10      37.5059      7.13  |  Q      |         |         |      V
|
   17+15      37.5625      8.22  |   Q     |         |         |      V
|
   17+20      37.6222      8.66  |   Q     |         |         |      V
|
   17+25      37.6834      8.89  |   Q     |         |         |      V
|
   17+30      37.7452      8.98  |   Q     |         |         |      V
|
   17+35      37.8073      9.02  |   Q     |         |         |      V
|
   17+40      37.8697      9.06  |   Q     |         |         |      V
|
   17+45      37.9322      9.08  |   Q     |         |         |      V
|
   17+50      37.9934      8.88  |   Q     |         |         |      V
|
   17+55      38.0469      7.77  |  Q      |         |         |      V
|
   18+ 0      38.0967      7.24  |  Q      |         |         |      V
|
   18+ 5      38.1451      7.03  |  Q      |         |         |      V
|
   18+10      38.1929      6.94  |  Q      |         |         |       V
|
   18+15      38.2405      6.91  |  Q      |         |         |       V
|
   18+20      38.2880      6.90  |  Q      |         |         |       V
|
   18+25      38.3356      6.90  |  Q      |         |         |       V
|
   18+30      38.3831      6.91  |  Q      |         |         |       V
|
   18+35      38.4293      6.70  |  Q      |         |         |       V
|
   18+40      38.4678      5.59  | Q       |         |         |       V
|
   18+45      38.5027      5.06  | Q       |         |         |       V
|
   18+50      38.5347      4.64  | Q       |         |         |       V
|
   18+55      38.5582      3.42  |Q        |         |         |       V
|
   19+ 0      38.5779      2.86  |Q        |         |         |       V
|
   19+ 5      38.5975      2.85  |Q        |         |         |       V
|
   19+10      38.6241      3.86  |Q        |         |         |       V
|
   19+15      38.6542      4.37  | Q       |         |         |       V
|
   19+20      38.6872      4.79  | Q       |         |         |       V
```

```
|
   19+25      38.7286     6.02  |  Q      |         |         |       V
|
   19+30      38.7741     6.60  |  Q      |         |         |       V
|
   19+35      38.8197     6.63  |  Q      |         |         |       V
|
   19+40      38.8585     5.63  | Q       |         |         |       V
|
   19+45      38.8940     5.15  | Q       |         |         |       V
|
   19+50      38.9266     4.74  | Q       |         |         |       V
|
   19+55      38.9510     3.53  |Q        |         |         |       V
|
   20+ 0      38.9714     2.97  |Q        |         |         |       V
|
   20+ 5      38.9918     2.96  |Q        |         |         |       V
|
   20+10      39.0192     3.97  |Q        |         |         |       V
|
   20+15      39.0500     4.48  | Q       |         |         |       V
|
   20+20      39.0823     4.69  | Q       |         |         |       V
|
   20+25      39.1153     4.79  | Q       |         |         |       V
|
   20+30      39.1486     4.83  | Q       |         |         |       V
|
   20+35      39.1820     4.85  | Q       |         |         |
V|
   20+40      39.2156     4.88  | Q       |         |         |
V|
   20+45      39.2493     4.89  | Q       |         |         |
V|
   20+50      39.2815     4.68  | Q       |         |         |
V|
   20+55      39.3061     3.57  |Q        |         |         |
V|
   21+ 0      39.3270     3.04  |Q        |         |         |
V|
   21+ 5      39.3480     3.04  |Q        |         |         |
V|
   21+10      39.3760     4.07  | Q       |         |         |
V|
   21+15      39.4075     4.58  | Q       |         |         |
V|
   21+20      39.4389     4.57  | Q       |         |         |
V|
   21+25      39.4634     3.55  |Q        |         |         |
V|
   21+30      39.4844     3.05  |Q        |         |         |
V|
   21+35      39.5055     3.07  |Q        |         |         |
V|
   21+40      39.5337     4.10  | Q       |         |         |
V|
   21+45      39.5655     4.62  | Q       |         |         |
V|
   21+50      39.5973     4.61  | Q       |         |         |
```

```
V|
   21+55      39.6220      3.59  |Q         |         |         |
V|
   22+ 0      39.6433      3.09  |Q         |         |         |
V|
   22+ 5      39.6647      3.11  |Q         |         |         |
V|
   22+10      39.6932      4.14  | Q       |         |         |
V|
   22+15      39.7252      4.66  | Q       |         |         |
V|
   22+20      39.7573      4.65  | Q       |         |         |
V|
   22+25      39.7822      3.62  |Q         |         |         |
V|
   22+30      39.8037      3.12  |Q         |         |         |
V|
   22+35      39.8239      2.93  |Q         |         |         |
V|
   22+40      39.8434      2.84  |Q         |         |         |
V|
   22+45      39.8628      2.81  |Q         |         |         |
V|
   22+50      39.8821      2.80  |Q         |         |         |
V|
   22+55      39.9013      2.79  |Q         |         |         |
V|
   23+ 0      39.9205      2.79  |Q         |         |         |
V|
   23+ 5      39.9398      2.80  |Q         |         |         |
V|
   23+10      39.9591      2.80  |Q         |         |         |
V|
   23+15      39.9784      2.80  |Q         |         |         |
V|
   23+20      39.9977      2.81  |Q         |         |         |
V|
   23+25      40.0171      2.81  |Q         |         |         |
V|
   23+30      40.0365      2.81  |Q         |         |         |
V|
   23+35      40.0559      2.82  |Q         |         |         |
V|
   23+40      40.0753      2.82  |Q         |         |         |
V|
   23+45      40.0947      2.82  |Q         |         |         |
V|
   23+50      40.1142      2.83  |Q         |         |         |
V|
   23+55      40.1337      2.83  |Q         |         |         |
V|
   24+ 0      40.1532      2.83  |Q         |         |         |
V|
   24+ 5      40.1708      2.57  |Q         |         |         |
V|
   24+10      40.1789      1.17  Q          |         |         |
V|
   24+15      40.1822      0.49  Q          |         |         |
V|
   24+20      40.1838      0.22  Q          |         |         |
```

```
V|
   24+25      40.1844      0.09  Q          |          |          |
V|
   24+30      40.1847      0.04  Q          |          |          |
V|
   24+35      40.1849      0.02  Q          |          |          |
V|
   24+40      40.1849      0.01  Q          |          |          |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: area3post24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Area 3 Post Landfill
      Badlands Landfill
      100 Year 24 Hour Storm Event

      ------------------------------------------------------------------
--
      Drainage Area =     173.80(Ac.)  =      0.272 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =     173.80(Ac.)  =
0.272 Sq. Mi.
      Length along longest watercourse =    4530.00(Ft.)
      Length along longest watercourse measured to centroid =    1969.00
(Ft.)
      Length along longest watercourse =      0.858 Mi.
      Length along longest watercourse measured to centroid =      0.373
Mi.
      Difference in elevation =     616.00(Ft.)
      Slope along watercourse =    717.9868 Ft./Mi.
      Average Manning's 'N' = 0.020
      Lag time =    0.089 Hr.
      Lag time =     5.35 Min.
      25% of lag time =     1.34 Min.
      40% of lag time =     2.14 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
            173.80              2.00                  347.60

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
            173.80              5.50                  955.90

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.97 %
      Adjusted average point rain =    5.498(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
         173.800           93.00         0.100
       Total Area Entered =    173.80(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.100        0.033       1.000
0.033
                                                          Sum (F) =
0.033
      Area averaged mean soil loss (F) (In/Hr) =  0.033
      Minimum soil loss rate ((In/Hr)) =  0.017
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.820
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %            (CFS)
      ------------------------------------------------------------------
---
          1   0.083         93.392        12.220             21.404
          2   0.167        186.784        54.613             95.658
          3   0.250        280.177        19.841             34.753
          4   0.333        373.569         8.187             14.340
          5   0.417        466.961         3.220              5.640
          6   0.500        560.353         0.980              1.716
          7   0.583        653.746         0.635              1.112
          8   0.667        747.138         0.306              0.535
                                    Sum = 100.000   Sum=     175.158
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
```

	(Hr.)	Percent	(In/Hr)	Max	Low	(In/Hr)
1	0.08	0.07	0.044	0.059	0.036	0.01
2	0.17	0.07	0.044	0.058	0.036	0.01
3	0.25	0.07	0.044	0.058	0.036	0.01
4	0.33	0.10	0.066	0.058	---	0.01
5	0.42	0.10	0.066	0.058	---	0.01
6	0.50	0.10	0.066	0.058	---	0.01
7	0.58	0.10	0.066	0.057	---	0.01
8	0.67	0.10	0.066	0.057	---	0.01
9	0.75	0.10	0.066	0.057	---	0.01
10	0.83	0.13	0.088	0.057	---	0.03
11	0.92	0.13	0.088	0.056	---	0.03
12	1.00	0.13	0.088	0.056	---	0.03
13	1.08	0.10	0.066	0.056	---	0.01
14	1.17	0.10	0.066	0.056	---	0.01
15	1.25	0.10	0.066	0.056	---	0.01
16	1.33	0.10	0.066	0.055	---	0.01
17	1.42	0.10	0.066	0.055	---	0.01
18	1.50	0.10	0.066	0.055	---	0.01
19	1.58	0.10	0.066	0.055	---	0.01
20	1.67	0.10	0.066	0.054	---	0.01
21	1.75	0.10	0.066	0.054	---	0.01
22	1.83	0.13	0.088	0.054	---	0.03
23	1.92	0.13	0.088	0.054	---	0.03
24	2.00	0.13	0.088	0.054	---	0.03
25	2.08	0.13	0.088	0.053	---	0.03
26	2.17	0.13	0.088	0.053	---	0.03
27	2.25	0.13	0.088	0.053	---	0.04
28	2.33	0.13	0.088	0.053	---	0.04
29	2.42	0.13	0.088	0.053	---	0.04
30	2.50	0.13	0.088	0.052	---	0.04
31	2.58	0.17	0.110	0.052	---	0.06
32	2.67	0.17	0.110	0.052	---	0.06
33	2.75	0.17	0.110	0.052	---	0.06
34	2.83	0.17	0.110	0.051	---	0.06
35	2.92	0.17	0.110	0.051	---	0.06
36	3.00	0.17	0.110	0.051	---	0.06
37	3.08	0.17	0.110	0.051	---	0.06
38	3.17	0.17	0.110	0.051	---	0.06
39	3.25	0.17	0.110	0.050	---	0.06
40	3.33	0.17	0.110	0.050	---	0.06
41	3.42	0.17	0.110	0.050	---	0.06
42	3.50	0.17	0.110	0.050	---	0.06
43	3.58	0.17	0.110	0.050	---	0.06
44	3.67	0.17	0.110	0.049	---	0.06
45	3.75	0.17	0.110	0.049	---	0.06
46	3.83	0.20	0.132	0.049	---	0.08
47	3.92	0.20	0.132	0.049	---	0.08
48	4.00	0.20	0.132	0.049	---	0.08
49	4.08	0.20	0.132	0.048	---	0.08
50	4.17	0.20	0.132	0.048	---	0.08
51	4.25	0.20	0.132	0.048	---	0.08
52	4.33	0.23	0.154	0.048	---	0.11
53	4.42	0.23	0.154	0.048	---	0.11
54	4.50	0.23	0.154	0.047	---	0.11
55	4.58	0.23	0.154	0.047	---	0.11
56	4.67	0.23	0.154	0.047	---	0.11
57	4.75	0.23	0.154	0.047	---	0.11
58	4.83	0.27	0.176	0.046	---	0.13
59	4.92	0.27	0.176	0.046	---	0.13

60	5.00	0.27	0.176	0.046	---	0.13
61	5.08	0.20	0.132	0.046	---	0.09
62	5.17	0.20	0.132	0.046	---	0.09
63	5.25	0.20	0.132	0.045	---	0.09
64	5.33	0.23	0.154	0.045	---	0.11
65	5.42	0.23	0.154	0.045	---	0.11
66	5.50	0.23	0.154	0.045	---	0.11
67	5.58	0.27	0.176	0.045	---	0.13
68	5.67	0.27	0.176	0.045	---	0.13
69	5.75	0.27	0.176	0.044	---	0.13
70	5.83	0.27	0.176	0.044	---	0.13
71	5.92	0.27	0.176	0.044	---	0.13
72	6.00	0.27	0.176	0.044	---	0.13
73	6.08	0.30	0.198	0.044	---	0.15
74	6.17	0.30	0.198	0.043	---	0.15
75	6.25	0.30	0.198	0.043	---	0.15
76	6.33	0.30	0.198	0.043	---	0.15
77	6.42	0.30	0.198	0.043	---	0.16
78	6.50	0.30	0.198	0.043	---	0.16
79	6.58	0.33	0.220	0.042	---	0.18
80	6.67	0.33	0.220	0.042	---	0.18
81	6.75	0.33	0.220	0.042	---	0.18
82	6.83	0.33	0.220	0.042	---	0.18
83	6.92	0.33	0.220	0.042	---	0.18
84	7.00	0.33	0.220	0.041	---	0.18
85	7.08	0.33	0.220	0.041	---	0.18
86	7.17	0.33	0.220	0.041	---	0.18
87	7.25	0.33	0.220	0.041	---	0.18
88	7.33	0.37	0.242	0.041	---	0.20
89	7.42	0.37	0.242	0.040	---	0.20
90	7.50	0.37	0.242	0.040	---	0.20
91	7.58	0.40	0.264	0.040	---	0.22
92	7.67	0.40	0.264	0.040	---	0.22
93	7.75	0.40	0.264	0.040	---	0.22
94	7.83	0.43	0.286	0.040	---	0.25
95	7.92	0.43	0.286	0.039	---	0.25
96	8.00	0.43	0.286	0.039	---	0.25
97	8.08	0.50	0.330	0.039	---	0.29
98	8.17	0.50	0.330	0.039	---	0.29
99	8.25	0.50	0.330	0.039	---	0.29
100	8.33	0.50	0.330	0.038	---	0.29
101	8.42	0.50	0.330	0.038	---	0.29
102	8.50	0.50	0.330	0.038	---	0.29
103	8.58	0.53	0.352	0.038	---	0.31
104	8.67	0.53	0.352	0.038	---	0.31
105	8.75	0.53	0.352	0.038	---	0.31
106	8.83	0.57	0.374	0.037	---	0.34
107	8.92	0.57	0.374	0.037	---	0.34
108	9.00	0.57	0.374	0.037	---	0.34
109	9.08	0.63	0.418	0.037	---	0.38
110	9.17	0.63	0.418	0.037	---	0.38
111	9.25	0.63	0.418	0.037	---	0.38
112	9.33	0.67	0.440	0.036	---	0.40
113	9.42	0.67	0.440	0.036	---	0.40
114	9.50	0.67	0.440	0.036	---	0.40
115	9.58	0.70	0.462	0.036	---	0.43
116	9.67	0.70	0.462	0.036	---	0.43
117	9.75	0.70	0.462	0.035	---	0.43
118	9.83	0.73	0.484	0.035	---	0.45
119	9.92	0.73	0.484	0.035	---	0.45

120	10.00	0.73	0.484	0.035	---	0.45
121	10.08	0.50	0.330	0.035	---	0.30
122	10.17	0.50	0.330	0.035	---	0.30
123	10.25	0.50	0.330	0.034	---	0.30
124	10.33	0.50	0.330	0.034	---	0.30
125	10.42	0.50	0.330	0.034	---	0.30
126	10.50	0.50	0.330	0.034	---	0.30
127	10.58	0.67	0.440	0.034	---	0.41
128	10.67	0.67	0.440	0.034	---	0.41
129	10.75	0.67	0.440	0.033	---	0.41
130	10.83	0.67	0.440	0.033	---	0.41
131	10.92	0.67	0.440	0.033	---	0.41
132	11.00	0.67	0.440	0.033	---	0.41
133	11.08	0.63	0.418	0.033	---	0.39
134	11.17	0.63	0.418	0.033	---	0.39
135	11.25	0.63	0.418	0.033	---	0.39
136	11.33	0.63	0.418	0.032	---	0.39
137	11.42	0.63	0.418	0.032	---	0.39
138	11.50	0.63	0.418	0.032	---	0.39
139	11.58	0.57	0.374	0.032	---	0.34
140	11.67	0.57	0.374	0.032	---	0.34
141	11.75	0.57	0.374	0.032	---	0.34
142	11.83	0.60	0.396	0.031	---	0.36
143	11.92	0.60	0.396	0.031	---	0.36
144	12.00	0.60	0.396	0.031	---	0.36
145	12.08	0.83	0.550	0.031	---	0.52
146	12.17	0.83	0.550	0.031	---	0.52
147	12.25	0.83	0.550	0.031	---	0.52
148	12.33	0.87	0.572	0.030	---	0.54
149	12.42	0.87	0.572	0.030	---	0.54
150	12.50	0.87	0.572	0.030	---	0.54
151	12.58	0.93	0.616	0.030	---	0.59
152	12.67	0.93	0.616	0.030	---	0.59
153	12.75	0.93	0.616	0.030	---	0.59
154	12.83	0.97	0.638	0.030	---	0.61
155	12.92	0.97	0.638	0.029	---	0.61
156	13.00	0.97	0.638	0.029	---	0.61
157	13.08	1.13	0.748	0.029	---	0.72
158	13.17	1.13	0.748	0.029	---	0.72
159	13.25	1.13	0.748	0.029	---	0.72
160	13.33	1.13	0.748	0.029	---	0.72
161	13.42	1.13	0.748	0.029	---	0.72
162	13.50	1.13	0.748	0.028	---	0.72
163	13.58	0.77	0.506	0.028	---	0.48
164	13.67	0.77	0.506	0.028	---	0.48
165	13.75	0.77	0.506	0.028	---	0.48
166	13.83	0.77	0.506	0.028	---	0.48
167	13.92	0.77	0.506	0.028	---	0.48
168	14.00	0.77	0.506	0.028	---	0.48
169	14.08	0.90	0.594	0.027	---	0.57
170	14.17	0.90	0.594	0.027	---	0.57
171	14.25	0.90	0.594	0.027	---	0.57
172	14.33	0.87	0.572	0.027	---	0.54
173	14.42	0.87	0.572	0.027	---	0.54
174	14.50	0.87	0.572	0.027	---	0.55
175	14.58	0.87	0.572	0.027	---	0.55
176	14.67	0.87	0.572	0.026	---	0.55
177	14.75	0.87	0.572	0.026	---	0.55
178	14.83	0.83	0.550	0.026	---	0.52
179	14.92	0.83	0.550	0.026	---	0.52

```
180  15.00     0.83      0.550         0.026      ---          0.52
181  15.08     0.80      0.528         0.026      ---          0.50
182  15.17     0.80      0.528         0.026      ---          0.50
183  15.25     0.80      0.528         0.025      ---          0.50
184  15.33     0.77      0.506         0.025      ---          0.48
185  15.42     0.77      0.506         0.025      ---          0.48
186  15.50     0.77      0.506         0.025      ---          0.48
187  15.58     0.63      0.418         0.025      ---          0.39
188  15.67     0.63      0.418         0.025      ---          0.39
189  15.75     0.63      0.418         0.025      ---          0.39
190  15.83     0.63      0.418         0.025      ---          0.39
191  15.92     0.63      0.418         0.024      ---          0.39
192  16.00     0.63      0.418         0.024      ---          0.39
193  16.08     0.13      0.088         0.024      ---          0.06
194  16.17     0.13      0.088         0.024      ---          0.06
195  16.25     0.13      0.088         0.024      ---          0.06
196  16.33     0.13      0.088         0.024      ---          0.06
197  16.42     0.13      0.088         0.024      ---          0.06
198  16.50     0.13      0.088         0.024      ---          0.06
199  16.58     0.10      0.066         0.023      ---          0.04
200  16.67     0.10      0.066         0.023      ---          0.04
201  16.75     0.10      0.066         0.023      ---          0.04
202  16.83     0.10      0.066         0.023      ---          0.04
203  16.92     0.10      0.066         0.023      ---          0.04
204  17.00     0.10      0.066         0.023      ---          0.04
205  17.08     0.17      0.110         0.023      ---          0.09
206  17.17     0.17      0.110         0.023      ---          0.09
207  17.25     0.17      0.110         0.023      ---          0.09
208  17.33     0.17      0.110         0.022      ---          0.09
209  17.42     0.17      0.110         0.022      ---          0.09
210  17.50     0.17      0.110         0.022      ---          0.09
211  17.58     0.17      0.110         0.022      ---          0.09
212  17.67     0.17      0.110         0.022      ---          0.09
213  17.75     0.17      0.110         0.022      ---          0.09
214  17.83     0.13      0.088         0.022      ---          0.07
215  17.92     0.13      0.088         0.022      ---          0.07
216  18.00     0.13      0.088         0.022      ---          0.07
217  18.08     0.13      0.088         0.021      ---          0.07
218  18.17     0.13      0.088         0.021      ---          0.07
219  18.25     0.13      0.088         0.021      ---          0.07
220  18.33     0.13      0.088         0.021      ---          0.07
221  18.42     0.13      0.088         0.021      ---          0.07
222  18.50     0.13      0.088         0.021      ---          0.07
223  18.58     0.10      0.066         0.021      ---          0.05
224  18.67     0.10      0.066         0.021      ---          0.05
225  18.75     0.10      0.066         0.021      ---          0.05
226  18.83     0.07      0.044         0.021      ---          0.02
227  18.92     0.07      0.044         0.020      ---          0.02
228  19.00     0.07      0.044         0.020      ---          0.02
229  19.08     0.10      0.066         0.020      ---          0.05
230  19.17     0.10      0.066         0.020      ---          0.05
231  19.25     0.10      0.066         0.020      ---          0.05
232  19.33     0.13      0.088         0.020      ---          0.07
233  19.42     0.13      0.088         0.020      ---          0.07
234  19.50     0.13      0.088         0.020      ---          0.07
235  19.58     0.10      0.066         0.020      ---          0.05
236  19.67     0.10      0.066         0.020      ---          0.05
237  19.75     0.10      0.066         0.019      ---          0.05
238  19.83     0.07      0.044         0.019      ---          0.02
239  19.92     0.07      0.044         0.019      ---          0.02
```

```
 240  20.00     0.07      0.044         0.019      ---          0.02
 241  20.08     0.10      0.066         0.019      ---          0.05
 242  20.17     0.10      0.066         0.019      ---          0.05
 243  20.25     0.10      0.066         0.019      ---          0.05
 244  20.33     0.10      0.066         0.019      ---          0.05
 245  20.42     0.10      0.066         0.019      ---          0.05
 246  20.50     0.10      0.066         0.019      ---          0.05
 247  20.58     0.10      0.066         0.019      ---          0.05
 248  20.67     0.10      0.066         0.019      ---          0.05
 249  20.75     0.10      0.066         0.019      ---          0.05
 250  20.83     0.07      0.044         0.018      ---          0.03
 251  20.92     0.07      0.044         0.018      ---          0.03
 252  21.00     0.07      0.044         0.018      ---          0.03
 253  21.08     0.10      0.066         0.018      ---          0.05
 254  21.17     0.10      0.066         0.018      ---          0.05
 255  21.25     0.10      0.066         0.018      ---          0.05
 256  21.33     0.07      0.044         0.018      ---          0.03
 257  21.42     0.07      0.044         0.018      ---          0.03
 258  21.50     0.07      0.044         0.018      ---          0.03
 259  21.58     0.10      0.066         0.018      ---          0.05
 260  21.67     0.10      0.066         0.018      ---          0.05
 261  21.75     0.10      0.066         0.018      ---          0.05
 262  21.83     0.07      0.044         0.018      ---          0.03
 263  21.92     0.07      0.044         0.018      ---          0.03
 264  22.00     0.07      0.044         0.017      ---          0.03
 265  22.08     0.10      0.066         0.017      ---          0.05
 266  22.17     0.10      0.066         0.017      ---          0.05
 267  22.25     0.10      0.066         0.017      ---          0.05
 268  22.33     0.07      0.044         0.017      ---          0.03
 269  22.42     0.07      0.044         0.017      ---          0.03
 270  22.50     0.07      0.044         0.017      ---          0.03
 271  22.58     0.07      0.044         0.017      ---          0.03
 272  22.67     0.07      0.044         0.017      ---          0.03
 273  22.75     0.07      0.044         0.017      ---          0.03
 274  22.83     0.07      0.044         0.017      ---          0.03
 275  22.92     0.07      0.044         0.017      ---          0.03
 276  23.00     0.07      0.044         0.017      ---          0.03
 277  23.08     0.07      0.044         0.017      ---          0.03
 278  23.17     0.07      0.044         0.017      ---          0.03
 279  23.25     0.07      0.044         0.017      ---          0.03
 280  23.33     0.07      0.044         0.017      ---          0.03
 281  23.42     0.07      0.044         0.017      ---          0.03
 282  23.50     0.07      0.044         0.017      ---          0.03
 283  23.58     0.07      0.044         0.017      ---          0.03
 284  23.67     0.07      0.044         0.017      ---          0.03
 285  23.75     0.07      0.044         0.017      ---          0.03
 286  23.83     0.07      0.044         0.017      ---          0.03
 287  23.92     0.07      0.044         0.017      ---          0.03
 288  24.00     0.07      0.044         0.017      ---          0.03
     Sum =     100.0                                   Sum =    56.5
      Flood volume = Effective rainfall      4.71(In)
       times area     173.8(Ac.)/[(In)/(Ft.)] =      68.2(Ac.Ft)
      Total soil loss =      0.79(In)
      Total soil loss =    11.438(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     2970503.7 Cubic Feet
      Total soil loss =      498235.5 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =    125.852(CFS)
```

```
      -----------------------------------------------------------------
--
      +++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                            24 - H O U R   S T O R M
                       R u n o f f     H y d r o g r a p h
      -----------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      -----------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0
200.0

----------------------------------------------------------------------
    0+ 5       0.0012      0.17  Q         |         |         |
|
    0+10       0.0076      0.93  Q         |         |         |
|
    0+15       0.0158      1.20  Q         |         |         |
|
    0+20       0.0249      1.32  Q         |         |         |
|
    0+25       0.0343      1.37  Q         |         |         |
|
    0+30       0.0440      1.41  Q         |         |         |
|
    0+35       0.0540      1.45  Q         |         |         |
|
    0+40       0.0643      1.49  Q         |         |         |
|
    0+45       0.0749      1.53  Q         |         |         |
|
    0+50       0.0889      2.04  Q         |         |         |
|
    0+55       0.1178      4.19  Q         |         |         |
|
    1+ 0       0.1521      4.99  Q         |         |         |
|
    1+ 5       0.1857      4.87  Q         |         |         |
|
    1+10       0.2059      2.93  Q         |         |         |
|
    1+15       0.2214      2.24  Q         |         |         |
|
    1+20       0.2351      1.99  Q         |         |         |
|
    1+25       0.2483      1.92  Q         |         |         |
|
    1+30       0.2615      1.92  Q         |         |         |
|
    1+35       0.2748      1.93  Q         |         |         |
|
    1+40       0.2883      1.96  Q         |         |         |
|
    1+45       0.3021      2.00  Q         |         |         |
|
    1+50       0.3193      2.51  Q         |         |         |
|
```

```
    1+55       0.3514       4.65  Q         |         |         |
|
    2+ 0       0.3889       5.45  VQ        |         |         |
|
    2+ 5       0.4289       5.81  VQ        |         |         |
|
    2+10       0.4701       5.97  VQ        |         |         |
|
    2+15       0.5117       6.05  VQ        |         |         |
|
    2+20       0.5537       6.11  VQ        |         |         |
|
    2+25       0.5962       6.16  VQ        |         |         |
|
    2+30       0.6388       6.19  VQ        |         |         |
|
    2+35       0.6850       6.70  VQ        |         |         |
|
    2+40       0.7459       8.85  VQ        |         |         |
|
    2+45       0.8124       9.65  VQ        |         |         |
|
    2+50       0.8812      10.00  V Q       |         |         |
|
    2+55       0.9512      10.16  V Q       |         |         |
|
    3+ 0       1.0217      10.24  V Q       |         |         |
|
    3+ 5       1.0927      10.30  V Q       |         |         |
|
    3+10       1.1639      10.35  V Q       |         |         |
|
    3+15       1.2355      10.39  V Q       |         |         |
|
    3+20       1.3072      10.42  V Q       |         |         |
|
    3+25       1.3793      10.46  V Q       |         |         |
|
    3+30       1.4515      10.50  V Q       |         |         |
|
    3+35       1.5241      10.53  V Q       |         |         |
|
    3+40       1.5969      10.57  V Q       |         |         |
|
    3+45       1.6699      10.61  V Q       |         |         |
|
    3+50       1.7464      11.11  |VQ       |         |         |
|
    3+55       1.8377      13.25  |VQ       |         |         |
|
    4+ 0       1.9345      14.05  |VQ       |         |         |
|
    4+ 5       2.0337      14.41  |VQ       |         |         |
|
    4+10       2.1341      14.57  |VQ       |         |         |
|
    4+15       2.2349      14.64  |VQ       |         |         |
|
    4+20       2.3394      15.17  |V Q      |         |         |
|
```

```
    4+25       2.4587     17.32  |V Q       |         |         |
|
    4+30       2.5835     18.12  |V Q       |         |         |
|
    4+35       2.7108     18.48  |V Q       |         |         |
|
    4+40       2.8391     18.64  |V Q       |         |         |
|
    4+45       2.9680     18.71  |V Q       |         |         |
|
    4+50       3.1005     19.24  |V Q       |         |         |
|
    4+55       3.2478     21.39  |V  Q      |         |         |
|
    5+ 0       3.4006     22.19  |V  Q      |         |         |
|
    5+ 5       3.5494     21.60  | V Q      |         |         |
|
    5+10       3.6703     17.55  | VQ       |         |         |
|
    5+15       3.7811     16.09  | VQ       |         |         |
|
    5+20       3.8912     15.99  | VQ       |         |         |
|
    5+25       4.0145     17.90  | VQ       |         |         |
|
    5+30       4.1427     18.62  | VQ       |         |         |
|
    5+35       4.2763     19.39  | VQ       |         |         |
|
    5+40       4.4253     21.63  | V Q      |         |         |
|
    5+45       4.5800     22.47  | V Q      |         |         |
|
    5+50       4.7373     22.84  | V Q      |         |         |
|
    5+55       4.8958     23.01  | V Q      |         |         |
|
    6+ 0       5.0548     23.09  | V Q      |         |         |
|
    6+ 5       5.2175     23.62  |  VQ      |         |         |
|
    6+10       5.3949     25.77  |  V Q     |         |         |
|
    6+15       5.5779     26.56  |  V Q     |         |         |
|
    6+20       5.7632     26.91  |  V Q     |         |         |
|
    6+25       5.9497     27.07  |  V Q     |         |         |
|
    6+30       6.1366     27.14  |  V Q     |         |         |
|
    6+35       6.3272     27.67  |  V Q     |         |         |
|
    6+40       6.5326     29.82  |  V Q     |         |         |
|
    6+45       6.7435     30.62  |  V  Q    |         |         |
|
    6+50       6.9568     30.97  |   V Q    |         |         |
|
```

```
    6+55       7.1712     31.13  |   V Q   |         |         |
|
    7+ 0       7.3860     31.20  |   V Q   |         |         |
|
    7+ 5       7.6013     31.26  |   V Q   |         |         |
|
    7+10       7.8169     31.30  |   V Q   |         |         |
|
    7+15       8.0327     31.33  |   V Q   |         |         |
|
    7+20       8.2519     31.84  |   V Q   |         |         |
|
    7+25       8.4859     33.98  |   V Q   |         |         |
|
    7+30       8.7254     34.77  |    VQ   |         |         |
|
    7+35       8.9705     35.59  |    V Q  |         |         |
|
    7+40       9.2312     37.85  |    V Q  |         |         |
|
    7+45       9.4976     38.69  |    V Q  |         |         |
|
    7+50       9.7699     39.53  |    V Q  |         |         |
|
    7+55      10.0578     41.80  |    V  Q |         |         |
|
    8+ 0      10.3515     42.64  |     V Q |         |         |
|
    8+ 5      10.6542     43.95  |     V Q |         |         |
|
    8+10      10.9870     48.33  |     V  Q|         |         |
|
    8+15      11.3309     49.93  |     V  Q|         |         |
|
    8+20      11.6795     50.62  |     V   Q         |         |
|
    8+25      12.0301     50.91  |      V  Q         |         |
|
    8+30      12.3814     51.02  |      V  Q         |         |
|
    8+35      12.7366     51.57  |      V  Q         |         |
|
    8+40      13.1066     53.73  |      V  Q         |         |
|
    8+45      13.4821     54.52  |      V  Q         |         |
|
    8+50      13.8632     55.34  |       V |Q        |         |
|
    8+55      14.2599     57.60  |       V |Q        |         |
|
    9+ 0      14.6623     58.43  |       V |Q        |         |
|
    9+ 5      15.0738     59.75  |       V |Q        |         |
|
    9+10      15.5154     64.12  |        V| Q       |         |
|
    9+15      15.9680     65.72  |        V|  Q      |         |
|
    9+20      16.4286     66.88  |        V|  Q      |         |
|
```

```
   9+25      16.9057     69.27  |        V|  Q      |         |
|
   9+30      17.3888     70.14  |         V   Q     |         |
|
   9+35      17.8779     71.01  |         V   Q     |         |
|
   9+40      18.3826     73.29  |         V   Q     |         |
|
   9+45      18.8931     74.12  |         |V  Q     |         |
|
   9+50      19.4094     74.97  |         |V  Q     |         |
|
   9+55      19.9414     77.24  |         |V   Q    |         |
|
  10+ 0      20.4790     78.07  |         | V  Q    |         |
|
  10+ 5      20.9965     75.14  |         | V  Q    |         |
|
  10+10      21.4137     60.57  |         | Q       |         |
|
  10+15      21.7945     55.29  |         |QV       |         |
|
  10+20      22.1604     53.13  |         Q V       |         |
|
  10+25      22.5206     52.31  |         Q  V      |         |
|
  10+30      22.8793     52.07  |         Q  V      |         |
|
  10+35      23.2531     54.28  |         Q  V      |         |
|
  10+40      23.6991     64.75  |         | QV      |         |
|
  10+45      24.1716     68.61  |         |  QV     |         |
|
  10+50      24.6551     70.21  |         |   Q     |         |
|
  10+55      25.1432     70.86  |         |   Q     |         |
|
  11+ 0      25.6327     71.08  |         |   QV    |         |
|
  11+ 5      26.1200     70.76  |         |   QV    |         |
|
  11+10      26.5935     68.74  |         |  Q V    |         |
|
  11+15      27.0618     68.01  |         |  Q V    |         |
|
  11+20      27.5282     67.72  |         |  Q  V   |         |
|
  11+25      27.9939     67.62  |         |  Q  V   |         |
|
  11+30      28.4596     67.61  |         |  Q  V   |         |
|
  11+35      28.9188     66.68  |         |  Q  V   |         |
|
  11+40      29.3491     62.48  |         | Q    V  |         |
|
  11+45      29.7691     60.98  |         | Q    V  |         |
|
  11+50      30.1881     60.85  |         | Q    V  |         |
|
```

```
   11+55      30.6202     62.73  |         | Q    V  |         |
|
   12+ 0      31.0572     63.45  |         | Q     V |         |
|
   12+ 5      31.5189     67.04  |         |  Q    V |         |
|
   12+10      32.0829     81.90  |         |     Q V |         |
|
   12+15      32.6843     87.32  |         |      Q V|         |
|
   12+20      33.3045     90.05  |         |       QV|         |
|
   12+25      33.9454     93.06  |         |       QV|         |
|
   12+30      34.5936     94.12  |         |       Q V         |
|
   12+35      35.2518     95.57  |         |        QV         |
|
   12+40      35.9406    100.02  |         |         QV        |
|
   12+45      36.6404    101.61  |         |         QV        |
|
   12+50      37.3482    102.76  |         |         QV        |
|
   12+55      38.0724    105.15  |         |         |QV       |
|
   13+ 0      38.8025    106.02  |         |         |QV       |
|
   13+ 5      39.5516    108.77  |         |         |Q V      |
|
   13+10      40.3744    119.46  |         |         |  Q      |
|
   13+15      41.2239    123.35  |         |         |   Q     |
|
   13+20      42.0847    124.98  |         |         |   Q     |
|
   13+25      42.9499    125.64  |         |         |    Q    |
|
   13+30      43.8167    125.85  |         |         |    Q    |
|
   13+35      44.6488    120.82  |         |         |   Q V   |
|
   13+40      45.3220     97.75  |         |        Q|     V   |
|
   13+45      45.9374     89.36  |         |      Q  |     V   |
|
   13+50      46.5291     85.92  |         |      Q  |      V  |
|
   13+55      47.1116     84.58  |         |     Q   |      V  |
|
   14+ 0      47.6914     84.19  |         |     Q   |      V  |
|
   14+ 5      48.2825     85.83  |         |      Q  |       V |
|
   14+10      48.9309     94.14  |         |       Q |       V |
|
   14+15      49.6005     97.22  |         |        Q|        V|
|
   14+20      50.2757     98.04  |         |        Q|        V|
|
```

```
   14+25      50.9400     96.46  |         |        Q|        V|
|
   14+30      51.6002     95.87  |         |        Q|         V
|
   14+35      52.2591     95.67  |         |        Q|         V
|
   14+40      52.9176     95.62  |         |        Q|         |V
|
   14+45      53.5761     95.61  |         |        Q|         |V
|
   14+50      54.2313     95.13  |         |        Q|         |V
|
   14+55      54.8721     93.04  |         |       Q |         | V
|
   15+ 0      55.5077     92.30  |         |       Q |         | V
|
   15+ 5      56.1382     91.54  |         |       Q |         | V
|
   15+10      56.7534     89.33  |         |      Q  |         |  V
|
   15+15      57.3633     88.55  |         |      Q  |         |  V
|
   15+20      57.9677     87.76  |         |      Q  |         |   V
|
   15+25      58.5569     85.55  |         |      Q  |         |   V
|
   15+30      59.1406     84.77  |         |     Q   |         |   V
|
   15+35      59.7093     82.57  |         |     Q   |         |    V
|
   15+40      60.2191     74.03  |         |   Q     |         |    V
|
   15+45      60.7078     70.96  |         |   Q     |         |    V
|
   15+50      61.1878     69.69  |         |  Q      |         |    V
|
   15+55      61.6645     69.21  |         |  Q      |         |     V
|
   16+ 0      62.1402     69.08  |         |  Q      |         |     V
|
   16+ 5      62.5668     61.94  |         | Q       |         |     V
|
   16+10      62.7758     30.34  |     Q   |         |         |     V
|
   16+15      62.9059     18.89  |  Q      |         |         |     V
|
   16+20      63.0036     14.18  | Q       |         |         |     V
|
   16+25      63.0885     12.34  | Q       |         |         |      V
|
   16+30      63.1698     11.80  | Q       |         |         |      V
|
   16+35      63.2454     10.98  | Q       |         |         |      V
|
   16+40      63.3054      8.72  |Q        |         |         |      V
|
   16+45      63.3604      7.98  |Q        |         |         |      V
|
   16+50      63.4133      7.68  |Q        |         |         |      V
|
```

```
   16+55      63.4654      7.58  |Q        |         |         |      V
|
   17+ 0      63.5175      7.56  |Q        |         |         |      V
|
   17+ 5      63.5760      8.50  |Q        |         |         |      V
|
   17+10      63.6636     12.72  | Q       |         |         |      V
|
   17+15      63.7619     14.27  | Q       |         |         |      V
|
   17+20      63.8646     14.92  | Q       |         |         |      V
|
   17+25      63.9692     15.18  |  Q      |         |         |      V
|
   17+30      64.0744     15.28  |  Q      |         |         |      V
|
   17+35      64.1801     15.35  |  Q      |         |         |      V
|
   17+40      64.2861     15.39  |  Q      |         |         |      V
|
   17+45      64.3922     15.41  |  Q      |         |         |      V
|
   17+50      64.4953     14.96  | Q       |         |         |      V
|
   17+55      64.5839     12.87  | Q       |         |         |      V
|
   18+ 0      64.6675     12.13  | Q       |         |         |      V
|
   18+ 5      64.7489     11.83  | Q       |         |         |      V
|
   18+10      64.8297     11.73  | Q       |         |         |       V
|
   18+15      64.9103     11.71  | Q       |         |         |       V
|
   18+20      64.9909     11.70  | Q       |         |         |       V
|
   18+25      65.0715     11.71  | Q       |         |         |       V
|
   18+30      65.1523     11.72  | Q       |         |         |       V
|
   18+35      65.2299     11.27  | Q       |         |         |       V
|
   18+40      65.2931      9.18  |Q        |         |         |       V
|
   18+45      65.3513      8.44  |Q        |         |         |       V
|
   18+50      65.4041      7.67  |Q        |         |         |       V
|
   18+55      65.4416      5.46  |Q        |         |         |       V
|
   19+ 0      65.4738      4.67  Q         |         |         |       V
|
   19+ 5      65.5070      4.82  Q         |         |         |       V
|
   19+10      65.5539      6.81  |Q        |         |         |       V
|
   19+15      65.6059      7.55  |Q        |         |         |       V
|
   19+20      65.6632      8.33  |Q        |         |         |       V
|
```

```
   19+25      65.7360     10.56  | Q       |         |         |       V
|
   19+30      65.8143     11.38  | Q       |         |         |       V
|
   19+35      65.8919     11.27  | Q       |         |         |       V
|
   19+40      65.9561      9.31  |Q        |         |         |       V
|
   19+45      66.0153      8.60  |Q        |         |         |       V
|
   19+50      66.0694      7.85  |Q        |         |         |       V
|
   19+55      66.1083      5.65  |Q        |         |         |       V
|
   20+ 0      66.1418      4.87  Q         |         |         |       V
|
   20+ 5      66.1764      5.01  |Q        |         |         |       V
|
   20+10      66.2245      7.00  |Q        |         |         |       V
|
   20+15      66.2778      7.74  |Q        |         |         |       V
|
   20+20      66.3332      8.04  |Q        |         |         |       V
|
   20+25      66.3895      8.17  |Q        |         |         |       V
|
   20+30      66.4461      8.22  |Q        |         |         |       V
|
   20+35      66.5030      8.26  |Q        |         |         |
V|
   20+40      66.5601      8.29  |Q        |         |         |
V|
   20+45      66.6172      8.30  |Q        |         |         |
V|
   20+50      66.6712      7.84  |Q        |         |         |
V|
   20+55      66.7109      5.75  |Q        |         |         |
V|
   21+ 0      66.7453      5.00  Q         |         |         |
V|
   21+ 5      66.7809      5.17  |Q        |         |         |
V|
   21+10      66.8302      7.16  |Q        |         |         |
V|
   21+15      66.8846      7.90  |Q        |         |         |
V|
   21+20      66.9379      7.73  |Q        |         |         |
V|
   21+25      66.9775      5.75  |Q        |         |         |
V|
   21+30      67.0122      5.04  |Q        |         |         |
V|
   21+35      67.0482      5.23  |Q        |         |         |
V|
   21+40      67.0980      7.23  |Q        |         |         |
V|
   21+45      67.1529      7.97  |Q        |         |         |
V|
   21+50      67.2067      7.80  |Q        |         |         |
V|
```

```
   21+55      67.2468      5.82  |Q         |         |         |
V|
   22+ 0      67.2819      5.11  |Q         |         |         |
V|
   22+ 5      67.3184      5.30  |Q         |         |         |
V|
   22+10      67.3687      7.30  |Q         |         |         |
V|
   22+15      67.4240      8.04  |Q         |         |         |
V|
   22+20      67.4782      7.87  |Q         |         |         |
V|
   22+25      67.5187      5.88  |Q         |         |         |
V|
   22+30      67.5543      5.17  |Q         |         |         |
V|
   22+35      67.5879      4.88  Q          |         |         |
V|
   22+40      67.6208      4.78  Q          |         |         |
V|
   22+45      67.6535      4.75  Q          |         |         |
V|
   22+50      67.6862      4.73  Q          |         |         |
V|
   22+55      67.7187      4.73  Q          |         |         |
V|
   23+ 0      67.7514      4.74  Q          |         |         |
V|
   23+ 5      67.7840      4.75  Q          |         |         |
V|
   23+10      67.8168      4.75  Q          |         |         |
V|
   23+15      67.8495      4.76  Q          |         |         |
V|
   23+20      67.8824      4.77  Q          |         |         |
V|
   23+25      67.9152      4.77  Q          |         |         |
V|
   23+30      67.9481      4.78  Q          |         |         |
V|
   23+35      67.9811      4.78  Q          |         |         |
V|
   23+40      68.0140      4.79  Q          |         |         |
V|
   23+45      68.0470      4.79  Q          |         |         |
V|
   23+50      68.0801      4.80  Q          |         |         |
V|
   23+55      68.1131      4.80  Q          |         |         |
V|
   24+ 0      68.1462      4.80  Q          |         |         |
V|
   24+ 5      68.1752      4.22  Q          |         |         |
V|
   24+10      68.1862      1.59  Q          |         |         |
V|
   24+15      68.1906      0.64  Q          |         |         |
V|
   24+20      68.1923      0.25  Q          |         |         |
V|
```

```
   24+25      68.1930      0.09  Q          |         |         |
V|
   24+30      68.1933      0.05  Q          |         |         |
V|
   24+35      68.1934      0.01  Q          |         |         |
V
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: area2post24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
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      ------------------------------------------------------------------
------

      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---
      Area 2 Post Landfill
      Badlands Landfill
      100 Year 24 Hour Storm Event

      ------------------------------------------------------------------
--
      Drainage Area =     259.30(Ac.)  =      0.405 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =     259.30(Ac.)  =
0.405 Sq. Mi.
      Length along longest watercourse =   11886.00(Ft.)
      Length along longest watercourse measured to centroid =    5257.00
(Ft.)
      Length along longest watercourse =      2.251 Mi.
      Length along longest watercourse measured to centroid =      0.996
Mi.
      Difference in elevation =     630.00(Ft.)
      Slope along watercourse =    279.8587 Ft./Mi.
      Average Manning's 'N' = 0.020
      Lag time =    0.224 Hr.
      Lag time =    13.42 Min.
      25% of lag time =     3.35 Min.
      40% of lag time =     5.37 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
            259.30              2.00                 518.60

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
            259.30              5.50                1426.15

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.95 %
      Adjusted average point rain =    5.497(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
         259.300           93.00         0.100
       Total Area Entered =    259.30(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.100        0.033       1.000
0.033
                                                          Sum (F) =
0.033
      Area averaged mean soil loss (F) (In/Hr) =  0.033
      Minimum soil loss rate ((In/Hr)) =  0.017
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.820
      ------------------------------------------------------------------
---

                  Unit Hydrograph
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083         37.265          2.847              7.439
          2   0.167         74.530         10.223             26.715
          3   0.250        111.796         26.808             70.056
          4   0.333        149.061         25.477             66.577
          5   0.417        186.326         10.631             27.782
          6   0.500        223.591          7.028             18.366
          7   0.583        260.857          5.015             13.104
          8   0.667        298.122          3.688              9.637
          9   0.750        335.387          2.732              7.140
         10   0.833        372.652          1.890              4.938
         11   0.917        409.917          1.296              3.387
         12   1.000        447.183          0.609              1.591
         13   1.083        484.448          0.415              1.085
```

```
         14   1.167        521.713          0.348              0.908
         15   1.250        558.978          0.239              0.624
         16   1.333        596.243          0.277              0.723
         17   1.417        633.509          0.238              0.622
         18   1.500        670.774          0.138              0.361
         19   1.583        708.039          0.103              0.269
                                    Sum = 100.000   Sum=     261.326
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.059     0.036          0.01
   2   0.17     0.07      0.044         0.058     0.036          0.01
   3   0.25     0.07      0.044         0.058     0.036          0.01
   4   0.33     0.10      0.066         0.058      ---           0.01
   5   0.42     0.10      0.066         0.058      ---           0.01
   6   0.50     0.10      0.066         0.058      ---           0.01
   7   0.58     0.10      0.066         0.057      ---           0.01
   8   0.67     0.10      0.066         0.057      ---           0.01
   9   0.75     0.10      0.066         0.057      ---           0.01
  10   0.83     0.13      0.088         0.057      ---           0.03
  11   0.92     0.13      0.088         0.056      ---           0.03
  12   1.00     0.13      0.088         0.056      ---           0.03
  13   1.08     0.10      0.066         0.056      ---           0.01
  14   1.17     0.10      0.066         0.056      ---           0.01
  15   1.25     0.10      0.066         0.056      ---           0.01
  16   1.33     0.10      0.066         0.055      ---           0.01
  17   1.42     0.10      0.066         0.055      ---           0.01
  18   1.50     0.10      0.066         0.055      ---           0.01
  19   1.58     0.10      0.066         0.055      ---           0.01
  20   1.67     0.10      0.066         0.054      ---           0.01
  21   1.75     0.10      0.066         0.054      ---           0.01
  22   1.83     0.13      0.088         0.054      ---           0.03
  23   1.92     0.13      0.088         0.054      ---           0.03
  24   2.00     0.13      0.088         0.054      ---           0.03
  25   2.08     0.13      0.088         0.053      ---           0.03
  26   2.17     0.13      0.088         0.053      ---           0.03
  27   2.25     0.13      0.088         0.053      ---           0.03
  28   2.33     0.13      0.088         0.053      ---           0.04
  29   2.42     0.13      0.088         0.053      ---           0.04
  30   2.50     0.13      0.088         0.052      ---           0.04
  31   2.58     0.17      0.110         0.052      ---           0.06
  32   2.67     0.17      0.110         0.052      ---           0.06
  33   2.75     0.17      0.110         0.052      ---           0.06
  34   2.83     0.17      0.110         0.051      ---           0.06
  35   2.92     0.17      0.110         0.051      ---           0.06
  36   3.00     0.17      0.110         0.051      ---           0.06
  37   3.08     0.17      0.110         0.051      ---           0.06
  38   3.17     0.17      0.110         0.051      ---           0.06
  39   3.25     0.17      0.110         0.050      ---           0.06
  40   3.33     0.17      0.110         0.050      ---           0.06
  41   3.42     0.17      0.110         0.050      ---           0.06
  42   3.50     0.17      0.110         0.050      ---           0.06
  43   3.58     0.17      0.110         0.050      ---           0.06
  44   3.67     0.17      0.110         0.049      ---           0.06
  45   3.75     0.17      0.110         0.049      ---           0.06
  46   3.83     0.20      0.132         0.049      ---           0.08
  47   3.92     0.20      0.132         0.049      ---           0.08
  48   4.00     0.20      0.132         0.049      ---           0.08
```

49	4.08	0.20	0.132	0.048	---	0.08
50	4.17	0.20	0.132	0.048	---	0.08
51	4.25	0.20	0.132	0.048	---	0.08
52	4.33	0.23	0.154	0.048	---	0.11
53	4.42	0.23	0.154	0.048	---	0.11
54	4.50	0.23	0.154	0.047	---	0.11
55	4.58	0.23	0.154	0.047	---	0.11
56	4.67	0.23	0.154	0.047	---	0.11
57	4.75	0.23	0.154	0.047	---	0.11
58	4.83	0.27	0.176	0.046	---	0.13
59	4.92	0.27	0.176	0.046	---	0.13
60	5.00	0.27	0.176	0.046	---	0.13
61	5.08	0.20	0.132	0.046	---	0.09
62	5.17	0.20	0.132	0.046	---	0.09
63	5.25	0.20	0.132	0.045	---	0.09
64	5.33	0.23	0.154	0.045	---	0.11
65	5.42	0.23	0.154	0.045	---	0.11
66	5.50	0.23	0.154	0.045	---	0.11
67	5.58	0.27	0.176	0.045	---	0.13
68	5.67	0.27	0.176	0.045	---	0.13
69	5.75	0.27	0.176	0.044	---	0.13
70	5.83	0.27	0.176	0.044	---	0.13
71	5.92	0.27	0.176	0.044	---	0.13
72	6.00	0.27	0.176	0.044	---	0.13
73	6.08	0.30	0.198	0.044	---	0.15
74	6.17	0.30	0.198	0.043	---	0.15
75	6.25	0.30	0.198	0.043	---	0.15
76	6.33	0.30	0.198	0.043	---	0.15
77	6.42	0.30	0.198	0.043	---	0.16
78	6.50	0.30	0.198	0.043	---	0.16
79	6.58	0.33	0.220	0.042	---	0.18
80	6.67	0.33	0.220	0.042	---	0.18
81	6.75	0.33	0.220	0.042	---	0.18
82	6.83	0.33	0.220	0.042	---	0.18
83	6.92	0.33	0.220	0.042	---	0.18
84	7.00	0.33	0.220	0.041	---	0.18
85	7.08	0.33	0.220	0.041	---	0.18
86	7.17	0.33	0.220	0.041	---	0.18
87	7.25	0.33	0.220	0.041	---	0.18
88	7.33	0.37	0.242	0.041	---	0.20
89	7.42	0.37	0.242	0.040	---	0.20
90	7.50	0.37	0.242	0.040	---	0.20
91	7.58	0.40	0.264	0.040	---	0.22
92	7.67	0.40	0.264	0.040	---	0.22
93	7.75	0.40	0.264	0.040	---	0.22
94	7.83	0.43	0.286	0.040	---	0.25
95	7.92	0.43	0.286	0.039	---	0.25
96	8.00	0.43	0.286	0.039	---	0.25
97	8.08	0.50	0.330	0.039	---	0.29
98	8.17	0.50	0.330	0.039	---	0.29
99	8.25	0.50	0.330	0.039	---	0.29
100	8.33	0.50	0.330	0.038	---	0.29
101	8.42	0.50	0.330	0.038	---	0.29
102	8.50	0.50	0.330	0.038	---	0.29
103	8.58	0.53	0.352	0.038	---	0.31
104	8.67	0.53	0.352	0.038	---	0.31
105	8.75	0.53	0.352	0.038	---	0.31
106	8.83	0.57	0.374	0.037	---	0.34
107	8.92	0.57	0.374	0.037	---	0.34
108	9.00	0.57	0.374	0.037	---	0.34

```
109   9.08      0.63      0.418          0.037       ---           0.38
110   9.17      0.63      0.418          0.037       ---           0.38
111   9.25      0.63      0.418          0.037       ---           0.38
112   9.33      0.67      0.440          0.036       ---           0.40
113   9.42      0.67      0.440          0.036       ---           0.40
114   9.50      0.67      0.440          0.036       ---           0.40
115   9.58      0.70      0.462          0.036       ---           0.43
116   9.67      0.70      0.462          0.036       ---           0.43
117   9.75      0.70      0.462          0.035       ---           0.43
118   9.83      0.73      0.484          0.035       ---           0.45
119   9.92      0.73      0.484          0.035       ---           0.45
120  10.00      0.73      0.484          0.035       ---           0.45
121  10.08      0.50      0.330          0.035       ---           0.30
122  10.17      0.50      0.330          0.035       ---           0.30
123  10.25      0.50      0.330          0.034       ---           0.30
124  10.33      0.50      0.330          0.034       ---           0.30
125  10.42      0.50      0.330          0.034       ---           0.30
126  10.50      0.50      0.330          0.034       ---           0.30
127  10.58      0.67      0.440          0.034       ---           0.41
128  10.67      0.67      0.440          0.034       ---           0.41
129  10.75      0.67      0.440          0.033       ---           0.41
130  10.83      0.67      0.440          0.033       ---           0.41
131  10.92      0.67      0.440          0.033       ---           0.41
132  11.00      0.67      0.440          0.033       ---           0.41
133  11.08      0.63      0.418          0.033       ---           0.38
134  11.17      0.63      0.418          0.033       ---           0.39
135  11.25      0.63      0.418          0.033       ---           0.39
136  11.33      0.63      0.418          0.032       ---           0.39
137  11.42      0.63      0.418          0.032       ---           0.39
138  11.50      0.63      0.418          0.032       ---           0.39
139  11.58      0.57      0.374          0.032       ---           0.34
140  11.67      0.57      0.374          0.032       ---           0.34
141  11.75      0.57      0.374          0.032       ---           0.34
142  11.83      0.60      0.396          0.031       ---           0.36
143  11.92      0.60      0.396          0.031       ---           0.36
144  12.00      0.60      0.396          0.031       ---           0.36
145  12.08      0.83      0.550          0.031       ---           0.52
146  12.17      0.83      0.550          0.031       ---           0.52
147  12.25      0.83      0.550          0.031       ---           0.52
148  12.33      0.87      0.572          0.030       ---           0.54
149  12.42      0.87      0.572          0.030       ---           0.54
150  12.50      0.87      0.572          0.030       ---           0.54
151  12.58      0.93      0.616          0.030       ---           0.59
152  12.67      0.93      0.616          0.030       ---           0.59
153  12.75      0.93      0.616          0.030       ---           0.59
154  12.83      0.97      0.638          0.030       ---           0.61
155  12.92      0.97      0.638          0.029       ---           0.61
156  13.00      0.97      0.638          0.029       ---           0.61
157  13.08      1.13      0.748          0.029       ---           0.72
158  13.17      1.13      0.748          0.029       ---           0.72
159  13.25      1.13      0.748          0.029       ---           0.72
160  13.33      1.13      0.748          0.029       ---           0.72
161  13.42      1.13      0.748          0.029       ---           0.72
162  13.50      1.13      0.748          0.028       ---           0.72
163  13.58      0.77      0.506          0.028       ---           0.48
164  13.67      0.77      0.506          0.028       ---           0.48
165  13.75      0.77      0.506          0.028       ---           0.48
166  13.83      0.77      0.506          0.028       ---           0.48
167  13.92      0.77      0.506          0.028       ---           0.48
168  14.00      0.77      0.506          0.028       ---           0.48
```

```
169  14.08     0.90      0.594         0.027      ---          0.57
170  14.17     0.90      0.594         0.027      ---          0.57
171  14.25     0.90      0.594         0.027      ---          0.57
172  14.33     0.87      0.572         0.027      ---          0.54
173  14.42     0.87      0.572         0.027      ---          0.54
174  14.50     0.87      0.572         0.027      ---          0.55
175  14.58     0.87      0.572         0.027      ---          0.55
176  14.67     0.87      0.572         0.026      ---          0.55
177  14.75     0.87      0.572         0.026      ---          0.55
178  14.83     0.83      0.550         0.026      ---          0.52
179  14.92     0.83      0.550         0.026      ---          0.52
180  15.00     0.83      0.550         0.026      ---          0.52
181  15.08     0.80      0.528         0.026      ---          0.50
182  15.17     0.80      0.528         0.026      ---          0.50
183  15.25     0.80      0.528         0.025      ---          0.50
184  15.33     0.77      0.506         0.025      ---          0.48
185  15.42     0.77      0.506         0.025      ---          0.48
186  15.50     0.77      0.506         0.025      ---          0.48
187  15.58     0.63      0.418         0.025      ---          0.39
188  15.67     0.63      0.418         0.025      ---          0.39
189  15.75     0.63      0.418         0.025      ---          0.39
190  15.83     0.63      0.418         0.025      ---          0.39
191  15.92     0.63      0.418         0.024      ---          0.39
192  16.00     0.63      0.418         0.024      ---          0.39
193  16.08     0.13      0.088         0.024      ---          0.06
194  16.17     0.13      0.088         0.024      ---          0.06
195  16.25     0.13      0.088         0.024      ---          0.06
196  16.33     0.13      0.088         0.024      ---          0.06
197  16.42     0.13      0.088         0.024      ---          0.06
198  16.50     0.13      0.088         0.024      ---          0.06
199  16.58     0.10      0.066         0.023      ---          0.04
200  16.67     0.10      0.066         0.023      ---          0.04
201  16.75     0.10      0.066         0.023      ---          0.04
202  16.83     0.10      0.066         0.023      ---          0.04
203  16.92     0.10      0.066         0.023      ---          0.04
204  17.00     0.10      0.066         0.023      ---          0.04
205  17.08     0.17      0.110         0.023      ---          0.09
206  17.17     0.17      0.110         0.023      ---          0.09
207  17.25     0.17      0.110         0.023      ---          0.09
208  17.33     0.17      0.110         0.022      ---          0.09
209  17.42     0.17      0.110         0.022      ---          0.09
210  17.50     0.17      0.110         0.022      ---          0.09
211  17.58     0.17      0.110         0.022      ---          0.09
212  17.67     0.17      0.110         0.022      ---          0.09
213  17.75     0.17      0.110         0.022      ---          0.09
214  17.83     0.13      0.088         0.022      ---          0.07
215  17.92     0.13      0.088         0.022      ---          0.07
216  18.00     0.13      0.088         0.022      ---          0.07
217  18.08     0.13      0.088         0.021      ---          0.07
218  18.17     0.13      0.088         0.021      ---          0.07
219  18.25     0.13      0.088         0.021      ---          0.07
220  18.33     0.13      0.088         0.021      ---          0.07
221  18.42     0.13      0.088         0.021      ---          0.07
222  18.50     0.13      0.088         0.021      ---          0.07
223  18.58     0.10      0.066         0.021      ---          0.05
224  18.67     0.10      0.066         0.021      ---          0.05
225  18.75     0.10      0.066         0.021      ---          0.05
226  18.83     0.07      0.044         0.021      ---          0.02
227  18.92     0.07      0.044         0.020      ---          0.02
228  19.00     0.07      0.044         0.020      ---          0.02
```

```
229  19.08     0.10      0.066         0.020      ---          0.05
230  19.17     0.10      0.066         0.020      ---          0.05
231  19.25     0.10      0.066         0.020      ---          0.05
232  19.33     0.13      0.088         0.020      ---          0.07
233  19.42     0.13      0.088         0.020      ---          0.07
234  19.50     0.13      0.088         0.020      ---          0.07
235  19.58     0.10      0.066         0.020      ---          0.05
236  19.67     0.10      0.066         0.020      ---          0.05
237  19.75     0.10      0.066         0.019      ---          0.05
238  19.83     0.07      0.044         0.019      ---          0.02
239  19.92     0.07      0.044         0.019      ---          0.02
240  20.00     0.07      0.044         0.019      ---          0.02
241  20.08     0.10      0.066         0.019      ---          0.05
242  20.17     0.10      0.066         0.019      ---          0.05
243  20.25     0.10      0.066         0.019      ---          0.05
244  20.33     0.10      0.066         0.019      ---          0.05
245  20.42     0.10      0.066         0.019      ---          0.05
246  20.50     0.10      0.066         0.019      ---          0.05
247  20.58     0.10      0.066         0.019      ---          0.05
248  20.67     0.10      0.066         0.019      ---          0.05
249  20.75     0.10      0.066         0.019      ---          0.05
250  20.83     0.07      0.044         0.018      ---          0.03
251  20.92     0.07      0.044         0.018      ---          0.03
252  21.00     0.07      0.044         0.018      ---          0.03
253  21.08     0.10      0.066         0.018      ---          0.05
254  21.17     0.10      0.066         0.018      ---          0.05
255  21.25     0.10      0.066         0.018      ---          0.05
256  21.33     0.07      0.044         0.018      ---          0.03
257  21.42     0.07      0.044         0.018      ---          0.03
258  21.50     0.07      0.044         0.018      ---          0.03
259  21.58     0.10      0.066         0.018      ---          0.05
260  21.67     0.10      0.066         0.018      ---          0.05
261  21.75     0.10      0.066         0.018      ---          0.05
262  21.83     0.07      0.044         0.018      ---          0.03
263  21.92     0.07      0.044         0.018      ---          0.03
264  22.00     0.07      0.044         0.017      ---          0.03
265  22.08     0.10      0.066         0.017      ---          0.05
266  22.17     0.10      0.066         0.017      ---          0.05
267  22.25     0.10      0.066         0.017      ---          0.05
268  22.33     0.07      0.044         0.017      ---          0.03
269  22.42     0.07      0.044         0.017      ---          0.03
270  22.50     0.07      0.044         0.017      ---          0.03
271  22.58     0.07      0.044         0.017      ---          0.03
272  22.67     0.07      0.044         0.017      ---          0.03
273  22.75     0.07      0.044         0.017      ---          0.03
274  22.83     0.07      0.044         0.017      ---          0.03
275  22.92     0.07      0.044         0.017      ---          0.03
276  23.00     0.07      0.044         0.017      ---          0.03
277  23.08     0.07      0.044         0.017      ---          0.03
278  23.17     0.07      0.044         0.017      ---          0.03
279  23.25     0.07      0.044         0.017      ---          0.03
280  23.33     0.07      0.044         0.017      ---          0.03
281  23.42     0.07      0.044         0.017      ---          0.03
282  23.50     0.07      0.044         0.017      ---          0.03
283  23.58     0.07      0.044         0.017      ---          0.03
284  23.67     0.07      0.044         0.017      ---          0.03
285  23.75     0.07      0.044         0.017      ---          0.03
286  23.83     0.07      0.044         0.017      ---          0.03
287  23.92     0.07      0.044         0.017      ---          0.03
288  24.00     0.07      0.044         0.017      ---          0.03
```

```
     Sum =     100.0                                   Sum =    56.5
      Flood volume = Effective rainfall      4.71(In)
       times area     259.3(Ac.)/[(In)/(Ft.)] =     101.7(Ac.Ft)
      Total soil loss =      0.79(In)
      Total soil loss =    17.065(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =     4430964.3 Cubic Feet
      Total soil loss =      743338.4 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =    182.430(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++
                          24 - H O U R    S T O R M
                     R u n o f f      H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0       50.0     100.0     150.0
200.0

-----------------------------------------------------------------------
    0+ 5       0.0004      0.06  Q         |         |         |
|
    0+10       0.0023      0.27  Q         |         |         |
|
    0+15       0.0080      0.83  Q         |         |         |
|
    0+20       0.0173      1.35  Q         |         |         |
|
    0+25       0.0281      1.57  Q         |         |         |
|
    0+30       0.0400      1.73  Q         |         |         |
|
    0+35       0.0528      1.86  Q         |         |         |
|
    0+40       0.0664      1.97  Q         |         |         |
|
    0+45       0.0807      2.07  Q         |         |         |
|
    0+50       0.0967      2.32  Q         |         |         |
|
    0+55       0.1173      2.99  Q         |         |         |
|
    1+ 0       0.1490      4.60  Q         |         |         |
|
    1+ 5       0.1900      5.96  VQ        |         |         |
|
    1+10       0.2317      6.05  VQ        |         |         |
|
    1+15       0.2660      4.98  Q         |         |         |
|
    1+20       0.2926      3.86  Q         |         |         |
|
    1+25       0.3168      3.52  Q         |         |         |
```

```
|
    1+30        0.3398       3.34  Q          |         |         |
|
    1+35        0.3620       3.22  Q          |         |         |
|
    1+40        0.3836       3.14  Q          |         |         |
|
    1+45        0.4048       3.07  Q          |         |         |
|
    1+50        0.4269       3.21  Q          |         |         |
|
    1+55        0.4530       3.80  Q          |         |         |
|
    2+ 0        0.4901       5.38  VQ         |         |         |
|
    2+ 5        0.5375       6.89  VQ         |         |         |
|
    2+10        0.5896       7.55  VQ         |         |         |
|
    2+15        0.6447       8.01  VQ         |         |         |
|
    2+20        0.7022       8.34  VQ         |         |         |
|
    2+25        0.7614       8.60  VQ         |         |         |
|
    2+30        0.8220       8.80  VQ         |         |         |
|
    2+35        0.8849       9.13  VQ         |         |         |
|
    2+40        0.9527       9.85  VQ         |         |         |
|
    2+45        1.0317      11.48  V Q        |         |         |
|
    2+50        1.1214      13.02  V Q        |         |         |
|
    2+55        1.2158      13.71  V Q        |         |         |
|
    3+ 0        1.3135      14.18  V Q        |         |         |
|
    3+ 5        1.4137      14.54  V Q        |         |         |
|
    3+10        1.5158      14.82  V Q        |         |         |
|
    3+15        1.6194      15.04  V  Q       |         |         |
|
    3+20        1.7242      15.21  V  Q       |         |         |
|
    3+25        1.8299      15.34  V  Q       |         |         |
|
    3+30        1.9362      15.43  V  Q       |         |         |
|
    3+35        2.0430      15.51  V  Q       |         |         |
|
    3+40        2.1504      15.59  V  Q       |         |         |
|
    3+45        2.2582      15.66  V  Q       |         |         |
|
    3+50        2.3676      15.89  V  Q       |         |         |
|
    3+55        2.4816      16.55  V  Q       |         |         |
```

```
|
    4+ 0       2.6066     18.15  |V Q      |         |         |
|
    4+ 5       2.7421     19.68  |V Q      |         |         |
|
    4+10       2.8822     20.34  |V  Q     |         |         |
|
    4+15       3.0254     20.80  |V  Q     |         |         |
|
    4+20       3.1721     21.30  |V  Q     |         |         |
|
    4+25       3.3248     22.16  |V  Q     |         |         |
|
    4+30       3.4894     23.91  |V  Q     |         |         |
|
    4+35       3.6653     25.54  |V   Q    |         |         |
|
    4+40       3.8463     26.28  |V   Q    |         |         |
|
    4+45       4.0306     26.77  |V   Q    |         |         |
|
    4+50       4.2186     27.30  |V   Q    |         |         |
|
    4+55       4.4126     28.17  |V   Q    |         |         |
|
    5+ 0       4.6188     29.93  |V   Q    |         |         |
|
    5+ 5       4.8340     31.25  |V    Q   |         |         |
|
    5+10       5.0463     30.83  |V    Q   |         |         |
|
    5+15       5.2408     28.24  | V  Q    |         |         |
|
    5+20       5.4188     25.85  | V  Q    |         |         |
|
    5+25       5.5944     25.50  | V  Q    |         |         |
|
    5+30       5.7766     26.45  | V  Q    |         |         |
|
    5+35       5.9673     27.68  | V  Q    |         |         |
|
    5+40       6.1642     28.60  | V  Q    |         |         |
|
    5+45       6.3731     30.32  | V   Q   |         |         |
|
    5+50       6.5930     31.94  | V   Q   |         |         |
|
    5+55       6.8181     32.69  | V   Q   |         |         |
|
    6+ 0       7.0471     33.24  | V   Q   |         |         |
|
    6+ 5       7.2800     33.82  | V   Q   |         |         |
|
    6+10       7.5191     34.72  | V   Q   |         |         |
|
    6+15       7.7704     36.49  |  V   Q  |         |         |
|
    6+20       8.0329     38.11  |  V   Q  |         |         |
|
    6+25       8.3003     38.84  |  V   Q  |         |         |
```

```
|
    6+30       8.5712     39.32  |  V   Q  |         |         |
|
    6+35       8.8456     39.85  |  V   Q  |         |         |
|
    6+40       9.1262     40.74  |  V    Q |         |         |
|
    6+45       9.4190     42.51  |  V    Q |         |         |
|
    6+50       9.7231     44.15  |  V    Q |         |         |
|
    6+55      10.0323     44.90  |  V    Q |         |         |
|
    7+ 0      10.3450     45.40  |   V    Q|         |         |
|
    7+ 5      10.6602     45.77  |   V    Q|         |         |
|
    7+10      10.9773     46.05  |   V    Q|         |         |
|
    7+15      11.2960     46.27  |   V    Q|         |         |
|
    7+20      11.6170     46.61  |   V    Q|         |         |
|
    7+25      11.9430     47.33  |   V    Q|         |         |
|
    7+30      12.2802     48.97  |   V    Q|         |         |
|
    7+35      12.6292     50.67  |   V     Q         |         |
|
    7+40      12.9869     51.94  |    V    Q         |         |
|
    7+45      13.3584     53.95  |    V    Q         |         |
|
    7+50      13.7436     55.93  |    V    |Q        |         |
|
    7+55      14.1390     57.40  |    V    |Q        |         |
|
    8+ 0      14.5492     59.56  |    V    |Q        |         |
|
    8+ 5      14.9748     61.80  |    V    | Q       |         |
|
    8+10      15.4150     63.92  |     V   | Q       |         |
|
    8+15      15.8810     67.65  |     V   |  Q      |         |
|
    8+20      16.3703     71.05  |     V   |   Q     |         |
|
    8+25      16.8705     72.63  |     V   |   Q     |         |
|
    8+30      17.3779     73.69  |     V   |   Q     |         |
|
    8+35      17.8919     74.62  |      V  |   Q     |         |
|
    8+40      18.4138     75.79  |      V  |    Q    |         |
|
    8+45      18.9493     77.75  |      V  |    Q    |         |
|
    8+50      19.4981     79.69  |      V  |    Q    |         |
|
    8+55      20.0568     81.12  |      V  |     Q   |         |
```

```
|
    9+ 0      20.6298      83.20 |        V |     Q   |           |
|
    9+ 5      21.2179      85.40 |        V |      Q  |           |
|
    9+10      21.8205      87.49 |        V |      Q  |           |
|
    9+15      22.4487      91.22 |        V |       Q |           |
|
    9+20      23.1015      94.79 |         V|       Q |           |
|
    9+25      23.7693      96.96 |         V|        Q|           |
|
    9+30      24.4550      99.57 |         V|        Q|           |
|
    9+35      25.1572     101.96 |         V|         Q           |
|
    9+40      25.8716     103.72 |          V         Q           |
|
    9+45      26.6022     106.08 |          V         |Q          |
|
    9+50      27.3480     108.30 |          V         |Q          |
|
    9+55      28.1051     109.93 |          |V        |Q          |
|
   10+ 0      28.8777     112.17 |          |V        | Q         |
|
   10+ 5      29.6559     113.00 |          |V        | Q         |
|
   10+10      30.4127     109.89 |          |V        |Q          |
|
   10+15      31.0999      99.77 |          | V      Q|           |
|
   10+20      31.7199      90.02 |          | V     Q |           |
|
   10+25      32.3130      86.12 |          | V    Q  |           |
|
   10+30      32.8885      83.56 |          | V   Q   |           |
|
   10+35      33.4571      82.56 |          |  V  Q   |           |
|
   10+40      34.0368      84.17 |          |  V  Q   |           |
|
   10+45      34.6627      90.88 |          |  V    Q |           |
|
   10+50      35.3344      97.53 |          |  V     Q|           |
|
   10+55      36.0240     100.14 |          |   V     Q           |
|
   11+ 0      36.7264     101.98 |          |   V     Q           |
|
   11+ 5      37.4368     103.16 |          |   V     Q           |
|
   11+10      38.1500     103.55 |          |    V    Q           |
|
   11+15      38.8576     102.74 |          |    V    Q           |
|
   11+20      39.5584     101.76 |          |    V    Q           |
|
   11+25      40.2572     101.47 |          |    V    Q           |
```

```
|
   11+30      40.9544    101.23  |         |     V   Q         |
|
   11+35      41.6481    100.73  |         |     V   Q         |
|
   11+40      42.3333     99.48  |         |     V  Q|         |
|
   11+45      42.9969     96.36  |         |     V  Q|         |
|
   11+50      43.6415     93.60  |         |      VQ |         |
|
   11+55      44.2820     93.00  |         |      VQ |         |
|
   12+ 0      44.9279     93.78  |         |      VQ |         |
|
   12+ 5      45.5881     95.86  |         |      V Q|         |
|
   12+10      46.2781    100.19  |         |       V Q         |
|
   12+15      47.0432    111.09  |         |       V | Q       |
|
   12+20      47.8807    121.60  |         |       V |   Q     |
|
   12+25      48.7523    126.56  |         |        V|    Q    |
|
   12+30      49.6548    131.05  |         |        V|     Q   |
|
   12+35      50.5843    134.95  |         |        V|     Q   |
|
   12+40      51.5367    138.30  |         |         V      Q  |
|
   12+45      52.5211    142.93  |         |         V       Q |
|
   12+50      53.5343    147.11  |         |         |V       Q|
|
   12+55      54.5651    149.68  |         |         |V       Q|
|
   13+ 0      55.6152    152.47  |         |         |V        Q
|
   13+ 5      56.6872    155.65  |         |         | V       |Q
|
   13+10      57.7884    159.89  |         |         | V       |Q
|
   13+15      58.9488    168.49  |         |         |  V      |  Q
|
   13+20      60.1644    176.50  |         |         |  V      |    Q
|
   13+25      61.4046    180.07  |         |         |   V     |     Q
|
   13+30      62.6610    182.43  |         |         |   V     |     Q
|
   13+35      63.9166    182.32  |         |         |    V    |     Q
|
   13+40      65.1362    177.08  |         |         |    V    |    Q
|
   13+45      66.2452    161.02  |         |         |     V   | Q
|
   13+50      67.2477    145.56  |         |         |     V  Q|
|
   13+55      68.2069    139.29  |         |         |     VQ  |
```

```
|
   14+ 0      69.1373    135.09  |         |         |      Q  |
|
   14+ 5      70.0516    132.75  |         |         |     QV  |
|
   14+10      70.9670    132.92  |         |         |     QV  |
|
   14+15      71.9138    137.47  |         |         |      QV |
|
   14+20      72.8925    142.10  |         |         |       Q |
|
   14+25      73.8790    143.24  |         |         |       QV|
|
   14+30      74.8639    143.01  |         |         |       QV|
|
   14+35      75.8453    142.50  |         |         |       QV|
|
   14+40      76.8270    142.55  |         |         |       Q V
|
   14+45      77.8095    142.66  |         |         |       Q V
|
   14+50      78.7910    142.50  |         |         |       Q V
|
   14+55      79.7681    141.89  |         |         |       Q |V
|
   15+ 0      80.7342    140.28  |         |         |       Q |V
|
   15+ 5      81.6888    138.61  |         |         |      Q  | V
|
   15+10      82.6354    137.45  |         |         |      Q  | V
|
   15+15      83.5690    135.56  |         |         |      Q  | V
|
   15+20      84.4899    133.71  |         |         |     Q   |  V
|
   15+25      85.4016    132.37  |         |         |     Q   |  V
|
   15+30      86.2991    130.32  |         |         |     Q   |  V
|
   15+35      87.1796    127.85  |         |         |    Q    |   V
|
   15+40      88.0379    124.62  |         |         |   Q     |   V
|
   15+45      88.8498    117.89  |         |         |  Q      |   V
|
   15+50      89.6186    111.63  |         |         | Q       |    V
|
   15+55      90.3687    108.92  |         |         |Q        |    V
|
   16+ 0      91.1065    107.13  |         |         |Q        |    V
|
   16+ 5      91.8186    103.40  |         |         Q         |     V
|
   16+10      92.4637     93.66  |         |       Q |         |     V
|
   16+15      92.9451     69.89  |         |  Q      |         |     V
|
   16+20      93.2720     47.48  |        Q|         |         |     V
|
   16+25      93.5338     38.01  |      Q  |         |         |     V
```

```
|
   16+30      93.7529     31.82  |     Q   |         |         |     V
|
   16+35      93.9406     27.24  |    Q    |         |         |     V
|
   16+40      94.1018     23.41  |   Q     |         |         |      V
|
   16+45      94.2360     19.49  |  Q      |         |         |      V
|
   16+50      94.3486     16.35  |  Q      |         |         |      V
|
   16+55      94.4492     14.60  | Q       |         |         |      V
|
   17+ 0      94.5433     13.67  | Q       |         |         |      V
|
   17+ 5      94.6353     13.36  | Q       |         |         |      V
|
   17+10      94.7321     14.05  | Q       |         |         |      V
|
   17+15      94.8479     16.80  |  Q      |         |         |      V
|
   17+20      94.9816     19.42  |  Q      |         |         |      V
|
   17+25      95.1220     20.39  |   Q     |         |         |      V
|
   17+30      95.2671     21.07  |   Q     |         |         |      V
|
   17+35      95.4157     21.57  |   Q     |         |         |      V
|
   17+40      95.5672     22.00  |   Q     |         |         |      V
|
   17+45      95.7210     22.33  |   Q     |         |         |      V
|
   17+50      95.8752     22.40  |   Q     |         |         |      V
|
   17+55      96.0265     21.97  |   Q     |         |         |      V
|
   18+ 0      96.1679     20.52  |   Q     |         |         |      V
|
   18+ 5      96.2996     19.13  |  Q      |         |         |      V
|
   18+10      96.4276     18.59  |  Q      |         |         |      V
|
   18+15      96.5532     18.24  |  Q      |         |         |      V
|
   18+20      96.6772     18.01  |  Q      |         |         |       V
|
   18+25      96.8002     17.85  |  Q      |         |         |       V
|
   18+30      96.9223     17.74  |  Q      |         |         |       V
|
   18+35      97.0429     17.50  |  Q      |         |         |       V
|
   18+40      97.1590     16.87  |  Q      |         |         |       V
|
   18+45      97.2645     15.32  |  Q      |         |         |       V
|
   18+50      97.3589     13.69  | Q       |         |         |       V
|
   18+55      97.4450     12.50  | Q       |         |         |       V
```

```
|
   19+ 0      97.5177     10.57  | Q       |         |         |       V
|
   19+ 5      97.5796      8.99  |Q        |         |         |       V
|
   19+10      97.6400      8.77  |Q        |         |         |       V
|
   19+15      97.7072      9.76  |Q        |         |         |       V
|
   19+20      97.7831     11.01  | Q       |         |         |       V
|
   19+25      97.8654     11.95  | Q       |         |         |       V
|
   19+30      97.9600     13.73  | Q       |         |         |       V
|
   19+35      98.0647     15.21  |  Q      |         |         |       V
|
   19+40      98.1706     15.38  |  Q      |         |         |       V
|
   19+45      98.2696     14.37  | Q       |         |         |       V
|
   19+50      98.3600     13.12  | Q       |         |         |       V
|
   19+55      98.4440     12.20  | Q       |         |         |       V
|
   20+ 0      98.5160     10.45  | Q       |         |         |       V
|
   20+ 5      98.5779      8.99  |Q        |         |         |       V
|
   20+10      98.6389      8.86  |Q        |         |         |       V
|
   20+15      98.7072      9.91  |Q        |         |         |       V
|
   20+20      98.7831     11.03  | Q       |         |         |       V
|
   20+25      98.8617     11.41  | Q       |         |         |       V
|
   20+30      98.9420     11.67  | Q       |         |         |       V
|
   20+35      99.0238     11.86  | Q       |         |         |       V
|
   20+40      99.1065     12.02  | Q       |         |         |       V
|
   20+45      99.1902     12.15  | Q       |         |         |
V|
   20+50      99.2735     12.09  | Q       |         |         |
V|
   20+55      99.3531     11.56  | Q       |         |         |
V|
   21+ 0      99.4223     10.05  | Q       |         |         |
V|
   21+ 5      99.4827      8.77  |Q        |         |         |
V|
   21+10      99.5432      8.78  |Q        |         |         |
V|
   21+15      99.6116      9.94  |Q        |         |         |
V|
   21+20      99.6872     10.98  | Q       |         |         |
V|
   21+25      99.7618     10.82  | Q       |         |         |
```

```
V|
   21+30      99.8276      9.56  |Q         |         |         |
V|
   21+35      99.8859      8.46  |Q         |         |         |
V|
   21+40      99.9450      8.59  |Q         |         |         |
V|
   21+45     100.0130      9.87  |Q         |         |         |
V|
   21+50     100.0886     10.98  | Q        |         |         |
V|
   21+55     100.1635     10.87  | Q        |         |         |
V|
   22+ 0     100.2296      9.61  |Q         |         |         |
V|
   22+ 5     100.2883      8.51  |Q         |         |         |
V|
   22+10     100.3478      8.65  |Q         |         |         |
V|
   22+15     100.4162      9.93  |Q         |         |         |
V|
   22+20     100.4923     11.05  | Q        |         |         |
V|
   22+25     100.5677     10.95  | Q        |         |         |
V|
   22+30     100.6345      9.70  |Q         |         |         |
V|
   22+35     100.6926      8.44  |Q         |         |         |
V|
   22+40     100.7476      7.99  |Q         |         |         |
V|
   22+45     100.8008      7.72  |Q         |         |         |
V|
   22+50     100.8528      7.54  |Q         |         |         |
V|
   22+55     100.9038      7.41  |Q         |         |         |
V|
   23+ 0     100.9540      7.30  |Q         |         |         |
V|
   23+ 5     101.0037      7.21  |Q         |         |         |
V|
   23+10     101.0530      7.16  |Q         |         |         |
V|
   23+15     101.1022      7.14  |Q         |         |         |
V|
   23+20     101.1513      7.14  |Q         |         |         |
V|
   23+25     101.2005      7.14  |Q         |         |         |
V|
   23+30     101.2497      7.14  |Q         |         |         |
V|
   23+35     101.2989      7.14  |Q         |         |         |
V|
   23+40     101.3480      7.14  |Q         |         |         |
V|
   23+45     101.3972      7.14  |Q         |         |         |
V|
   23+50     101.4463      7.14  |Q         |         |         |
V|
   23+55     101.4955      7.14  |Q         |         |         |
```

```
V|
   24+ 0     101.5448      7.15  |Q         |         |         |
V|
   24+ 5     101.5927      6.95  |Q         |         |         |
V|
   24+10     101.6355      6.22  |Q         |         |         |
V|
   24+15     101.6652      4.30  Q          |         |         |
V|
   24+20     101.6822      2.48  Q          |         |         |
V|
   24+25     101.6941      1.72  Q          |         |         |
V|
   24+30     101.7025      1.22  Q          |         |         |
V|
   24+35     101.7084      0.86  Q          |         |         |
V|
   24+40     101.7124      0.59  Q          |         |         |
V|
   24+45     101.7152      0.40  Q          |         |         |
V|
   24+50     101.7170      0.26  Q          |         |         |
V|
   24+55     101.7181      0.17  Q          |         |         |
V|
   25+ 0     101.7190      0.13  Q          |         |         |
V|
   25+ 5     101.7197      0.10  Q          |         |         |
V|
   25+10     101.7202      0.07  Q          |         |         |
V|
   25+15     101.7205      0.05  Q          |         |         |
V|
   25+20     101.7208      0.03  Q          |         |         |
V|
   25+25     101.7209      0.02  Q          |         |         |
V|
   25+30     101.7209      0.01  Q          |         |         |
V|
-----------------------------------------------------------------------
```

```
            U n i t   H y d r o g r a p h   A n a l y s i s

            Copyright (c) CIVILCADD/CIVILDESIGN, 1989 - 2002, Version
6.1
                  Study date  04/03/18 File: stockpilearea2post24100.out


      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
++++++
      ------------------------------------------------------------------
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      Riverside County Synthetic Unit Hydrology Method
      RCFC & WCD Manual date - April 1978

      FOR OFFICIAL USE ONLY - Riverside County Waste Management - S/N
872

      ------------------------------------------------------------------
---
       English (in-lb) Input Units Used
       English Rainfall Data (Inches) Input Values Used

       English Units used in output format



      ------------------------------------------------------------------
---

      Badlands landfill
      Stockpile Area 2 Post Landfill
      24 hr 100 year storm event
      ------------------------------------------------------------------
--
      Drainage Area =      30.90(Ac.)  =      0.048 Sq. Mi.
      Drainage Area for Depth-Area Areal Adjustment =      30.90(Ac.)  =
0.048 Sq. Mi.
      Length along longest watercourse =    2357.00(Ft.)
      Length along longest watercourse measured to centroid =    1118.00
(Ft.)
      Length along longest watercourse =      0.446 Mi.
      Length along longest watercourse measured to centroid =      0.212
Mi.
      Difference in elevation =     367.00(Ft.)
      Slope along watercourse =    822.1298 Ft./Mi.
      Average Manning's 'N' = 0.020
      Lag time =    0.055 Hr.
      Lag time =     3.28 Min.
      25% of lag time =     0.82 Min.
      40% of lag time =     1.31 Min.
      Unit time =     5.00 Min.
      Duration of storm = 24 Hour(s)
      User Entered Base Flow =     0.00(CFS)

      2 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
```

```
             30.90              2.00                  61.80

      100 YEAR Area rainfall data:


      Area(Ac.)[1]       Rainfall(In)[2]      Weighting[1*2]
             30.90              5.50                 169.95

      STORM EVENT (YEAR) =  100.00
      Area Averaged 2-Year Rainfall =    2.000(In)
      Area Averaged 100-Year Rainfall =    5.500(In)

      Point rain (area averaged) =    5.500(In)
      Areal adjustment factor =   99.99 %
      Adjusted average point rain =    5.500(In)

      Sub-Area Data:
      Area(Ac.)         Runoff Index   Impervious %
          30.900           93.00         0.100
       Total Area Entered =     30.90(Ac.)


      RI    RI   Infil. Rate Impervious   Adj. Infil. Rate  Area%     F
      AMC2 AMC-3     (In/Hr)    (Dec.%)     (In/Hr)      (Dec.)
(In/Hr)
      93.0  97.2      0.036     0.100        0.033       1.000
0.033
                                                          Sum (F) =
0.033
      Area averaged mean soil loss (F) (In/Hr) =  0.033
      Minimum soil loss rate ((In/Hr)) =  0.017
      (for 24 hour storm duration)
      Soil low loss rate (decimal) =   0.820
      ------------------------------------------------------------------
---

                  U n i t  H y d r o g r a p h
                        FOOTHILL S-Curve
      ------------------------------------------------------------------
--
                  Unit Hydrograph Data
      ------------------------------------------------------------------
---
      Unit time period   Time % of lag   Distribution   Unit Hydrograph
          (hrs)                           Graph %           (CFS)
      ------------------------------------------------------------------
---
          1   0.083        152.305         31.177             9.709
          2   0.167        304.609         54.153            16.864
          3   0.250        456.914         11.590             3.609
          4   0.333        609.219          2.276             0.709
          5   0.417        761.524          0.804             0.250
                                     Sum = 100.000   Sum=      31.141
-----------------------------------------------------------------------


  Unit Time   Pattern   Storm Rain     Loss rate(In./Hr)     Effective
       (Hr.)  Percent   (In/Hr)         Max   |   Low        (In/Hr)
   1   0.08     0.07      0.044         0.059     0.036          0.01
   2   0.17     0.07      0.044         0.058     0.036          0.01
```

3	0.25	0.07	0.044	0.058	0.036	0.01
4	0.33	0.10	0.066	0.058	---	0.01
5	0.42	0.10	0.066	0.058	---	0.01
6	0.50	0.10	0.066	0.058	---	0.01
7	0.58	0.10	0.066	0.057	---	0.01
8	0.67	0.10	0.066	0.057	---	0.01
9	0.75	0.10	0.066	0.057	---	0.01
10	0.83	0.13	0.088	0.057	---	0.03
11	0.92	0.13	0.088	0.056	---	0.03
12	1.00	0.13	0.088	0.056	---	0.03
13	1.08	0.10	0.066	0.056	---	0.01
14	1.17	0.10	0.066	0.056	---	0.01
15	1.25	0.10	0.066	0.056	---	0.01
16	1.33	0.10	0.066	0.055	---	0.01
17	1.42	0.10	0.066	0.055	---	0.01
18	1.50	0.10	0.066	0.055	---	0.01
19	1.58	0.10	0.066	0.055	---	0.01
20	1.67	0.10	0.066	0.054	---	0.01
21	1.75	0.10	0.066	0.054	---	0.01
22	1.83	0.13	0.088	0.054	---	0.03
23	1.92	0.13	0.088	0.054	---	0.03
24	2.00	0.13	0.088	0.054	---	0.03
25	2.08	0.13	0.088	0.053	---	0.03
26	2.17	0.13	0.088	0.053	---	0.03
27	2.25	0.13	0.088	0.053	---	0.04
28	2.33	0.13	0.088	0.053	---	0.04
29	2.42	0.13	0.088	0.053	---	0.04
30	2.50	0.13	0.088	0.052	---	0.04
31	2.58	0.17	0.110	0.052	---	0.06
32	2.67	0.17	0.110	0.052	---	0.06
33	2.75	0.17	0.110	0.052	---	0.06
34	2.83	0.17	0.110	0.051	---	0.06
35	2.92	0.17	0.110	0.051	---	0.06
36	3.00	0.17	0.110	0.051	---	0.06
37	3.08	0.17	0.110	0.051	---	0.06
38	3.17	0.17	0.110	0.051	---	0.06
39	3.25	0.17	0.110	0.050	---	0.06
40	3.33	0.17	0.110	0.050	---	0.06
41	3.42	0.17	0.110	0.050	---	0.06
42	3.50	0.17	0.110	0.050	---	0.06
43	3.58	0.17	0.110	0.050	---	0.06
44	3.67	0.17	0.110	0.049	---	0.06
45	3.75	0.17	0.110	0.049	---	0.06
46	3.83	0.20	0.132	0.049	---	0.08
47	3.92	0.20	0.132	0.049	---	0.08
48	4.00	0.20	0.132	0.049	---	0.08
49	4.08	0.20	0.132	0.048	---	0.08
50	4.17	0.20	0.132	0.048	---	0.08
51	4.25	0.20	0.132	0.048	---	0.08
52	4.33	0.23	0.154	0.048	---	0.11
53	4.42	0.23	0.154	0.048	---	0.11
54	4.50	0.23	0.154	0.047	---	0.11
55	4.58	0.23	0.154	0.047	---	0.11
56	4.67	0.23	0.154	0.047	---	0.11
57	4.75	0.23	0.154	0.047	---	0.11
58	4.83	0.27	0.176	0.046	---	0.13
59	4.92	0.27	0.176	0.046	---	0.13
60	5.00	0.27	0.176	0.046	---	0.13
61	5.08	0.20	0.132	0.046	---	0.09
62	5.17	0.20	0.132	0.046	---	0.09

63	5.25	0.20	0.132	0.045	---	0.09
64	5.33	0.23	0.154	0.045	---	0.11
65	5.42	0.23	0.154	0.045	---	0.11
66	5.50	0.23	0.154	0.045	---	0.11
67	5.58	0.27	0.176	0.045	---	0.13
68	5.67	0.27	0.176	0.045	---	0.13
69	5.75	0.27	0.176	0.044	---	0.13
70	5.83	0.27	0.176	0.044	---	0.13
71	5.92	0.27	0.176	0.044	---	0.13
72	6.00	0.27	0.176	0.044	---	0.13
73	6.08	0.30	0.198	0.044	---	0.15
74	6.17	0.30	0.198	0.043	---	0.15
75	6.25	0.30	0.198	0.043	---	0.15
76	6.33	0.30	0.198	0.043	---	0.16
77	6.42	0.30	0.198	0.043	---	0.16
78	6.50	0.30	0.198	0.043	---	0.16
79	6.58	0.33	0.220	0.042	---	0.18
80	6.67	0.33	0.220	0.042	---	0.18
81	6.75	0.33	0.220	0.042	---	0.18
82	6.83	0.33	0.220	0.042	---	0.18
83	6.92	0.33	0.220	0.042	---	0.18
84	7.00	0.33	0.220	0.041	---	0.18
85	7.08	0.33	0.220	0.041	---	0.18
86	7.17	0.33	0.220	0.041	---	0.18
87	7.25	0.33	0.220	0.041	---	0.18
88	7.33	0.37	0.242	0.041	---	0.20
89	7.42	0.37	0.242	0.040	---	0.20
90	7.50	0.37	0.242	0.040	---	0.20
91	7.58	0.40	0.264	0.040	---	0.22
92	7.67	0.40	0.264	0.040	---	0.22
93	7.75	0.40	0.264	0.040	---	0.22
94	7.83	0.43	0.286	0.040	---	0.25
95	7.92	0.43	0.286	0.039	---	0.25
96	8.00	0.43	0.286	0.039	---	0.25
97	8.08	0.50	0.330	0.039	---	0.29
98	8.17	0.50	0.330	0.039	---	0.29
99	8.25	0.50	0.330	0.039	---	0.29
100	8.33	0.50	0.330	0.038	---	0.29
101	8.42	0.50	0.330	0.038	---	0.29
102	8.50	0.50	0.330	0.038	---	0.29
103	8.58	0.53	0.352	0.038	---	0.31
104	8.67	0.53	0.352	0.038	---	0.31
105	8.75	0.53	0.352	0.038	---	0.31
106	8.83	0.57	0.374	0.037	---	0.34
107	8.92	0.57	0.374	0.037	---	0.34
108	9.00	0.57	0.374	0.037	---	0.34
109	9.08	0.63	0.418	0.037	---	0.38
110	9.17	0.63	0.418	0.037	---	0.38
111	9.25	0.63	0.418	0.037	---	0.38
112	9.33	0.67	0.440	0.036	---	0.40
113	9.42	0.67	0.440	0.036	---	0.40
114	9.50	0.67	0.440	0.036	---	0.40
115	9.58	0.70	0.462	0.036	---	0.43
116	9.67	0.70	0.462	0.036	---	0.43
117	9.75	0.70	0.462	0.035	---	0.43
118	9.83	0.73	0.484	0.035	---	0.45
119	9.92	0.73	0.484	0.035	---	0.45
120	10.00	0.73	0.484	0.035	---	0.45
121	10.08	0.50	0.330	0.035	---	0.30
122	10.17	0.50	0.330	0.035	---	0.30

123	10.25	0.50	0.330	0.034	---	0.30
124	10.33	0.50	0.330	0.034	---	0.30
125	10.42	0.50	0.330	0.034	---	0.30
126	10.50	0.50	0.330	0.034	---	0.30
127	10.58	0.67	0.440	0.034	---	0.41
128	10.67	0.67	0.440	0.034	---	0.41
129	10.75	0.67	0.440	0.033	---	0.41
130	10.83	0.67	0.440	0.033	---	0.41
131	10.92	0.67	0.440	0.033	---	0.41
132	11.00	0.67	0.440	0.033	---	0.41
133	11.08	0.63	0.418	0.033	---	0.39
134	11.17	0.63	0.418	0.033	---	0.39
135	11.25	0.63	0.418	0.033	---	0.39
136	11.33	0.63	0.418	0.032	---	0.39
137	11.42	0.63	0.418	0.032	---	0.39
138	11.50	0.63	0.418	0.032	---	0.39
139	11.58	0.57	0.374	0.032	---	0.34
140	11.67	0.57	0.374	0.032	---	0.34
141	11.75	0.57	0.374	0.032	---	0.34
142	11.83	0.60	0.396	0.031	---	0.36
143	11.92	0.60	0.396	0.031	---	0.36
144	12.00	0.60	0.396	0.031	---	0.36
145	12.08	0.83	0.550	0.031	---	0.52
146	12.17	0.83	0.550	0.031	---	0.52
147	12.25	0.83	0.550	0.031	---	0.52
148	12.33	0.87	0.572	0.030	---	0.54
149	12.42	0.87	0.572	0.030	---	0.54
150	12.50	0.87	0.572	0.030	---	0.54
151	12.58	0.93	0.616	0.030	---	0.59
152	12.67	0.93	0.616	0.030	---	0.59
153	12.75	0.93	0.616	0.030	---	0.59
154	12.83	0.97	0.638	0.030	---	0.61
155	12.92	0.97	0.638	0.029	---	0.61
156	13.00	0.97	0.638	0.029	---	0.61
157	13.08	1.13	0.748	0.029	---	0.72
158	13.17	1.13	0.748	0.029	---	0.72
159	13.25	1.13	0.748	0.029	---	0.72
160	13.33	1.13	0.748	0.029	---	0.72
161	13.42	1.13	0.748	0.029	---	0.72
162	13.50	1.13	0.748	0.028	---	0.72
163	13.58	0.77	0.506	0.028	---	0.48
164	13.67	0.77	0.506	0.028	---	0.48
165	13.75	0.77	0.506	0.028	---	0.48
166	13.83	0.77	0.506	0.028	---	0.48
167	13.92	0.77	0.506	0.028	---	0.48
168	14.00	0.77	0.506	0.028	---	0.48
169	14.08	0.90	0.594	0.027	---	0.57
170	14.17	0.90	0.594	0.027	---	0.57
171	14.25	0.90	0.594	0.027	---	0.57
172	14.33	0.87	0.572	0.027	---	0.55
173	14.42	0.87	0.572	0.027	---	0.55
174	14.50	0.87	0.572	0.027	---	0.55
175	14.58	0.87	0.572	0.027	---	0.55
176	14.67	0.87	0.572	0.026	---	0.55
177	14.75	0.87	0.572	0.026	---	0.55
178	14.83	0.83	0.550	0.026	---	0.52
179	14.92	0.83	0.550	0.026	---	0.52
180	15.00	0.83	0.550	0.026	---	0.52
181	15.08	0.80	0.528	0.026	---	0.50
182	15.17	0.80	0.528	0.026	---	0.50

183	15.25	0.80	0.528	0.025	---	0.50
184	15.33	0.77	0.506	0.025	---	0.48
185	15.42	0.77	0.506	0.025	---	0.48
186	15.50	0.77	0.506	0.025	---	0.48
187	15.58	0.63	0.418	0.025	---	0.39
188	15.67	0.63	0.418	0.025	---	0.39
189	15.75	0.63	0.418	0.025	---	0.39
190	15.83	0.63	0.418	0.025	---	0.39
191	15.92	0.63	0.418	0.024	---	0.39
192	16.00	0.63	0.418	0.024	---	0.39
193	16.08	0.13	0.088	0.024	---	0.06
194	16.17	0.13	0.088	0.024	---	0.06
195	16.25	0.13	0.088	0.024	---	0.06
196	16.33	0.13	0.088	0.024	---	0.06
197	16.42	0.13	0.088	0.024	---	0.06
198	16.50	0.13	0.088	0.024	---	0.06
199	16.58	0.10	0.066	0.023	---	0.04
200	16.67	0.10	0.066	0.023	---	0.04
201	16.75	0.10	0.066	0.023	---	0.04
202	16.83	0.10	0.066	0.023	---	0.04
203	16.92	0.10	0.066	0.023	---	0.04
204	17.00	0.10	0.066	0.023	---	0.04
205	17.08	0.17	0.110	0.023	---	0.09
206	17.17	0.17	0.110	0.023	---	0.09
207	17.25	0.17	0.110	0.023	---	0.09
208	17.33	0.17	0.110	0.022	---	0.09
209	17.42	0.17	0.110	0.022	---	0.09
210	17.50	0.17	0.110	0.022	---	0.09
211	17.58	0.17	0.110	0.022	---	0.09
212	17.67	0.17	0.110	0.022	---	0.09
213	17.75	0.17	0.110	0.022	---	0.09
214	17.83	0.13	0.088	0.022	---	0.07
215	17.92	0.13	0.088	0.022	---	0.07
216	18.00	0.13	0.088	0.022	---	0.07
217	18.08	0.13	0.088	0.021	---	0.07
218	18.17	0.13	0.088	0.021	---	0.07
219	18.25	0.13	0.088	0.021	---	0.07
220	18.33	0.13	0.088	0.021	---	0.07
221	18.42	0.13	0.088	0.021	---	0.07
222	18.50	0.13	0.088	0.021	---	0.07
223	18.58	0.10	0.066	0.021	---	0.05
224	18.67	0.10	0.066	0.021	---	0.05
225	18.75	0.10	0.066	0.021	---	0.05
226	18.83	0.07	0.044	0.021	---	0.02
227	18.92	0.07	0.044	0.020	---	0.02
228	19.00	0.07	0.044	0.020	---	0.02
229	19.08	0.10	0.066	0.020	---	0.05
230	19.17	0.10	0.066	0.020	---	0.05
231	19.25	0.10	0.066	0.020	---	0.05
232	19.33	0.13	0.088	0.020	---	0.07
233	19.42	0.13	0.088	0.020	---	0.07
234	19.50	0.13	0.088	0.020	---	0.07
235	19.58	0.10	0.066	0.020	---	0.05
236	19.67	0.10	0.066	0.020	---	0.05
237	19.75	0.10	0.066	0.019	---	0.05
238	19.83	0.07	0.044	0.019	---	0.02
239	19.92	0.07	0.044	0.019	---	0.02
240	20.00	0.07	0.044	0.019	---	0.02
241	20.08	0.10	0.066	0.019	---	0.05
242	20.17	0.10	0.066	0.019	---	0.05

```
 243  20.25     0.10      0.066         0.019      ---          0.05
 244  20.33     0.10      0.066         0.019      ---          0.05
 245  20.42     0.10      0.066         0.019      ---          0.05
 246  20.50     0.10      0.066         0.019      ---          0.05
 247  20.58     0.10      0.066         0.019      ---          0.05
 248  20.67     0.10      0.066         0.019      ---          0.05
 249  20.75     0.10      0.066         0.019      ---          0.05
 250  20.83     0.07      0.044         0.018      ---          0.03
 251  20.92     0.07      0.044         0.018      ---          0.03
 252  21.00     0.07      0.044         0.018      ---          0.03
 253  21.08     0.10      0.066         0.018      ---          0.05
 254  21.17     0.10      0.066         0.018      ---          0.05
 255  21.25     0.10      0.066         0.018      ---          0.05
 256  21.33     0.07      0.044         0.018      ---          0.03
 257  21.42     0.07      0.044         0.018      ---          0.03
 258  21.50     0.07      0.044         0.018      ---          0.03
 259  21.58     0.10      0.066         0.018      ---          0.05
 260  21.67     0.10      0.066         0.018      ---          0.05
 261  21.75     0.10      0.066         0.018      ---          0.05
 262  21.83     0.07      0.044         0.018      ---          0.03
 263  21.92     0.07      0.044         0.018      ---          0.03
 264  22.00     0.07      0.044         0.017      ---          0.03
 265  22.08     0.10      0.066         0.017      ---          0.05
 266  22.17     0.10      0.066         0.017      ---          0.05
 267  22.25     0.10      0.066         0.017      ---          0.05
 268  22.33     0.07      0.044         0.017      ---          0.03
 269  22.42     0.07      0.044         0.017      ---          0.03
 270  22.50     0.07      0.044         0.017      ---          0.03
 271  22.58     0.07      0.044         0.017      ---          0.03
 272  22.67     0.07      0.044         0.017      ---          0.03
 273  22.75     0.07      0.044         0.017      ---          0.03
 274  22.83     0.07      0.044         0.017      ---          0.03
 275  22.92     0.07      0.044         0.017      ---          0.03
 276  23.00     0.07      0.044         0.017      ---          0.03
 277  23.08     0.07      0.044         0.017      ---          0.03
 278  23.17     0.07      0.044         0.017      ---          0.03
 279  23.25     0.07      0.044         0.017      ---          0.03
 280  23.33     0.07      0.044         0.017      ---          0.03
 281  23.42     0.07      0.044         0.017      ---          0.03
 282  23.50     0.07      0.044         0.017      ---          0.03
 283  23.58     0.07      0.044         0.017      ---          0.03
 284  23.67     0.07      0.044         0.017      ---          0.03
 285  23.75     0.07      0.044         0.017      ---          0.03
 286  23.83     0.07      0.044         0.017      ---          0.03
 287  23.92     0.07      0.044         0.017      ---          0.03
 288  24.00     0.07      0.044         0.017      ---          0.03
     Sum =     100.0                                   Sum =    56.5
      Flood volume = Effective rainfall      4.71(In)
       times area      30.9(Ac.)/[(In)/(Ft.)] =      12.1(Ac.Ft)
      Total soil loss =      0.79(In)
      Total soil loss =     2.034(Ac.Ft)
      Total rainfall =      5.50(In)
      Flood volume =      528299.4 Cubic Feet
      Total soil loss =       88581.8 Cubic Feet
      ------------------------------------------------------------------
--
       Peak flow rate of this hydrograph =     22.416(CFS)
      ------------------------------------------------------------------
--
      ++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++++
```

```
++
                          24 - H O U R   S T O R M
                     R u n o f f    H y d r o g r a p h
      ------------------------------------------------------------------
--
                  Hydrograph in   5   Minute intervals ((CFS))

      ------------------------------------------------------------------
--
  Time(h+m) Volume Ac.Ft   Q(CFS)  0        7.5      15.0      22.5
30.0

-----------------------------------------------------------------------
    0+ 5       0.0005      0.08  Q         |         |         |
|
    0+10       0.0020      0.21  Q         |         |         |
|
    0+15       0.0036      0.24  Q         |         |         |
|
    0+20       0.0053      0.25  Q         |         |         |
|
    0+25       0.0070      0.25  Q         |         |         |
|
    0+30       0.0088      0.26  Q         |         |         |
|
    0+35       0.0106      0.26  Q         |         |         |
|
    0+40       0.0125      0.27  Q         |         |         |
|
    0+45       0.0144      0.28  Q         |         |         |
|
    0+50       0.0178      0.50  Q         |         |         |
|
    0+55       0.0238      0.88  VQ        |         |         |
|
    1+ 0       0.0305      0.96  VQ        |         |         |
|
    1+ 5       0.0358      0.77  VQ        |         |         |
|
    1+10       0.0386      0.41  Q         |         |         |
|
    1+15       0.0409      0.34  Q         |         |         |
|
    1+20       0.0432      0.33  Q         |         |         |
|
    1+25       0.0455      0.33  Q         |         |         |
|
    1+30       0.0478      0.34  Q         |         |         |
|
    1+35       0.0502      0.35  Q         |         |         |
|
    1+40       0.0527      0.35  Q         |         |         |
|
    1+45       0.0551      0.36  Q         |         |         |
|
    1+50       0.0591      0.58  Q         |         |         |
|
    1+55       0.0657      0.96  VQ        |         |         |
|
    2+ 0       0.0729      1.04  VQ        |         |         |
```

```
|
    2+ 5       0.0803      1.07  VQ        |         |         |
|
    2+10       0.0877      1.08  VQ        |         |         |
|
    2+15       0.0952      1.09  VQ        |         |         |
|
    2+20       0.1027      1.09  VQ        |         |         |
|
    2+25       0.1103      1.10  VQ        |         |         |
|
    2+30       0.1179      1.11  VQ        |         |         |
|
    2+35       0.1270      1.33  VQ        |         |         |
|
    2+40       0.1388      1.70  V Q       |         |         |
|
    2+45       0.1511      1.79  V Q       |         |         |
|
    2+50       0.1636      1.81  V Q       |         |         |
|
    2+55       0.1761      1.82  V Q       |         |         |
|
    3+ 0       0.1887      1.83  V Q       |         |         |
|
    3+ 5       0.2014      1.84  V Q       |         |         |
|
    3+10       0.2141      1.84  V Q       |         |         |
|
    3+15       0.2269      1.85  V Q       |         |         |
|
    3+20       0.2396      1.86  V Q       |         |         |
|
    3+25       0.2525      1.86  V Q       |         |         |
|
    3+30       0.2654      1.87  V Q       |         |         |
|
    3+35       0.2783      1.88  V Q       |         |         |
|
    3+40       0.2913      1.88  V Q       |         |         |
|
    3+45       0.3043      1.89  |VQ       |         |         |
|
    3+50       0.3188      2.11  |VQ       |         |         |
|
    3+55       0.3360      2.49  |V Q      |         |         |
|
    4+ 0       0.3537      2.57  |V Q      |         |         |
|
    4+ 5       0.3716      2.60  |V Q      |         |         |
|
    4+10       0.3895      2.61  |V Q      |         |         |
|
    4+15       0.4075      2.61  |V Q      |         |         |
|
    4+20       0.4270      2.83  |V Q      |         |         |
|
    4+25       0.4492      3.21  |V  Q     |         |         |
|
    4+30       0.4719      3.30  |V  Q     |         |         |
```

```
|
    4+35       0.4947      3.32  |V  Q     |         |         |
|
    4+40       0.5177      3.33  |V  Q     |         |         |
|
    4+45       0.5407      3.34  |V  Q     |         |         |
|
    4+50       0.5652      3.56  |V  Q     |         |         |
|
    4+55       0.5923      3.94  |V   Q    |         |         |
|
    5+ 0       0.6199      4.02  | V  Q    |         |         |
|
    5+ 5       0.6448      3.62  | V Q     |         |         |
|
    5+10       0.6647      2.88  | VQ      |         |         |
|
    5+15       0.6835      2.73  | VQ      |         |         |
|
    5+20       0.7036      2.92  | VQ      |         |         |
|
    5+25       0.7263      3.29  | V Q     |         |         |
|
    5+30       0.7495      3.37  | V Q     |         |         |
|
    5+35       0.7744      3.61  | V Q     |         |         |
|
    5+40       0.8018      3.99  | V  Q    |         |         |
|
    5+45       0.8299      4.08  | V  Q    |         |         |
|
    5+50       0.8581      4.10  | V  Q    |         |         |
|
    5+55       0.8864      4.11  | V  Q    |         |         |
|
    6+ 0       0.9148      4.12  |  V Q    |         |         |
|
    6+ 5       0.9446      4.34  |  V Q    |         |         |
|
    6+10       0.9771      4.71  |  V  Q   |         |         |
|
    6+15       1.0101      4.80  |  V  Q   |         |         |
|
    6+20       1.0433      4.82  |  V  Q   |         |         |
|
    6+25       1.0766      4.83  |  V  Q   |         |         |
|
    6+30       1.1099      4.84  |  V  Q   |         |         |
|
    6+35       1.1448      5.06  |  V  Q   |         |         |
|
    6+40       1.1822      5.43  |  V   Q  |         |         |
|
    6+45       1.2202      5.52  |   V  Q  |         |         |
|
    6+50       1.2584      5.54  |   V  Q  |         |         |
|
    6+55       1.2966      5.55  |   V  Q  |         |         |
|
    7+ 0       1.3349      5.56  |   V  Q  |         |         |
```

```
|
    7+ 5       1.3732      5.56 |   V  Q  |         |         |
|
    7+10       1.4116      5.57 |   V  Q  |         |         |
|
    7+15       1.4500      5.58 |   V  Q  |         |         |
|
    7+20       1.4899      5.80 |   V  Q  |         |         |
|
    7+25       1.5324      6.17 |    V  Q |         |         |
|
    7+30       1.5755      6.26 |    V  Q |         |         |
|
    7+35       1.6202      6.49 |    V  Q |         |         |
|
    7+40       1.6676      6.88 |    V   Q|         |         |
|
    7+45       1.7155      6.96 |    V   Q|         |         |
|
    7+50       1.7650      7.20 |    V   Q|         |         |
|
    7+55       1.8172      7.58 |    V    Q         |         |
|
    8+ 0       1.8700      7.66 |     V   Q         |         |
|
    8+ 5       1.9259      8.11 |     V   Q         |         |
|
    8+10       1.9869      8.87 |     V   |Q        |         |
|
    8+15       2.0491      9.03 |     V   | Q       |         |
|
    8+20       2.1116      9.07 |     V   | Q       |         |
|
    8+25       2.1741      9.08 |      V  | Q       |         |
|
    8+30       2.2367      9.09 |      V  | Q       |         |
|
    8+35       2.3008      9.31 |      V  | Q       |         |
|
    8+40       2.3675      9.68 |      V  | Q       |         |
|
    8+45       2.4348      9.77 |       V |  Q      |         |
|
    8+50       2.5037     10.00 |       V |  Q      |         |
|
    8+55       2.5752     10.39 |       V |  Q      |         |
|
    9+ 0       2.6474     10.47 |       V |  Q      |         |
|
    9+ 5       2.7226     10.92 |       V |   Q     |         |
|
    9+10       2.8030     11.67 |        V|    Q    |         |
|
    9+15       2.8845     11.84 |        V|    Q    |         |
|
    9+20       2.9678     12.09 |        V|     Q   |         |
|
    9+25       3.0537     12.48 |         V     Q   |         |
|
    9+30       3.1402     12.56 |         V     Q   |         |
```

```
|
    9+35       3.2283     12.80  |         V      Q  |         |
|
    9+40       3.3191     13.18  |         V      Q  |         |
|
    9+45       3.4104     13.26  |         |V     Q  |         |
|
    9+50       3.5034     13.50  |         |V     Q  |         |
|
    9+55       3.5989     13.88  |         |V      Q |         |
|
   10+ 0       3.6951     13.96  |         | V     Q |         |
|
   10+ 5       3.7811     12.49  |         | V   Q   |         |
|
   10+10       3.8493      9.90  |         | VQ      |         |
|
   10+15       3.9137      9.35  |         | Q       |         |
|
   10+20       3.9774      9.25  |         | QV      |         |
|
   10+25       4.0408      9.21  |         | QV      |         |
|
   10+30       4.1043      9.22  |         | QV      |         |
|
   10+35       4.1752     10.29  |         |  Q      |         |
|
   10+40       4.2589     12.15  |         |   V Q   |         |
|
   10+45       4.3454     12.56  |         |   V Q   |         |
|
   10+50       4.4324     12.64  |         |   V Q   |         |
|
   10+55       4.5197     12.67  |         |   V Q   |         |
|
   11+ 0       4.6070     12.68  |         |    VQ   |         |
|
   11+ 5       4.6928     12.47  |         |    VQ   |         |
|
   11+10       4.7762     12.10  |         |    VQ   |         |
|
   11+15       4.8590     12.03  |         |     Q   |         |
|
   11+20       4.9418     12.02  |         |     Q   |         |
|
   11+25       5.0245     12.02  |         |     Q   |         |
|
   11+30       5.1073     12.02  |         |     Q   |         |
|
   11+35       5.1872     11.60  |         |    Q V  |         |
|
   11+40       5.2620     10.86  |         |   Q  V  |         |
|
   11+45       5.3358     10.71  |         |   Q  V  |         |
|
   11+50       5.4108     10.89  |         |   Q  V  |         |
|
   11+55       5.4883     11.26  |         |    Q  V |         |
|
   12+ 0       5.5665     11.34  |         |    Q  V |         |
```

```
|
   12+ 5       5.6550     12.86  |         |      QV |         |
|
   12+10       5.7616     15.47  |         |        VQ         |
|
   12+15       5.8720     16.03  |         |        V|Q        |
|
   12+20       5.9846     16.36  |         |        V|Q        |
|
   12+25       6.1001     16.77  |         |         V Q       |
|
   12+30       6.2162     16.86  |         |         V Q       |
|
   12+35       6.3354     17.30  |         |         V  Q      |
|
   12+40       6.4597     18.06  |         |         |V  Q     |
|
   12+45       6.5852     18.22  |         |         |V  Q     |
|
   12+50       6.7124     18.47  |         |         | V Q     |
|
   12+55       6.8423     18.86  |         |         | V  Q    |
|
   13+ 0       6.9727     18.94  |         |         | V  Q    |
|
   13+ 5       7.1107     20.03  |         |         |  V  Q   |
|
   13+10       7.2615     21.90  |         |         |  V     Q|
|
   13+15       7.4150     22.30  |         |         |   V    Q|
|
   13+20       7.5692     22.38  |         |         |   V    Q|
|
   13+25       7.7235     22.41  |         |         |    V   Q|
|
   13+30       7.8779     22.42  |         |         |    V   Q|
|
   13+35       8.0161     20.07  |         |         |     Q   |
|
   13+40       8.1263     15.99  |         |         |Q    V   |
|
   13+45       8.2304     15.12  |         |         Q      V  |
|
   13+50       8.3334     14.96  |         |        Q|      V  |
|
   13+55       8.4360     14.90  |         |        Q|      V  |
|
   14+ 0       8.5387     14.90  |         |        Q|       V |
|
   14+ 5       8.6472     15.76  |         |         |Q      V |
|
   14+10       8.7660     17.25  |         |         |  Q    V |
|
   14+15       8.8871     17.57  |         |         |  Q     V|
|
   14+20       9.0071     17.43  |         |         |  Q     V|
|
   14+25       9.1247     17.08  |         |         | Q       V
|
   14+30       9.2419     17.01  |         |         | Q       V
```

```
|
   14+35        9.3589     17.00  |         |         | Q       V
|
   14+40        9.4760     16.99  |         |         | Q       |V
|
   14+45        9.5930     17.00  |         |         | Q       |V
|
   14+50        9.7087     16.79  |         |         | Q       | V
|
   14+55        9.8218     16.42  |         |         |Q        | V
|
   15+ 0        9.9344     16.35  |         |         |Q        | V
|
   15+ 5       10.0454     16.12  |         |         |Q        |  V
|
   15+10       10.1538     15.75  |         |         Q         |  V
|
   15+15       10.2618     15.67  |         |         Q         |  V
|
   15+20       10.3682     15.45  |         |         Q         |   V
|
   15+25       10.4720     15.08  |         |         Q         |   V
|
   15+30       10.5753     15.00  |         |         Q         |   V
|
   15+35       10.6727     14.13  |         |       Q |         |    V
|
   15+40       10.7598     12.65  |         |     Q   |         |    V
|
   15+45       10.8447     12.33  |         |     Q   |         |    V
|
   15+50       10.9293     12.28  |         |     Q   |         |     V
|
   15+55       11.0137     12.26  |         |     Q   |         |     V
|
   16+ 0       11.0981     12.26  |         |     Q   |         |     V
|
   16+ 5       11.1605      9.06  |         | Q       |         |     V
|
   16+10       11.1846      3.50  |   Q     |         |         |     V
|
   16+15       11.2005      2.31  |  Q      |         |         |     V
|
   16+20       11.2148      2.08  | Q       |         |         |     V
|
   16+25       11.2286      2.00  | Q       |         |         |      V
|
   16+30       11.2424      2.00  | Q       |         |         |      V
|
   16+35       11.2548      1.79  | Q       |         |         |      V
|
   16+40       11.2646      1.43  |Q        |         |         |      V
|
   16+45       11.2739      1.35  |Q        |         |         |      V
|
   16+50       11.2831      1.34  |Q        |         |         |      V
|
   16+55       11.2923      1.34  |Q        |         |         |      V
|
   17+ 0       11.3015      1.34  |Q        |         |         |      V
```

```
|
   17+ 5      11.3137      1.77  | Q        |          |          |      V
|
   17+10      11.3311      2.52  |  Q       |          |          |      V
|
   17+15      11.3495      2.68  |  Q       |          |          |      V
|
   17+20      11.3682      2.71  |  Q       |          |          |      V
|
   17+25      11.3870      2.73  |  Q       |          |          |      V
|
   17+30      11.4058      2.73  |  Q       |          |          |      V
|
   17+35      11.4247      2.74  |  Q       |          |          |      V
|
   17+40      11.4435      2.74  |  Q       |          |          |      V
|
   17+45      11.4624      2.74  |  Q       |          |          |      V
|
   17+50      11.4799      2.53  |  Q       |          |          |      V
|
   17+55      11.4948      2.16  | Q        |          |          |      V
|
   18+ 0      11.5092      2.09  | Q        |          |          |      V
|
   18+ 5      11.5235      2.08  | Q        |          |          |       V
|
   18+10      11.5377      2.07  | Q        |          |          |       V
|
   18+15      11.5521      2.08  | Q        |          |          |       V
|
   18+20      11.5664      2.08  | Q        |          |          |       V
|
   18+25      11.5807      2.08  | Q        |          |          |       V
|
   18+30      11.5951      2.09  | Q        |          |          |       V
|
   18+35      11.6080      1.88  | Q        |          |          |       V
|
   18+40      11.6184      1.51  | Q        |          |          |       V
|
   18+45      11.6283      1.43  |Q         |          |          |       V
|
   18+50      11.6366      1.21  |Q         |          |          |       V
|
   18+55      11.6423      0.83  |Q         |          |          |       V
|
   19+ 0      11.6475      0.76  |Q         |          |          |       V
|
   19+ 5      11.6541      0.96  |Q         |          |          |       V
|
   19+10      11.6633      1.33  |Q         |          |          |       V
|
   19+15      11.6730      1.41  |Q         |          |          |       V
|
   19+20      11.6842      1.64  | Q        |          |          |       V
|
   19+25      11.6982      2.02  | Q        |          |          |       V
|
   19+30      11.7126      2.10  | Q        |          |          |       V
```

```
|
   19+35       11.7258       1.91  | Q        |          |          |        V
|
   19+40       11.7364       1.54  | Q        |          |          |        V
|
   19+45       11.7465       1.47  |Q         |          |          |        V
|
   19+50       11.7551       1.24  |Q         |          |          |        V
|
   19+55       11.7610       0.87  |Q         |          |          |        V
|
   20+ 0       11.7665       0.79  |Q         |          |          |        V
|
   20+ 5       11.7733       0.99  |Q         |          |          |        V
|
   20+10       11.7827       1.36  |Q         |          |          |        V
|
   20+15       11.7926       1.44  |Q         |          |          |        V
|
   20+20       11.8026       1.46  |Q         |          |          |        V
|
   20+25       11.8128       1.47  |Q         |          |          |        V
|
   20+30       11.8229       1.47  |Q         |          |          |        V
|
   20+35       11.8330       1.47  |Q         |          |          |
V|
   20+40       11.8432       1.48  |Q         |          |          |
V|
   20+45       11.8534       1.48  |Q         |          |          |
V|
   20+50       11.8621       1.27  |Q         |          |          |
V|
   20+55       11.8683       0.90  |Q         |          |          |
V|
   21+ 0       11.8739       0.82  |Q         |          |          |
V|
   21+ 5       11.8809       1.02  |Q         |          |          |
V|
   21+10       11.8905       1.39  |Q         |          |          |
V|
   21+15       11.9006       1.47  |Q         |          |          |
V|
   21+20       11.9094       1.27  |Q         |          |          |
V|
   21+25       11.9157       0.91  |Q         |          |          |
V|
   21+30       11.9214       0.83  |Q         |          |          |
V|
   21+35       11.9285       1.03  |Q         |          |          |
V|
   21+40       11.9382       1.40  |Q         |          |          |
V|
   21+45       11.9484       1.48  |Q         |          |          |
V|
   21+50       11.9573       1.29  |Q         |          |          |
V|
   21+55       11.9636       0.92  |Q         |          |          |
V|
   22+ 0       11.9694       0.85  |Q         |          |          |
```

```
V|
   22+ 5      11.9766      1.05  |Q         |         |         |
V|
   22+10      11.9864      1.41  |Q         |         |         |
V|
   22+15      11.9967      1.49  |Q         |         |         |
V|
   22+20      12.0056      1.30  |Q         |         |         |
V|
   22+25      12.0120      0.93  |Q         |         |         |
V|
   22+30      12.0179      0.86  |Q         |         |         |
V|
   22+35      12.0237      0.84  |Q         |         |         |
V|
   22+40      12.0295      0.84  |Q         |         |         |
V|
   22+45      12.0353      0.84  |Q         |         |         |
V|
   22+50      12.0411      0.84  |Q         |         |         |
V|
   22+55      12.0469      0.84  |Q         |         |         |
V|
   23+ 0      12.0527      0.84  |Q         |         |         |
V|
   23+ 5      12.0585      0.84  |Q         |         |         |
V|
   23+10      12.0643      0.85  |Q         |         |         |
V|
   23+15      12.0701      0.85  |Q         |         |         |
V|
   23+20      12.0760      0.85  |Q         |         |         |
V|
   23+25      12.0818      0.85  |Q         |         |         |
V|
   23+30      12.0877      0.85  |Q         |         |         |
V|
   23+35      12.0936      0.85  |Q         |         |         |
V|
   23+40      12.0994      0.85  |Q         |         |         |
V|
   23+45      12.1053      0.85  |Q         |         |         |
V|
   23+50      12.1112      0.85  |Q         |         |         |
V|
   23+55      12.1171      0.85  |Q         |         |         |
V|
   24+ 0      12.1229      0.85  |Q         |         |         |
V|
   24+ 5      12.1270      0.59  Q          |         |         |
V|
   24+10      12.1279      0.13  Q          |         |         |
V|
   24+15      12.1280      0.03  Q          |         |         |
V|
   24+20      12.1281      0.01  Q          |         |         |
V
-----------------------------------------------------------------------
```

Jurisdictional Delineation (JD)

BADLANDS LANDFILL EXPANSION PROJECT

Riverside County, California

DELINEATION OF STATE AND FEDERAL JURISDICTIONAL WATERS

Prepared For:

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July 2016
Revised March 2018
JN 152069

Michael Baker
INTERNATIONAL

BADLANDS LANDFILL EXPANSION PROJECT

RIVERSIDE COUNTY, CALIFORNIA

Delineation of State and Federal Jurisdictional Waters

The undersigned certify that this report is a complete and accurate account of the findings and conclusions of a jurisdictional “waters of the U.S.” (including wetlands) and “waters of the State” determination for the above-referenced project.

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Executive Summary

Introduction: At the request of the Riverside County Department of Waste Resources (County), Michael Baker International (Michael Baker) has prepared this Delineation of Jurisdictional Waters for the Badlands Landfill Expansion Project (project), located in unincorporated Riverside County, California.

Methods: The field work for this delineation was conducted on March 9, March 10, March 14, and March 23, 2016. This delineation documents the regulatory authority of the U.S. Army Corps of Engineers Los Angeles District (Corps) pursuant to Section 404 of the Clean Water Act, Santa Ana Regional Water Quality Control Board (Regional Board) pursuant to Section 401 of the Clean Water Act, California Department of Fish and Wildlife Inland Deserts Region (CDFW), pursuant to Section 1600-1616 of the California Fish and Game Code, and the Western Riverside Multiple Species Habitat Conservation Plan (MSHCP).

Results: Federal, State, and local jurisdictional areas were identified within the project site. Table ES-1 identifies each regulatory agency and total jurisdiction on-site.

TABLE ES-1. Jurisdictional Areas

Jurisdictional Feature	Corps and Regional Board (non-wetland)		CDFW			Western Riverside MSHCP Riverine/Riparian	
	Acreage	Linear Feet	Streambed		Associated Riparian	Acreage	Linear Feet
			Acreage	Linear Feet	Acreage		
Feature 1	0.06	1,368	0.09	1,368	--	0.09	1,368
Feature 2	0.06	1,406	0.16	1,406	--	0.16	1,406
Feature 3	0.14	1,781	0.79	4,588	1.05	1.84	4,588
Feature 4	0.59	9,313	0.82	9,313	0.60	1.42	9,313
Feature 5	0.93	23,231	1.02	23,231	1.00	2.02	23,231
Feature 6	0.15	965	0.15	965	0.02	0.17	965
Feature 7	0.31	5,268	0.88	9,833	1.13	2.01	9,833
Feature 8	0.03	1,050	0.06	1,050	--	0.06	1,050
Feature 9	0.28	8,954	0.33	8,954	0.05	0.38	8,954
Feature 10	0.13	4,966	0.19	4,966	0.19	0.38	4,966
Total	**2.68**	**58,302**	**4.49**	**65,674**	**4.04**	**8.53**	**65,674**

Conclusion: The project applicant shall obtain the following regulatory approvals prior to commencement of any construction activities within the identified jurisdictional areas: CWA

Section 404 Permit, CWA Section 401 Water Quality Certification, CDFW Section 1602 Streambed Alteration Agreement, and approval under the Western Riverside MSHCP. This report presents Michael Baker's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdiction. Refer to Sections 1 through 7 for a complete discussion.

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LIST OF ACRONYMS

CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CWA	Clean Water Act
DBH	Diameter at Breast Height
EPA	Environmental Protection Agency
FAC	Facultative Vegetation
FACU	Facultative Upland Vegetation
FACW	Facultative Wetland Vegetation
GPS	Global Positioning System
IP	Individual Permit
MSHCP	Multiple Species Habitat Conservation Plan
MSL	Mean Sea Level
NWP	Nationwide Permit
OBL	Obligate Wetland Vegetation
OHWM	Ordinary High Water Mark
RCA	Regional Conservation Authority
RPW	Relatively Permanent Waters
SAA	Streambed Alteration Agreement
SBBM	San Bernardino Base and Meridian
SWANCC	Solid Waste Agency of Northern Cook County
SWPPP	Storm Water Pollution Prevention Plan
TNW	Traditional Navigable Water
UPL	Obligate Upland Vegetation
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WoUS	Waters of the United States

Section 1 Introduction

This delineation has been prepared for the Riverside County Department of Waste Resources (County), in order to delineate the U.S. Army Corps of Engineers Los Angeles District's (Corps), Santa Ana Regional Water Quality Control Board's (Regional Board), California Department of Fish and Wildlife Inland Deserts Region's (CDFW), and Western Riverside Multiple Species Habitat Conservation Plan (MSHCP) jurisdictional authority located within the Badlands Landfill Expansion Project site boundaries.

The project site is located within an unincorporated section of Riverside County, California (refer to Exhibit 1, *Regional Vicinity*; and Exhibit 2, *Site Vicinity*). The project site is located immediately north of California Highway 60 (CA-60) and south of San Timoteo Canyon Road, between the cities of Moreno Valley and Beaumont.

This delineation has been designed to document the authority of the regulatory agencies, explain the methodology undertaken by Michael Baker International (Michael Baker), to document jurisdictional authority, and to support the findings made by Michael Baker within the boundaries of the project site. This report presents our best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies; however, only the regulatory agencies can make a final determination of jurisdictional boundaries.

1.1 PROJECT DESCRIPTION

The project site encompasses 1,037 acres of the Badlands Landfill property, which includes an adjacent 218-acre property that is being acquired from Riverside County Parks and Open Space District. Landfill activities within the project site may include landfilling, soil stockpiling, materials storage, equipment parking and maintenance, drainage control, energy recovery, waste recycling and composting, household hazardous waste management, landfill gas and groundwater/leachate monitoring and management, environmental mitigation, and office buildings.

Section 2 Summary of Regulations

There are three key agencies that regulate activities within inland streams, wetlands, and riparian areas in California. The Corps Regulatory Division regulates activities pursuant to Section 404 of the Federal Clean Water Act (CWA), Section 10 of the Rivers and Harbors Act, and Section 103 of the Marine Protection, Research and Sanctuaries Act. Of the State agencies, the CDFW regulates activities under the Fish and Game Code Section 1600-1616, and the Regional Board regulates activities pursuant to Section 401 of the CWA and the California Porter-Cologne Water Quality Control Act.

2.1 U.S. ARMY CORPS OF ENGINEERS

Since 1972, the Corps and U.S. Environmental Protection Agency (EPA) have jointly regulated the filling of "waters of the U.S." (WoUS), including wetlands, pursuant to Section 404 of the CWA. The Corps has regulatory authority over the discharge of dredged or fill material into the WoUS under Section 404 of the CWA. The Corps and EPA define "fill material" to include any "material placed in waters of the United States where the material has the effect of: (i) replacing any portion of a water of the United States with dry land; or (ii) changing the bottom elevation of any portion of the waters of the United States." Examples include, but are not limited to, sand, rock, clay, construction debris, wood chips, and "materials used to create any structure or infrastructure in the waters of the United States."

The term WoUS is defined under CWA regulations 33 CFR §328.3(a). Wetlands, a subset of jurisdictional waters, are jointly defined by the Corps and EPA under CWA regulations 33 CFR §328.3(b).

2.2 REGIONAL WATER QUALITY CONTROL BOARD

Applicants for a federal license or permit for activities which may discharge to WoUS must seek Water Quality Certification from the state or Indian tribe with jurisdiction.[1] Such Certification is based on a finding that the discharge will meet water quality standards and other applicable requirements. In California, there are nine different Regional Boards that issue or deny Certification for discharges within their geographical jurisdiction. Water Quality Certification must be based on a finding that the proposed discharge will comply with water quality standards, which are defined as numeric and narrative objectives in each Regional Board's Basin Plan. Where applicable, the State Water Resources Control Board has this responsibility for projects affecting waters within multiple Regional Boards. The Regional Board's jurisdiction extends to all waters of the State and to all WoUS, including wetlands.

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[1] Title 33, United States Code, Section 1341; Clean Water Act Section.

Additionally, the California Porter-Cologne Water Quality Control Act gives the State very broad authority to regulate waters of the State, which are defined as any surface water or groundwater, including saline waters. The Porter-Cologne Act has become an important tool in the post SWANCC[2] and Rapanos[3] regulatory environment, with respect to the state's authority over isolated and insignificant waters. Generally, any person proposing to discharge waste into a water body that could affect its water quality must file a Report of Waste Discharge in the event that there is no Section 404/401 nexus. Although "waste" is partially defined as any waste substance associated with human habitation, the Regional Board also interprets this to include fill discharged into water bodies.

2.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

California Fish and Game Code Sections 1600-1616 establishes a fee-based process to ensure that projects conducted in and around lakes, rivers, or streams do not adversely impact fish and wildlife resources, or, when adverse impacts cannot be avoided, ensures that adequate mitigation and/or compensation is provided.

Fish and Game Code Section 1602 requires any person, state, or local governmental agency or public utility to notify the CDFW before beginning any activity that will do one or more of the following:

(1) substantially obstruct or divert the natural flow of a river, stream, or lake;

(2) substantially change or use any material from the bed, channel, or bank of a river, stream, or lake; or

(3) deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake.

Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state.

2.4 WESTERN RIVERSIDE MULTIPLE SPECIES HABITAT CONSERVATION PLAN

The Western Riverside MSHCP requires that an assessment be completed if impacts to riparian/riverine areas and vernal pools will occur as a result of implementation of the proposed project. According to the MSHCP, the documentation for the assessment shall include mapping and a description of the functions and values of the mapped areas with respect to the species listed in Section 6.1.2 of the MSHCP, *Protection of Species Associated with Riparian/Riverine Areas and Vernal Pools*.

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[2] Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, 531 U.S. 159 (2001)

[3] Rapanos v. United States, 547 U.S. 715 (2006)

Section 3 Methods

The analysis presented in this document is supported by field surveys and verification of current conditions conducted on March 9, March 10, March 14, and March 23, 2016. GIS data was collected through the use of the ArcGIS Collector App for Apple iPads utilizing the iSX Blue II external GPS unit to achieve sub meter accuracy. The data collected in the field was stored and accessed from ESRI's ArcGIS Online cloud environment. The jurisdictional map was prepared in ESRI's ArcGIS for Desktop Version 10.3.1.

Drought conditions have developed over the past several years in California. Evaluation of temporal shifts in vegetation and periodic lack of hydrology indicators during periods of below-normal rainfall, drought conditions, and unusually low winter snowpack is considered during the field review. To the extent possible, the hydrophytic vegetation decision is based on the plant community that is normally present during the wet portion of the growing season in a normal rainfall year. The evaluation of hydrology considers the timing of the site visit in relation to normal seasonal and annual hydrologic variability, and whether the amount of rainfall prior to the site visit has been normal. In drought conditions, direct observation of plants and hydrology indicators may be misleading or problematic, so other methods of making wetland decisions may be appropriate. In general, wetland determinations on difficult or problematic sites must be based on the best information available to the field inspector, interpreted in light of his or her professional experience and knowledge of the ecology of wetlands in the region. Wetland determinations are based on a preponderance of all available information, including in many cases remote sensing and longer-term data, not just the field data collected under drought conditions.[4]

3.1 WATERS OF THE U.S.

Wetlands

For this project location, Corps jurisdictional wetlands are delineated using the methods outlined in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region, Version 2.0* (Corps, 2008). This document is one of a series of Regional Supplements to the 1987 Corps Wetland Delineation Manual (Corps Manual). According to the Corps Manual, identification of wetlands is based on a three-parameter approach involving indicators of hydrophytic vegetation, hydric soil, and wetland hydrology. In order to be considered a wetland, an area must exhibit at least minimal characteristics within these three parameters. The Regional Supplement presents wetland indicators, delineation guidance, and other information that is specific to the Arid West Region. In the field, vegetation, soils, and evidence of hydrology have been examined using the methodology

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[4] Corps Sacramento District, Public Notice SPK-2014-00005, *Guidance on Delineations in Drought Conditions*, February 2014.

listed below and documented on Corps' wetland data sheets, when applicable. It should be noted that both the Regional Board and the CDFW jurisdictional wetlands encompass those of the Corps.

Non-Wetlands

In the absence of adjacent wetlands, the limits of the Corps' jurisdiction in non-tidal waters extend to the OHWM, which is defined in CWA regulations 33 CFR §328.3(e). Indicators of an OHWM are defined in *A Field Guide to the Identification of the Ordinary High Water Mark (OHWM) in the Arid West Region of the Western United States* (Corps 2008). An OHWM can be determined by, but not limited to, the observation of benches, break in bank slope, particle size distribution, sediment deposits, drift, litter, and/or change in plant community. The Regional Board shares the Corps' jurisdictional methodology, unless State Waters are present.

3.2 WATERS OF THE STATE

The Regional Board's jurisdiction is mapped similarly to the Corps, by defining an OHWM and utilizing the three-parameter approach for wetlands (described in Section 3.3).

3.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The CDFW's jurisdiction applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the state. The CDFW's regulatory authority extends to include riparian habitat (including wetlands) supported by a river, stream, or lake regardless of the presence or absence of hydric soils and saturated soil conditions. Generally, the CDFW jurisdiction is mapped to the top of the active bank of the stream or to the outer drip line of the adjacent riparian vegetation, whichever is greater.

3.4 WESTERN RIVERSIDE COUNTY MULTIPLE SPECIES HABITAT CONSERVATION PLAN

Under MSHCP Section 6.1.2, riparian/riverine areas are defined as areas dominated by trees, shrubs, persistent emergent plants, or emergent mosses and lichens which occur close to or are dependent upon nearby freshwater, or areas with freshwater flowing during all or a portion of the year. The documentation for the assessment includes mapping and a description of the functions and values of the mapped areas with respect to the species listed in Section 6.1.2 of the MSHCP.

Section 4 Environmental Setting

Review of relevant literature and materials often aids in preliminarily identifying areas that may fall under an agency's jurisdiction. A summary of Michael Baker's literature review is provided below (refer to Section 8.0 for a complete list of references used during the course of this delineation).

4.1 WATERSHED REVIEW

The project site is split between the San Jacinto Hydrologic Area (Hydrologic Unit Code 18070202) to the south and the San Timoteo Hydrologic Area (18070203) to the north. The San Jacinto Hydrologic Area includes much of the San Jacinto Valley and is located entirely within northwest Riverside County. The watershed is approximately 770 square miles in area and drains to the San Jacinto River. Flows within the project site were deemed by the Corps to have significant connectivity to Mystic Lake, the San Jacinto River, the Santa Ana River, and ultimately, the Pacific Ocean. The San Timoteo Hydrologic Area is a much smaller watershed that is restricted to San Timoteo Canyon and San Timoteo Canyon Wash. The watershed is approximately 50 square miles in area and drains to the Santa Ana River, and ultimately, the Pacific Ocean.

4.2 LOCAL CLIMATE

The Moreno Valley Badlands are characterized by hot summer days and mild winters with low average precipitation. The project site is located in the Arid West, which is known for a significant degree of variability in spatial and temporal rainfall amounts. Average annual rainfall is 18.34 inches. Most rainfall occurs during winter months though high intensity rains can sometimes occur during the mid-summer producing flash floods and severe erosion.

4.3 USGS TOPOGRAPHIC QUADRANGLE

The USGS 7.5 Minute Series Topographic Quadrangle maps show geological formations and their characteristics, describing the physical setting of an area through contour lines and major surface features including lakes, rivers, streams, buildings, landmarks, and other factors that may fall under an agency's jurisdiction. Additionally, the maps depict topography through color and contour lines, which are helpful in determining elevations and latitude and longitude within a project site.

The project site is located within Sections 4-6 and 31-33, Range 2 West, Townships 2-3 South of the *El Casco, California* quadrangle. On-site topography ranges from approximately 1,835 to 2,564 feet above mean sea level (amsl) and consists of a consistent series of valleys and steep ridges throughout the entire project site.

4.4 AERIAL PHOTOGRAPHS

Michael Baker reviewed current aerial photographs ranging from 1996 to 2014 for the project site. Aerial photographs can be useful during the delineation process, as the photographs indicate potential drainage patterns and vegetation (i.e., riparian vegetation and/or wetlands) present within the boundaries of the project site. Aerial photographs are used to focus the field efforts on particular areas of interest with higher potential for jurisdictional features.

4.5 SOIL SURVEY

Onsite and adjoining soils were researched prior to the field visits using the U.S. Department of Agriculture National Resources Conservation Service and Soil Survey. The presence of hydric soils is initially investigated by comparing the mapped soil series for the site to the County list of hydric soils. Soil surveys furnish soil maps and interpretations originally needed in providing technical assistance to farmers and ranchers; in guiding other decisions about soil selection, use and management; and in planning, research and disseminating the results of the research. In addition, soil surveys are now heavily utilized in order to obtain soil information with respect to potential wetland environments and jurisdictional areas (i.e., soil characteristics, drainage, and color). The following soil series has been reported on site:

- Badland (BaG)
- Metz loamy sand, channeled, 0 to 15 percent slopes (MeD)
- Metz gravelly sandy loam, 2 to 15 percent slopes (MlD)
- San Emigdio fine sandy loam, 8 to 15 percent slopes, eroded (SeD2)
- San Timoteo loam, 25 to 50 percent slopes, eroded (SmF2)
- Terrace escarpments (TeG)

The attached soils map (Appendix A, Exhibit 4, *Soils Map*) shows the distribution of soils within the project site. The majority of the project site is characterized by the Badland soil series, a highly erosional and well-drained soil comprised of soft sedimentary rock that is conducive to forming irregular ravines and gullies. The northern portion of the project site that occurs in the Santa Ana Hydrologic Area is primarily characterized by San Timoteo loam, 25 to 50 percent slopes, eroded, and is similar in nature to the Badland description. The southern valleys of the project site are dominated by Metz loamy sand, channeled, 0-15 percent slopes, a soil type that forms during alluvial transport activities with a higher potential to develop wetland conditions.

4.6 HYDRIC SOILS LIST OF CALIFORNIA

Michael Baker reviewed the Hydric Soils List of California (December 2015), provided by the NRCS, in an effort to verify whether or not on-site soils are considered to be hydric. It should be noted that lists of hydric soils along with soil survey maps are good off-site ancillary tools to assist in wetland determinations, but they are not a substitute for onsite investigations. According to the soils list, the following soils are considered hydric: Metz loamy sand, channeled, 0 to 15 percent slopes (MeD). This soil type contains a minor component (Riverwash, 5%) that is considered hydric, which then classifies the entire soil type as hydric. Soil pits were dug within areas containing this soil type, the results of which are presented in Section 5 of this document.

4.7 NATIONAL WETLANDS INVENTORY

Michael Baker reviewed the U.S. Fish and Wildlife Service’s National Wetland Inventory maps. The NWI Maps are based on the biological definition of wetlands and should not be used in place of a site visit in order to map jurisdictional limits. According to the NWI map, no wetland or riparian features were found within or adjacent to the project site.

4.8 FLOOD ZONE

Michael Baker searched the Federal Emergency Management Agency (FEMA) website for flood data for the project site. There is no flood map printed for the project site. A digital version of the map panel for the project site was viewed using the national Flood Hazard Layer in Google Earth. No portions of the project site are located within FEMA-designated flood zones.

Section 5 Site Conditions

Michael Baker regulatory specialists Richard Beck and Daniel Cardoza, and biologists Dan Rosie and Travis McGill visited the project site on March 9, March 10, March 14, and March 23, 2016, to verify existing conditions and document potential jurisdictional areas. Refer to Appendix B, *Site Photographs*, for representative photographs taken throughout the project site. Refer to Appendix A, *Exhibits*, for jurisdictional maps of all features discussed herein.

In this section, jurisdictional features are presented as drainage systems, rather than individual drainages. Each feature includes the main stem drainage, plus any tributary features associated with the main stem feature. Since the descriptive characteristics of each feature were relatively consistent throughout the project site, the smaller tributary drainage features did not warrant explicit discussion. Dominant vegetation observed onsite includes sugar bush (*Rhus ovata*; NI), wild cucumber (*Marah macrocarpa*; NI*),* Russian thistle (*Salsola tragus*; FACU), deerweed (*Acmispon glaber*; NI), California sagebrush (*Artemisia californica*; NI), and tree tobacco (*Nicotiana glauca*; FAC), with a pervasive non-native grass layer consisting of ripgut brome (*Bromus diandrus*; NI), red brome (*Bromus rubens*; NI), and cheat grass (*Bromus tectorum*; NI). Mule fat (*Baccharis salicifolia*; FAC) and black elderberry (*Sambucus nigra*; FAC) were commonly located within or adjacent to drainage features or on the valley floor.

5.1 FEATURE 1

Feature 1 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 1 contains four drainage features, all of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. The OHWM ranged in width from one foot to three feet and remained consistent through the project site. The upper reaches of the feature are within the boundaries of the project site, while a majority of the drainage lies outside of the project site. Feature 1 did not contain a notable predominance of hydrophytic vegetation and, as such, did not warrant the completion of a wetland determination form. Feature 1 conveys flows to the south, underneath CA-60, and with significant connectivity into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.2 FEATURE 2

Feature 2 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 2 contains one drainage feature, all of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. The OHWM width remained consistent at two feet through the project site. Downstream of the project site, OHWM indicators are no longer present and the feature becomes a vegetated swale that is guided by topography. The low flow channel was primarily unvegetated, with intermittent adjoining patches of sugarbush and nonnative grasses. Feature 2 conveys flows to the south, underneath CA-60, and with significant connectivity, into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.3 FEATURE 3

Feature 3 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 3 contains five tributary drainage features, all of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density in Features 3a and 3b only. Feature 3a is the main stem of the drainage system with an OHWM width ranging from one to six feet. The feature contains a consistent riparian corridor that was primarily composed of mule fat scrub. One soil pit (SP-1) was dug due to the predominance of hydrophytic vegetation within this feature. The area met the requirements for hydrophytic vegetation and wetland hydrology, but lacked indicators of hydric soil.

The headwaters are eroded and incised drainage systems, typical of other headwaters within the project site. The OHWM indicators associated with Feature 3b dissipate and the drainage lacks an OHWM until its confluence with Feature 3a. Several stands of mule fat and elderberry were mapped within the valley floor in this area. Feature 3 conveys flows to the south, underneath CA-60, and with significant connectivity into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.4 FEATURE 4

Feature 4 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 4 contains seven tributary drainage features, all of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. Feature 4a is the main stem of the drainage system and has an OHWM width ranging from one to four feet. Feature 4a is predominantly vegetated with Russian thistle, with intermittent stands of sugarbush, elderberry, and mule fat within and adjacent to the feature.

The headwaters are eroded and incised drainage systems, typical of other headwaters within the project site. The downstream half of Feature 4 includes several adjoining valleys that were investigated for tributary features. The potential tributary valleys associated with the downstream portion of this feature were vegetated with non-native grasses and consistently failed to contain indicators of an OHWM or fluvial activity indicative of a streambed. As such, these valleys did not contain jurisdictional features beyond intermittent patches of elderberry shrubs. Several abandoned roads are visible from aerial imagery and appear as drainage features. These roads were investigated and confirmed to be abandoned access roads. Feature 4 conveys flows to the south, underneath CA-60, and with significant connectivity into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.5 FEATURE 5

Feature 5 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 5 contains 25 tributary drainage features, all of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. Feature 5a is the main stem of the drainage system and has an OHWM width ranging from one to six feet. Feature 5a is predominantly vegetated with Russian thistle, with intermittent stands of sugarbush, elderberry, and mule fat within and adjacent to the feature.

The headwaters are eroded and incised drainage systems, typical of other headwaters within the project site. Similar to Feature 4, the downstream half of Feature 5 includes several adjoining valleys that were investigated for tributary features. The potential tributary valleys associated with the downstream portion of this feature were vegetated with non-native grasses and consistently failed to contain indicators of an OHWM or fluvial activity indicative of a streambed. As such, these valleys did not contain jurisdictional features beyond intermittent patches of elderberry shrubs. Several abandoned roads are visible from aerial imagery and appear as drainage features. These roads were investigated and confirmed to be abandoned access roads. Feature 5 conveys flows to the south, underneath CA-60, and with significant connectivity into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.6 FEATURE 6

Feature 6 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 6 contains two tributary drainage features, both of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. Feature 6a is the main stem of the drainage system and has an OHWM width ranging from one to two feet. Feature 6a is predominantly vegetated with non-native grasses and with intermittent stands of sugarbush, elderberry, and mule fat within and adjacent to the feature.

Similar to Features 4 and 5, Feature 6 includes several adjoining valleys that were investigated for tributary features. The potential tributary valleys associated with this feature were vegetated with non-native grasses and consistently failed to contain indicators of an OHWM or fluvial activity indicative of a streambed. As such, these valleys did not contain jurisdictional features beyond intermittent patches of elderberry shrubs. Additionally, the OHWM indicators associated with Feature 6a dissipate and the drainage lacks an OHWM throughout the remainder of the project site. Feature 6 conveys flows to the south, underneath CA-60, and with significant connectivity into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.7 FEATURE 7

Feature 7 is an earthen, ephemeral drainage system that flows through the project site in a north to south direction. Feature 7 contains eleven tributary drainage features, most of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density in the lower reaches, while several reaches did not exhibit OHWM indicators. Feature 7h, the main stem of the drainage system, is predominantly vegetated with non-native grasses and Russian thistle, with intermittent stands of sugarbush, elderberry, and mule fat within and adjacent to the feature. Feature 7h contains a significant riparian corridor upstream of the confluence of Features 7h and 7i, vegetated primarily with arroyo willow, red willow, and Fremont’s cottonwood. Two wetland determination forms (SP-2 and SP-3) were completed for this area, primarily due to the apparent predominance of hydrophytic vegetation. While both soil pits met the requirements for hydrophytic vegetation and wetland hydrology, neither site was found to contain hydric soils. As such, this area was not determined to be a wetland.

Similar to other features within the project site, Feature 7 includes several adjoining valleys that were investigated for tributary features. The potential tributary valleys associated with this feature were vegetated with non-native grasses and consistently failed to contain indicators of an OHWM or fluvial activity indicative of a streambed. As such, these valleys did not contain jurisdictional features beyond intermittent patches of elderberry shrubs. Feature 7 conveys flows to the south, underneath CA-60, and with significant connectivity into Mystic Lake, the San Jacinto River, the Santa Ana River, and the Pacific Ocean.

5.8 FEATURE 8

Feature 8 is an earthen, ephemeral drainage system that flows through the project site in a south to north direction. Feature 8 contains four tributary drainage features, all of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. Feature 8a is the main stem of the drainage system and has an OHWM width ranging from one to two feet. Feature 8a is predominantly vegetated with non-native grasses and Russian thistle. Feature 8 flows to the north, into San Timoteo Canyon Wash, the Santa Ana River, and the Pacific Ocean.

5.9 FEATURE 9

Feature 9 is an earthen, ephemeral drainage system that flows through the project site in a south to north direction. Feature 9 contains 21 tributary drainage features, 13 of which are subject to Corps jurisdiction. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. Feature 9a is the main stem of the drainage system and has an OHWM width of one foot. Feature 9a is predominantly vegetated with non-native grasses and intermittent stands of sugarbush, elderberry, and mule fat within and adjacent to the feature.

The headwaters are eroded and incised drainage systems, typical of other headwaters within the project site. Two potential tributary valleys associated with this feature were vegetated with non-native grasses and consistently failed to contain indicators of an OHWM or fluvial activity indicative of a streambed. As such, these two valleys did not contain jurisdictional features. Feature 9 flows to the north, into San Timoteo Canyon Wash, the Santa Ana River, and the Pacific Ocean.

5.10 FEATURE 10

Feature 10 is an earthen, ephemeral drainage system that flows through the project site in a south to north direction. Feature 10 contains six tributary drainage features, most of which contain similar descriptive characteristics. Evidence of an OHWM was observed via drift deposits, benches, changes in sediment size, and change in vegetation type and density. Feature 10a is the main stem of the drainage system and has an OHWM width of one foot. Feature 10a is predominantly vegetated with non-native grasses and intermittent stands of sugarbush, elderberry, and mule fat within and adjacent to the feature. Much of Feature 10 has been disturbed by its past use as an off-road dirt bike park, with many of the relict off-road courses visible on aerial imagery. The off-road courses influence the hydrology of Feature 10, forcing some of the tributaries to flow in unnatural patterns.

The headwaters are eroded and incised drainage systems, typical of other headwaters within the project site. Similar to other features within the project site, Feature 10 includes several adjoining valleys that were investigated for tributary features. The potential tributary valleys associated with this feature were vegetated with non-native grasses and consistently failed to contain indicators of an OHWM or fluvial activity indicative of a streambed. As such, these valleys did not contain jurisdictional features beyond intermittent patches of elderberry shrubs. Feature 10 flows to the north, into San Timoteo Canyon Wash, the Santa Ana River, and the Pacific Ocean.

Section 6 Findings

This delineation has been prepared for the County in order to delineate the Corps, Regional Board, CDFW, and Western Riverside MSHCP jurisdictional authority within the project site. This report presents Michael Baker's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdictional boundaries within a project site/property.

6.1 U.S. ARMY CORPS OF ENGINEERS DETERMINATION

6.1.1 Non-Wetland WoUS Determination

Features 1 through 7 (and their tributaries) exhibit evidence of an OHWM, have a direct connection to a downstream TNW, the Pacific Ocean (via Mystic Lake, the San Jacinto River, and the Santa Ana River), and are considered to be non-wetland WoUS. Features 8, through 10 (and their tributaries) exhibit evidence of an OHWM, have a direct connection to a downstream TNW, the Pacific Ocean (via San Timoteo Creek and the Santa Ana River), and are considered to be non-wetland WoUS. The project site includes 2.68 acres of non-wetland WoUS. Refer to Table 1, *Jurisdictional Areas*, and Appendix A, Exhibit 6, *Corps/Regional Board Jurisdictional Map*.

6.1.2 Wetland Determination

As previously noted, an area must exhibit all three wetland parameters described in the Corps Arid West Regional Supplement to be considered a jurisdictional wetland. Features 3 and 7 were investigated for presence of wetland parameters based on the concentrated abundance of hydrophytic vegetation. Based on the results of the site visit, it was determined that no portion of the project site contained all three parameters. Wetland determination forms are included in Appendix C.

6.2 REGIONAL WATER QUALITY CONTROL BOARD DETERMINATION

Features 1 through 10 follow the jurisdiction of the Corps, and are considered non-wetland WoUS as described in Section 6.1.1, above. Refer to Table 1, *Jurisdictional Summary*, and Appendix A, Exhibit 6, *Corps/Regional Board Jurisdictional Map*.

6.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE DETERMINATION

Features 1 through 10 are considered CDFW jurisdictional streambed/banks and associated riparian vegetation. The project site includes 4.49 acres of CDFW jurisdictional streambed and 4.04 acres of associated riparian vegetation, which predominately included elderberry shrubs. Refer to Table 1, *Jurisdictional Areas*, and Appendix A, Exhibit 7, *CDFW/Western Riverside MSHCP Jurisdictional Map*).

6.4 WESTERN RIVERSIDE MSHCP RIPARIAN AND RIVERINE HABITAT DETERMINATION

Features 1 through 10 and any associated riparian vegetation are considered riparian/riverine habitat under the Western Riverside County MSHCP. The project site includes 8.53 acres of MSHCP riparian/riverine resources consistent with CDFW jurisdiction. Refer to Table 1, *Jurisdictional Areas*, and Appendix A, Exhibit 7, *CDFW/Western Riverside MSHCP Jurisdictional Map*).

Table 1: Jurisdictional Areas

Jurisdictional Feature	Corps and Regional Board (non-wetland)		CDFW			Western Riverside MSHCP Riverine/Riparian	
	Acreage	Linear Feet	Streambed		Associated Riparian	Acreage	Linear Feet
			Acreage	Linear Feet	Acreage		
Feature 1	0.06	1,368	0.09	1,368	--	0.09	1,368
Feature 2	0.06	1,406	0.16	1,406	--	0.16	1,406
Feature 3	0.14	1,781	0.79	4,588	1.05	1.84	4,588
Feature 4	0.59	9,313	0.82	9,313	0.60	1.42	9,313
Feature 5	0.93	23,231	1.02	23,231	1.00	2.02	23,231
Feature 6	0.15	965	0.15	965	0.02	0.17	965
Feature 7	0.31	5,268	0.88	9,833	1.13	2.01	9,833
Feature 8	0.03	1,050	0.06	1,050	--	0.06	1,050
Feature 9	0.28	8,954	0.33	8,954	0.05	0.38	8,954
Feature 10	0.13	4,966	0.19	4,966	0.19	0.38	4,966
Total	**2.68**	**58,302**	**4.49**	**65,674**	**4.04**	**8.53**	**65,674**

Section 7 Regulatory Approval Process

The following is a summary of the various permits, agreements, and certifications required before construction activities take place within the jurisdictional areas.

7.1 U.S. ARMY CORPS OF ENGINEERS

The Corps regulates discharges of dredged or fill materials into WoUS and wetlands pursuant to Section 404 of the CWA. Placement of fill materials into Features 1 through 10 will require a Section 404 permit from the Corps prior to commencement of construction activities.

7.2 REGIONAL WATER QUALITY CONTROL BOARD

The Regional Board regulates discharges to surface waters under the CWA. Placement of fill materials into Features 1 through 10 will require a Section 401 Water Quality Certification from the Regional Board prior to commencement of construction activities. A Regional Board application fee is required with the application package, and is calculated based on the acreage and linear feet of jurisdictional impacts.

7.3 CALIFORNIA DEPARTMENT OF FISH AND WILDLIFE

The CDFW regulates alteration to streambeds and associated vegetation under the Fish and Game Code. The CDFW must be notified prior to activities that alter jurisdictional areas. A Streambed Alteration Agreement from the CDFW would be required prior to commencement of any construction activities within the CDFW delineated jurisdictional areas. A CDFW application fee is required with the application package, and is calculated based on total project cost.

7.3 WESTERN RIVERSIDE MSHCP

Any individual, business, or public agency wishing to construct a project within the areas covered by the Western Riverside MSHCP must obtain an approval from the Regional Conservation Authority (RCA) and a permit for the project from the local agency responsible. Approved projects pay fees for the formal review of the project, as well as the construction of the project itself. This process generally runs concurrent with the State and Federal approvals discussed above.

7.4 GLOBAL RECOMMENDATIONS

This report presents Michael Baker's best effort at determining the jurisdictional boundaries using the most up-to-date regulations, written policy, and guidance from the regulatory agencies. However, as with any jurisdictional delineation, only the regulatory agencies can make a final determination of jurisdiction. It is highly recommended that this report be forwarded to each of the regulatory agencies for their concurrence.

Section 8 References

The following resources were utilized during preparation of this Delineation of State and Federal Jurisdictional Waters:

California Department of Fish and Wildlife, *Lake and Streambed Alteration Program*. (https://www.dfg.ca.gov/habcon/1600/)

Environmental Laboratory. 1987. *Corps of Engineers Wetlands Delineation Manual*. Technical Report Y-87-1. Vicksburg, MS: U.S. Army Engineer Waterways Experiment Station.

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U.S. Army Corps of Engineers, *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States*, August 2008.

U.S. Army Corps of Engineers, *Distribution of Ordinary High Water Mark Indicators and their Reliability in Identifying the Limits of "Waters of the United States" in the Arid Southwestern Channels*, February 2006.

U.S. Army Corps of Engineers, *Final Summary Report: Guidelines for Jurisdictional Determinations for Waters of the United States in the Arid Southwest*, June 2001.

U.S. Army Corps of Engineers, *Los Angeles District Regulatory Program.* (http://www.spl.usace.army.mil/Missions/Regulatory.aspx)

U.S. Army Corps of Engineers, *Minimum Standards for Acceptance of Preliminary Wetland Delineations*, November 20, 2001.

U.S. Army Corps of Engineers, *Practices for Documenting Jurisdiction under Section 404 of the CWA*, Regional Guidance Letter 07-01, June 5, 2007.

U.S. Army Corps of Engineers, *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)*, ed. J.S. Wakeley, R. W. Lichvar, and C. V. Nobel. ERDC/EL TR-08-28. Vicksburg, MS: U.S. Army Engineer Research and Development Center, 2008.

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U.S. Department of Agriculture, Natural Resources Conservation Service, *Web Soil Survey.* (http://websoilsurvey.nrcs.usda.gov/app/)

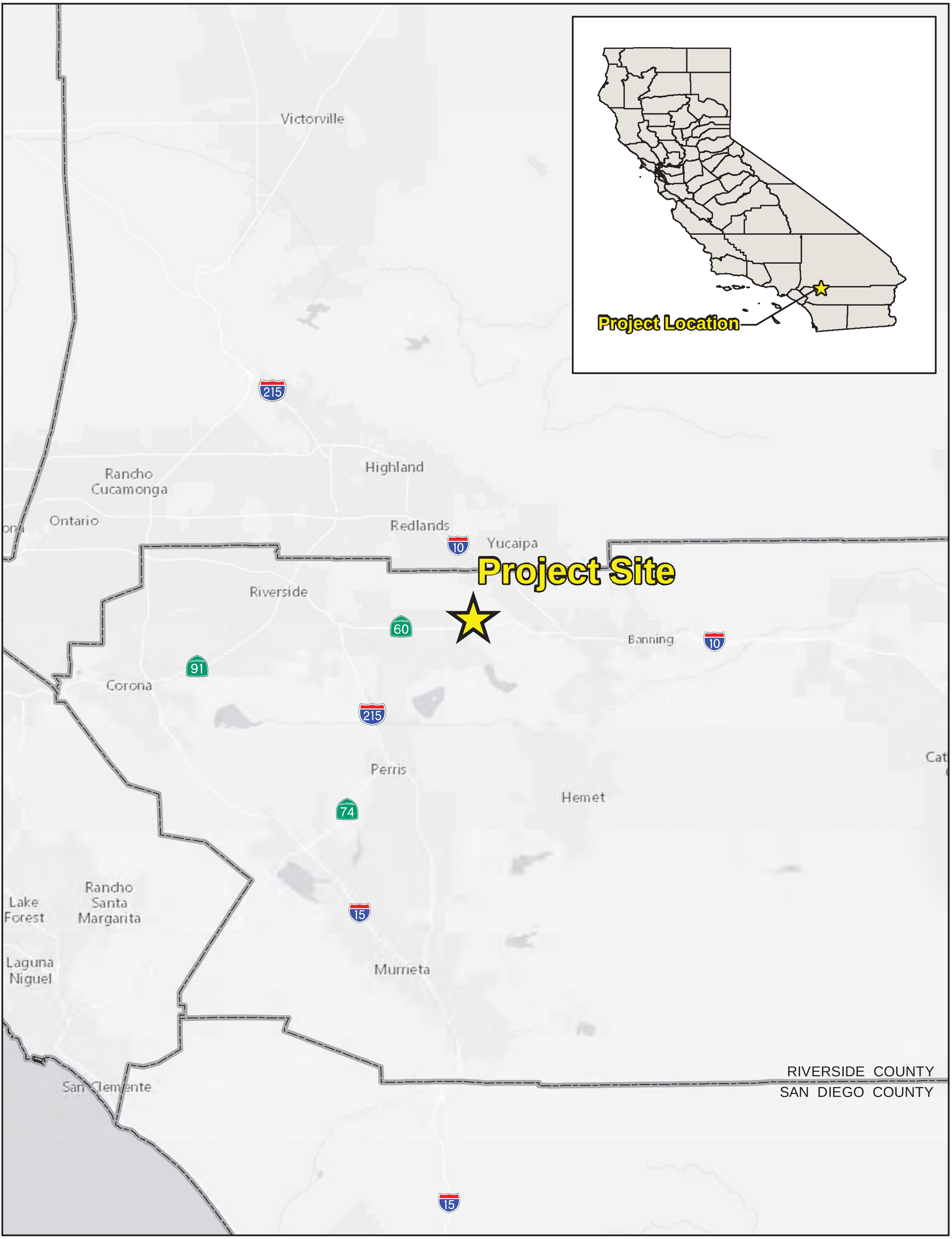
U.S. Department of Homeland Security, Federal Emergency Management Agency, National Flood Insurance Program, *Flood Insurance Rate Map No.* 06065C1576G, 06065C1557G, 06065C0915G, and 06065C1557G.

U.S. Fish and Wildlife Service, Department of Habitat and Resource Conservation, *National Wetland Inventory Map.* (http://wetlandsfws.er.usgs.gov/NWI/index.html)

U.S. Geological Survey, 7.5 Minute Series Topographic Quadrangle, *El Casco, California*, 1967, photorevised 1979.

Western Regional Climate Center, Beaumont, California Weather Station. (http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca0606)

Appendix A *Exhibits*



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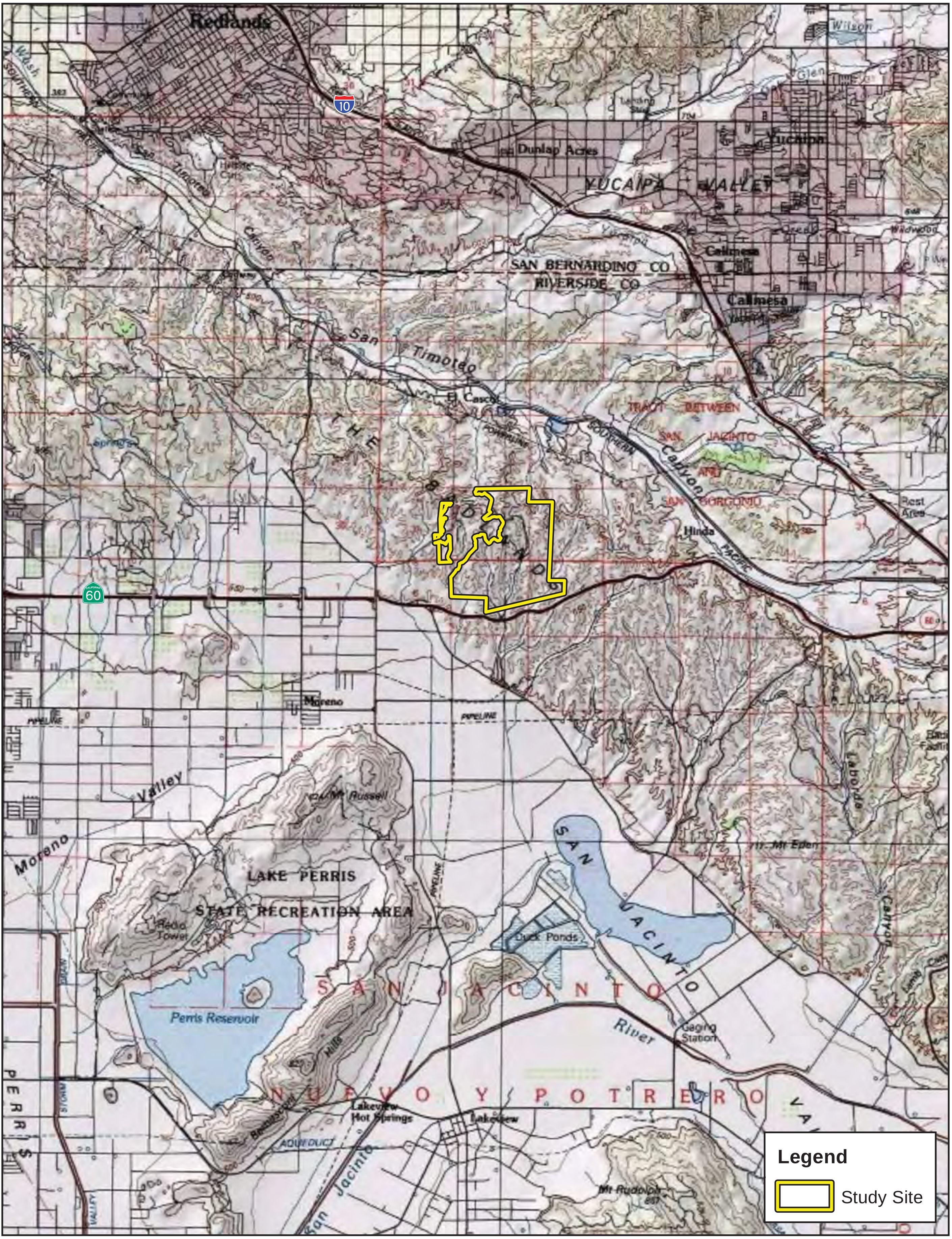
Michael Baker INTERNATIONAL

Source: ArcGIS online

BADLANDS LANDFILL EXPANSION PROJECT

Regional Vicinity

Exhibit 1



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Source: ArcGIS Online.

BADLANDS LANDFILL EXPANSION PROJECT

Site Vicinity

Exhibit 2

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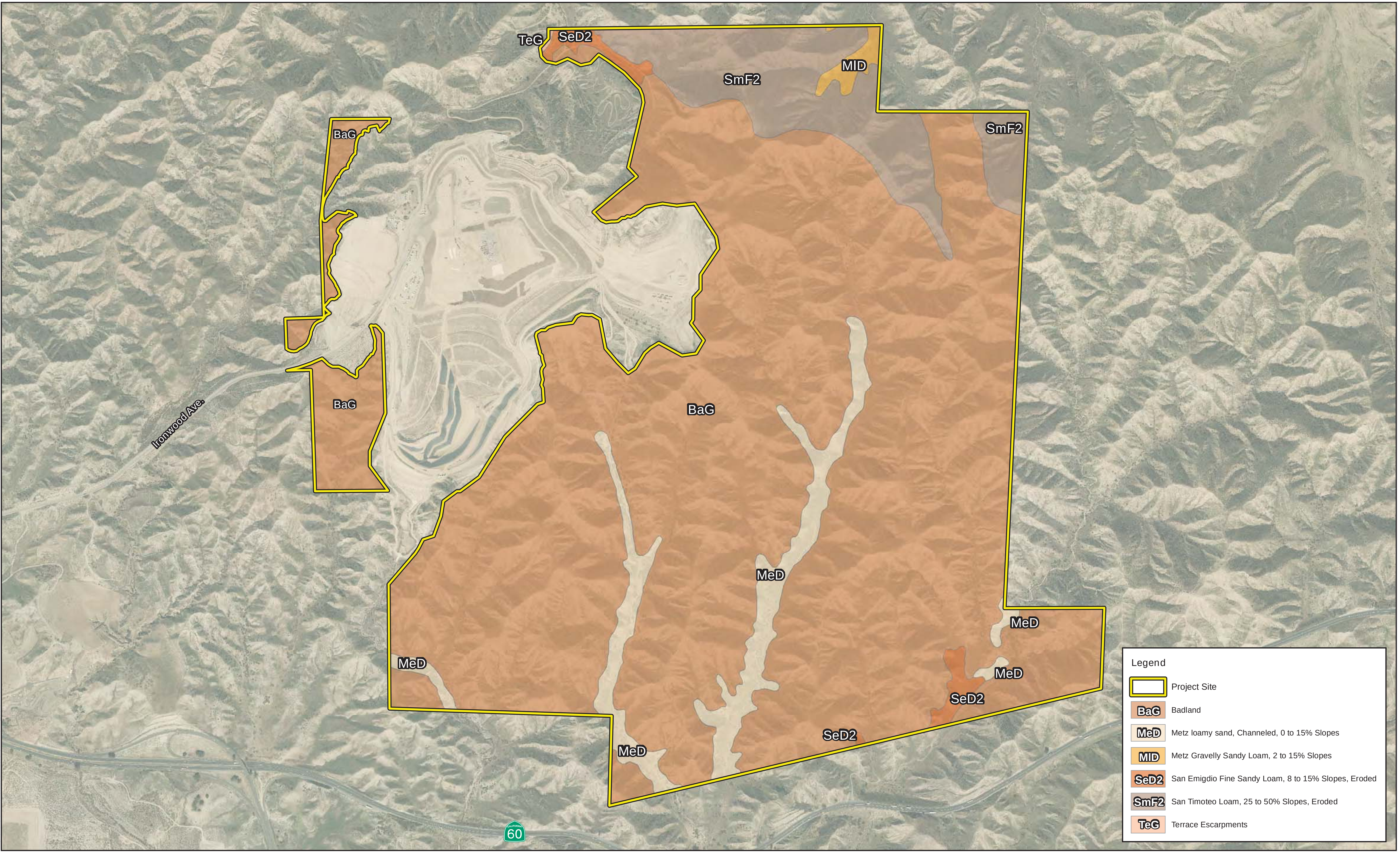
Source: Eagle Aerial.

BADLANDS LANDFILL EXPANSION PROJECT

Project Site

Exhibit 3



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Source: Eagle Aerial 2014

BADLANDS LANDFILL EXPANSION PROJECT

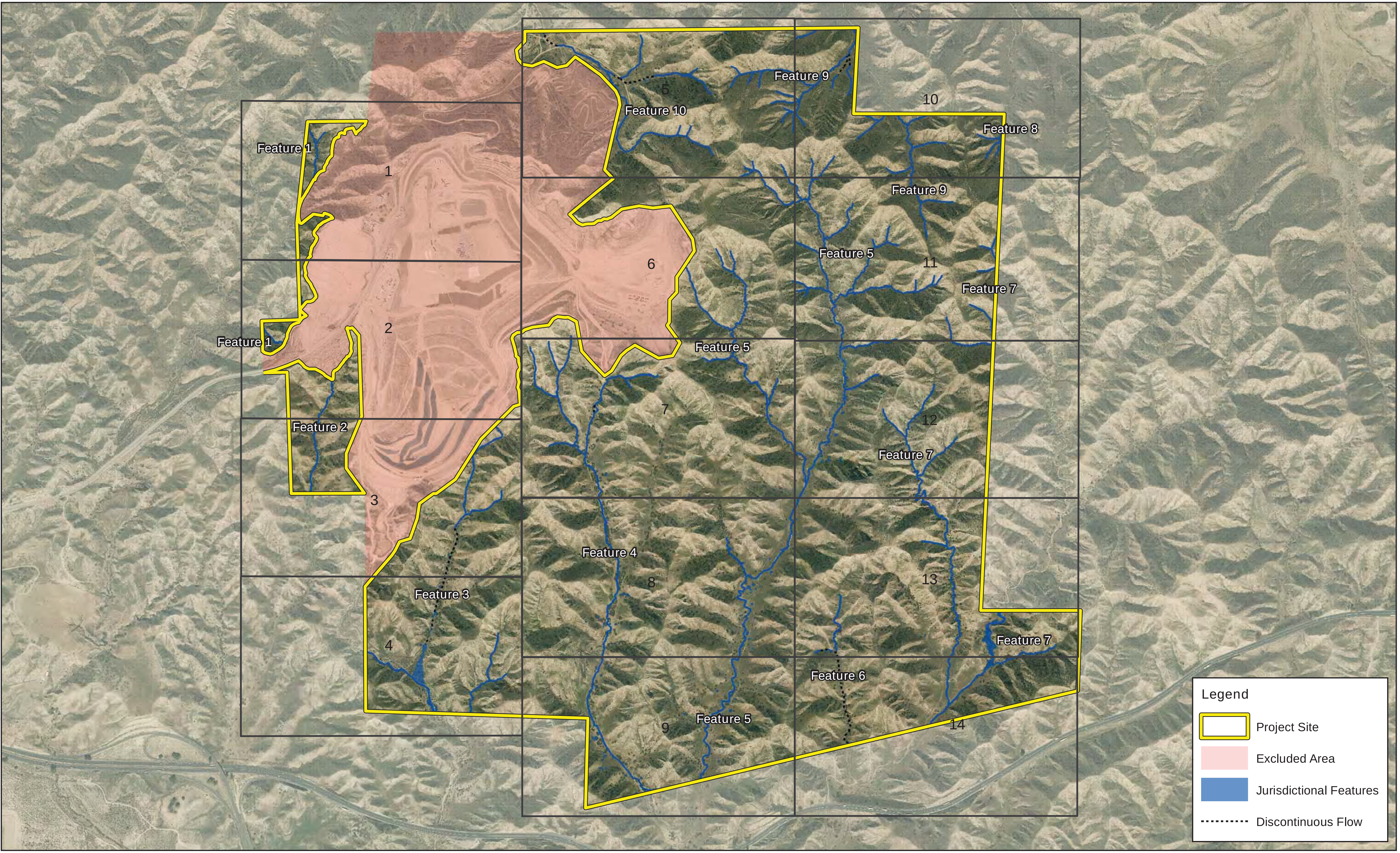
Soils Map

Exhibit 4

BADLANDS LANDFILL EXPANSION PROJECT

Jurisdictional Overview

Exhibit 5



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Source: Eagle Aerial

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Exhibit 6
Corps/Regional Board
Jurisdictional Map

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Exhibit 6
Corps/Regional Board
Jurisdictional Map

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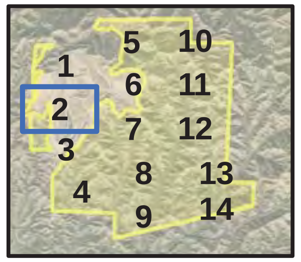

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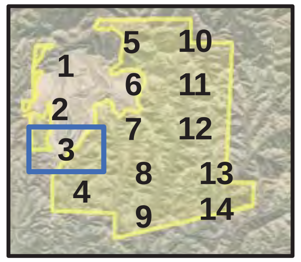

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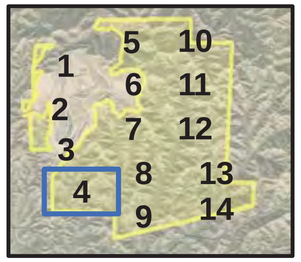

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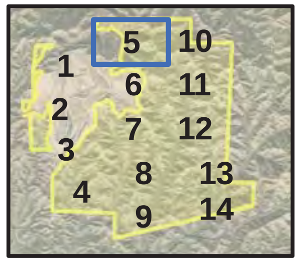

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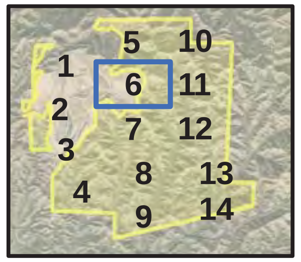

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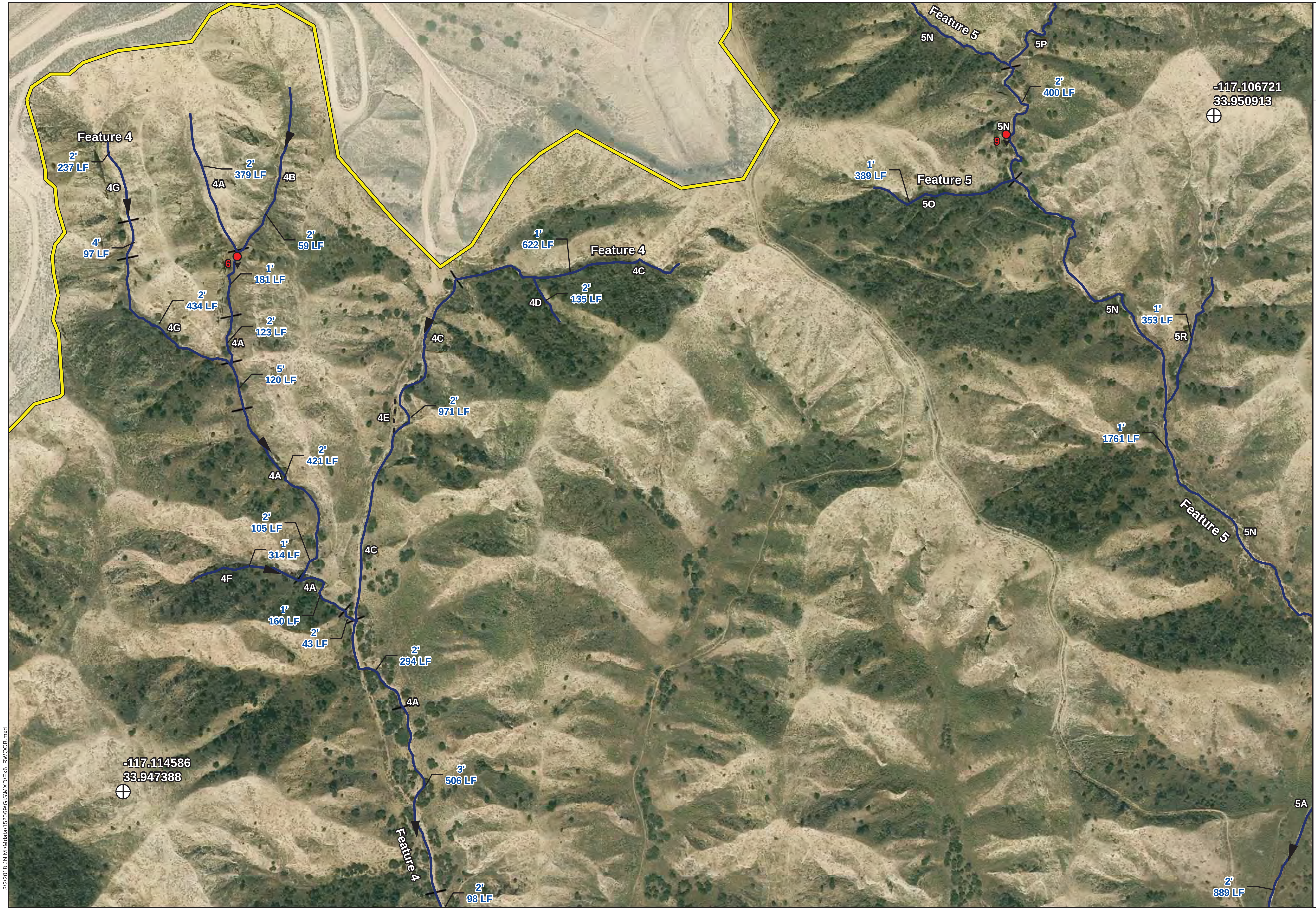

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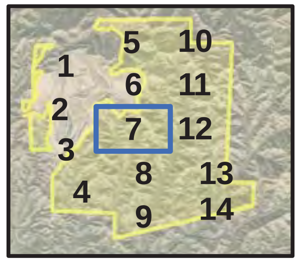

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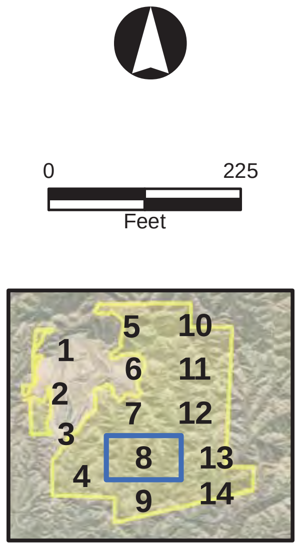

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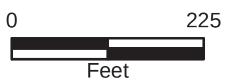

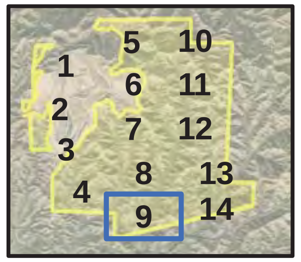

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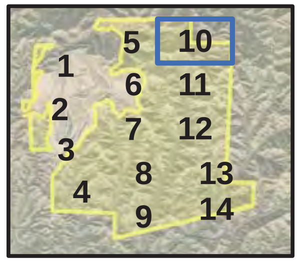

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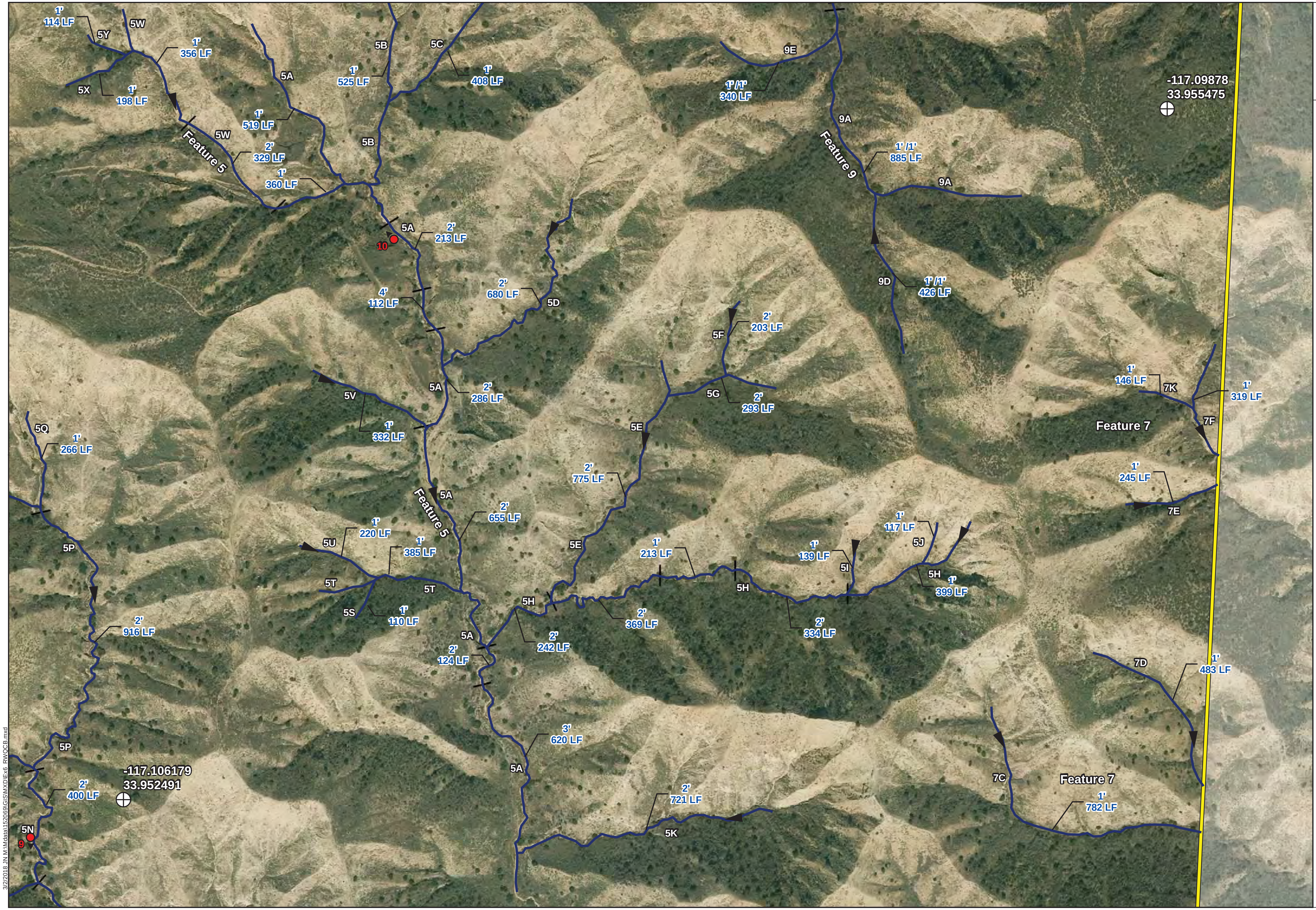

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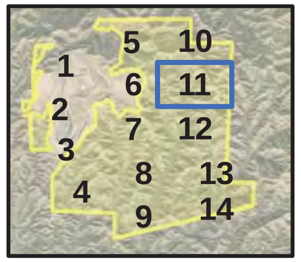

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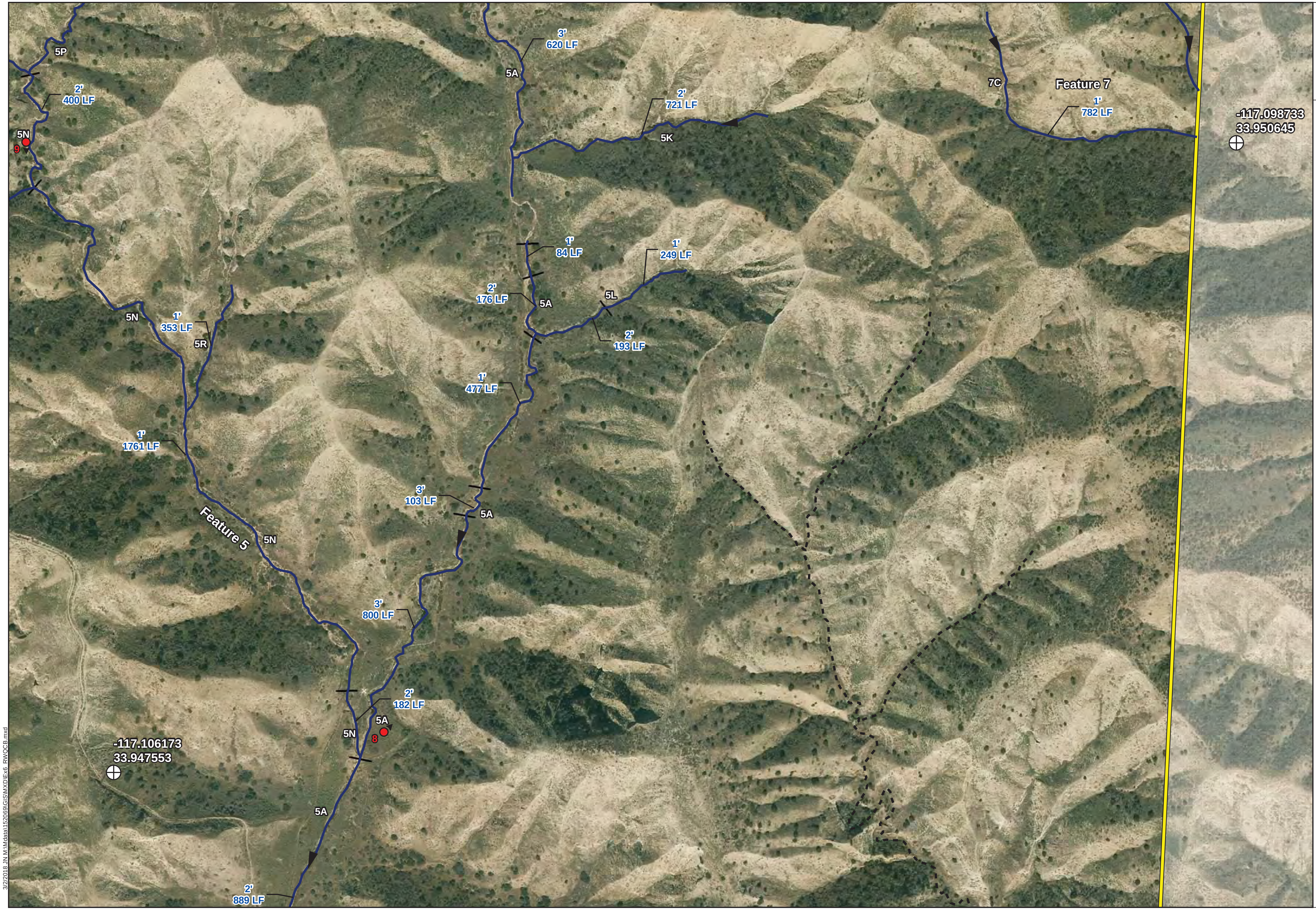

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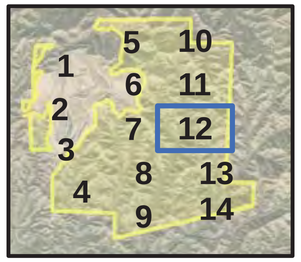

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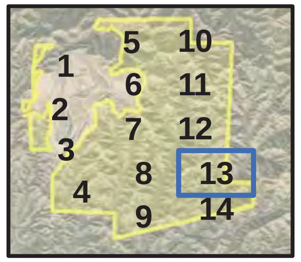

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Exhibit 6
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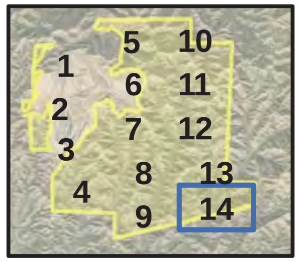

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Exhibit 7
CDFW/
Western Riverside MSHCP
Jurisdictional Maps

Page 1 of 14

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- 🟩 Vegetated Streambed (Width/Length in feet)
- ▨ Adjacent Riparian Vegetation
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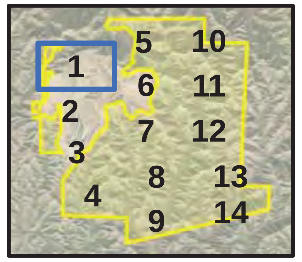

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Exhibit 7
CDFW/
Western Riverside MSHCP
Jurisdictional Maps

Page 2 of 14

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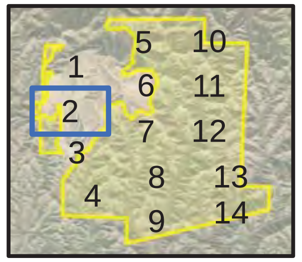

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Exhibit 7
CDFW/
Western Riverside MSHCP
Jurisdictional Maps

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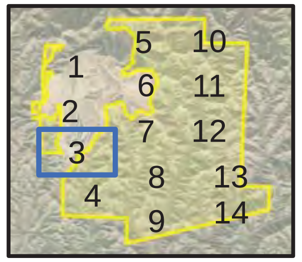

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Exhibit 7
CDFW/
Western Riverside MSHCP
Jurisdictional Maps

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- ◀ Flow Direction
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- 🟩 Vegetated Streambed (Width/Length in feet)
- 🟩 Adjacent Riparian Vegetation
- ☐ Project Site

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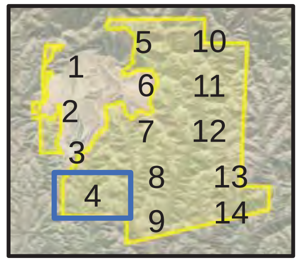

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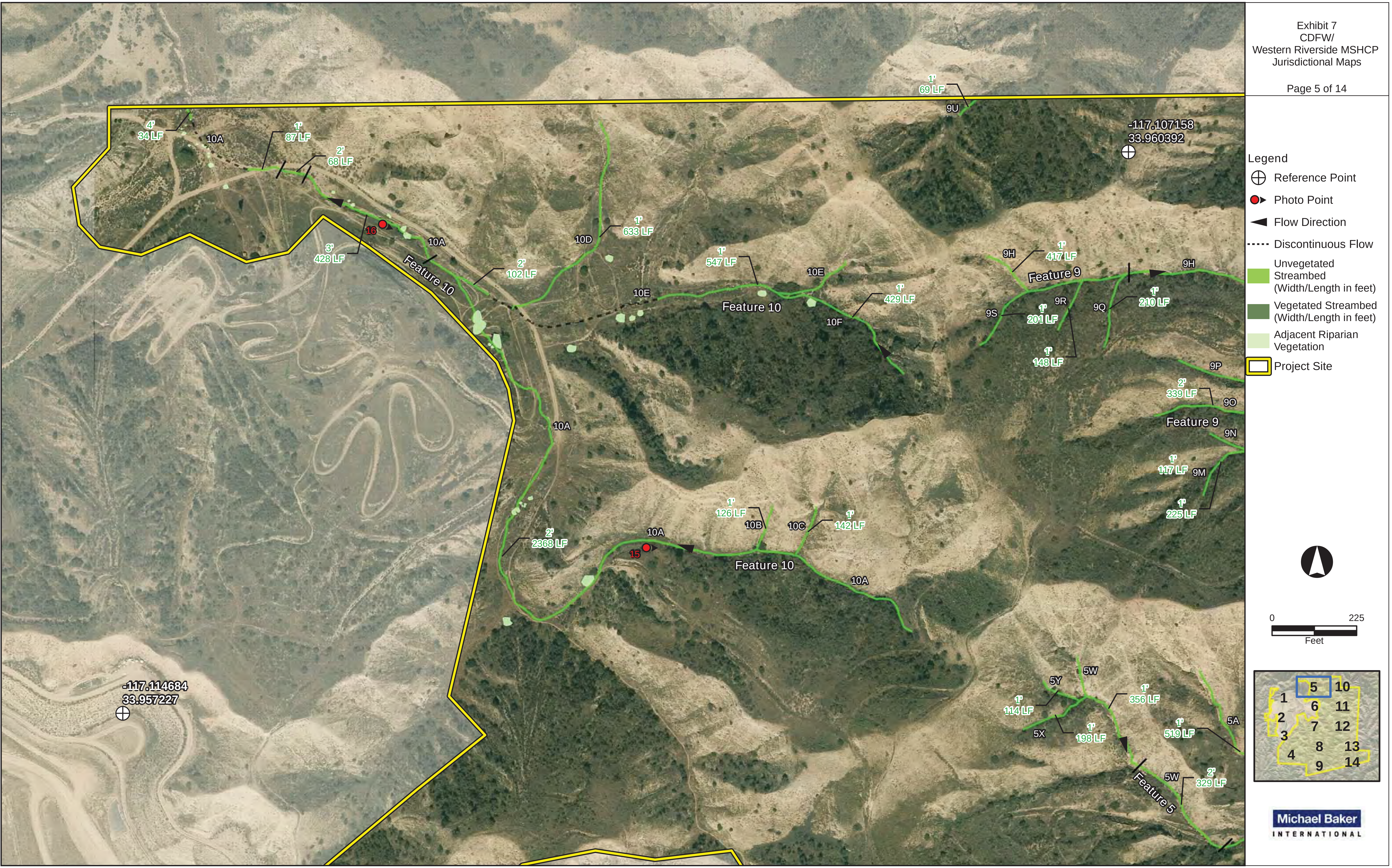

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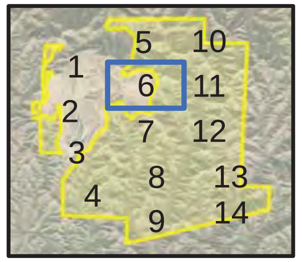

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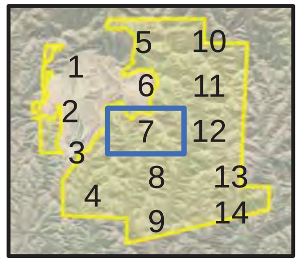

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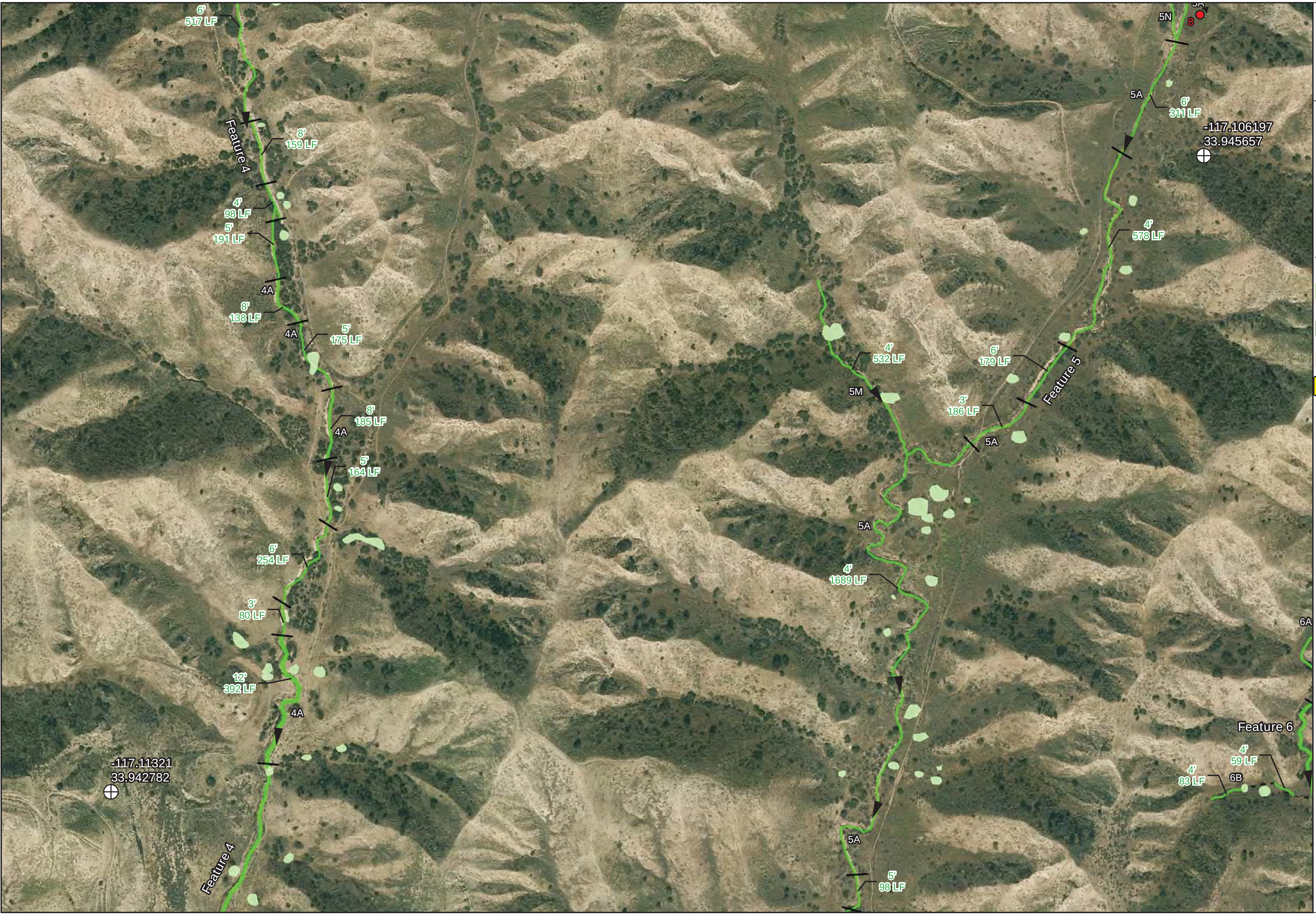

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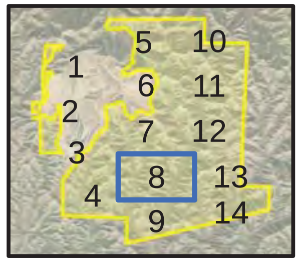

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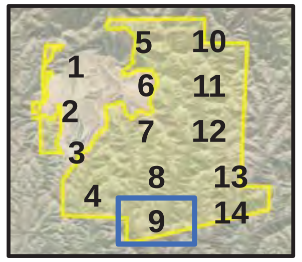

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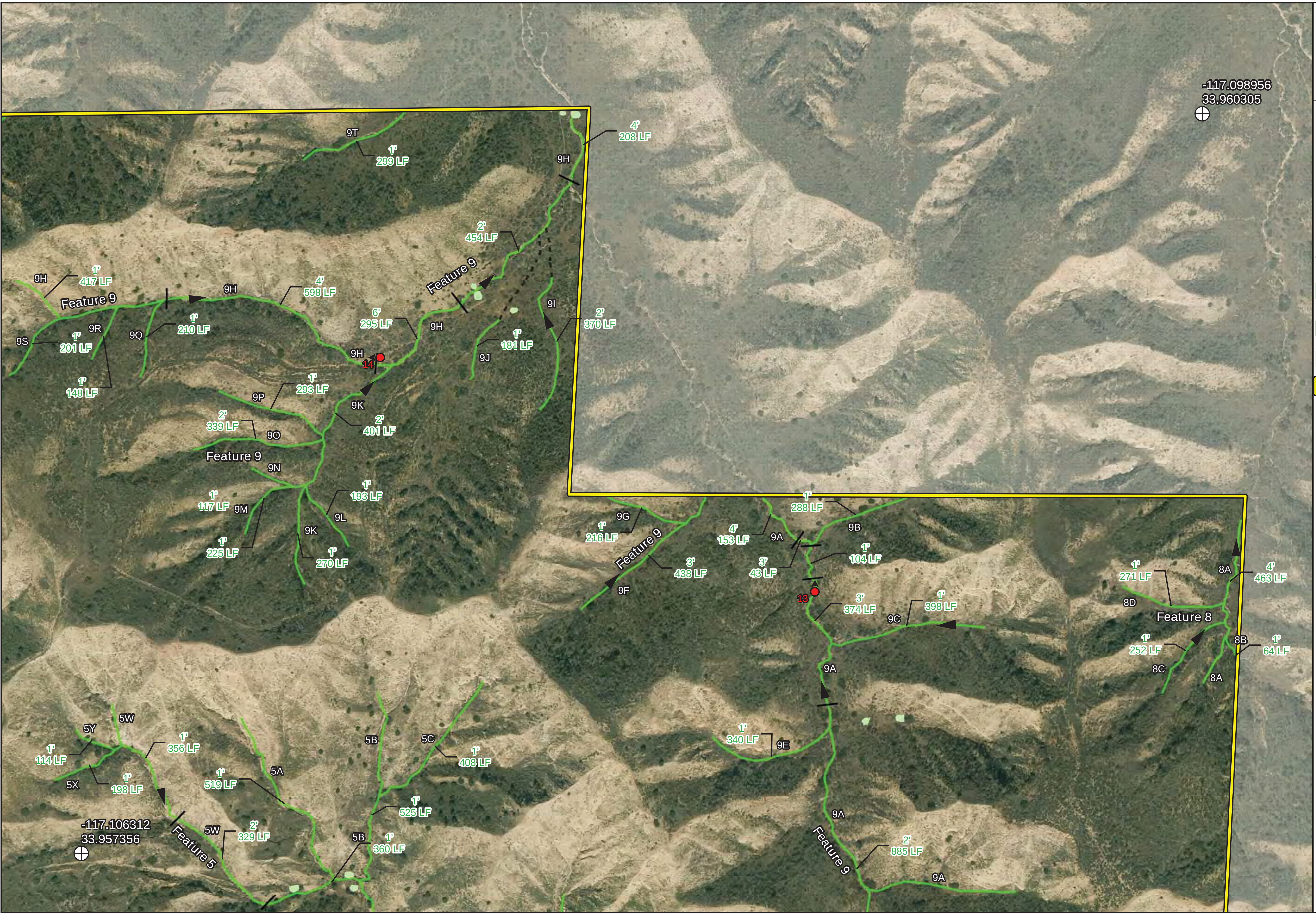

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🟩	Adjacent Riparian Vegetation
☐	Project Site

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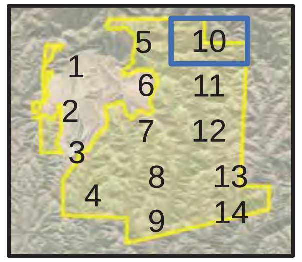

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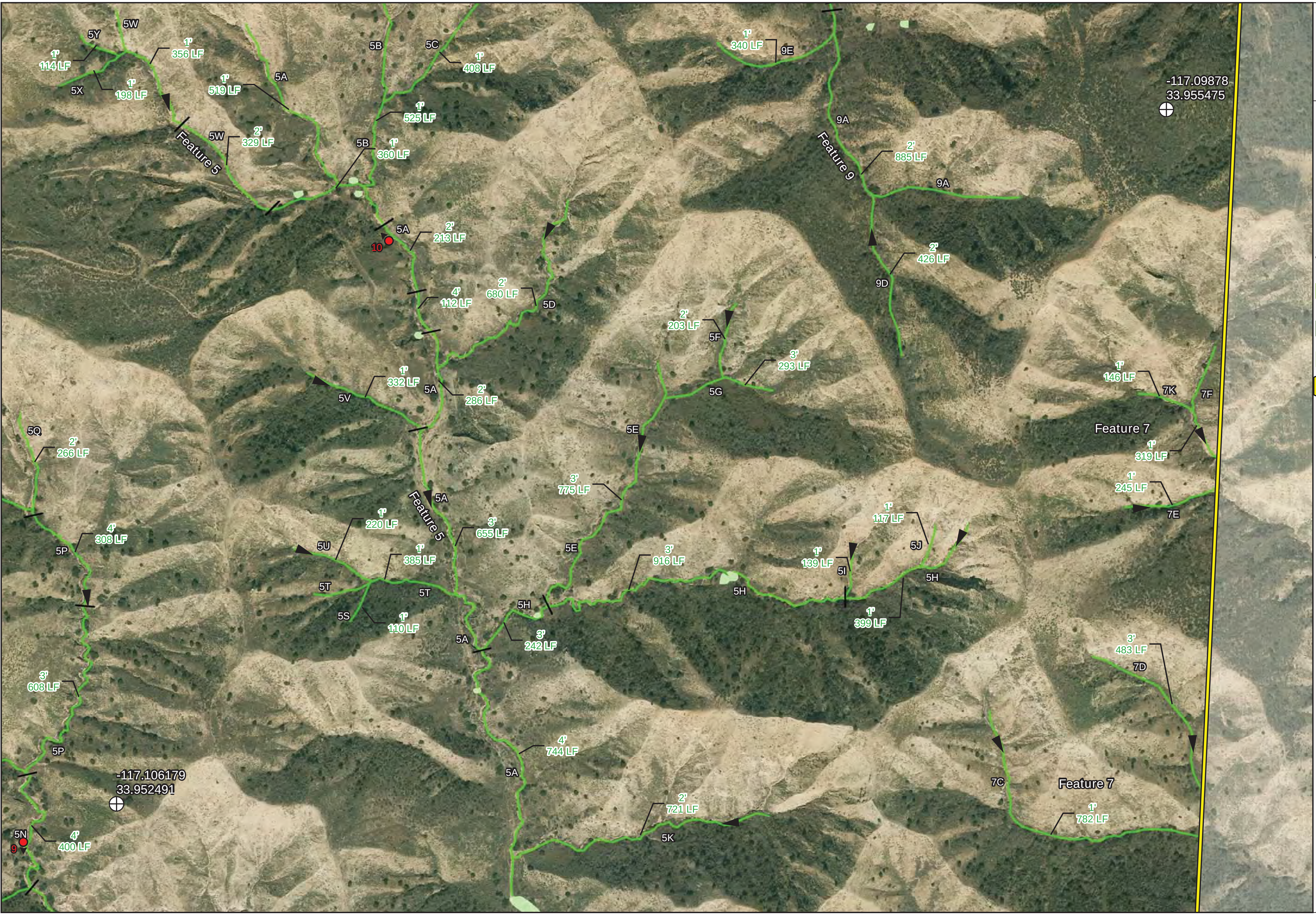

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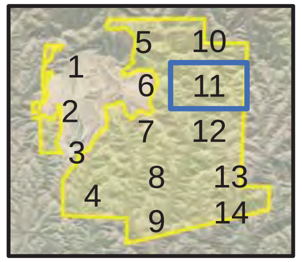

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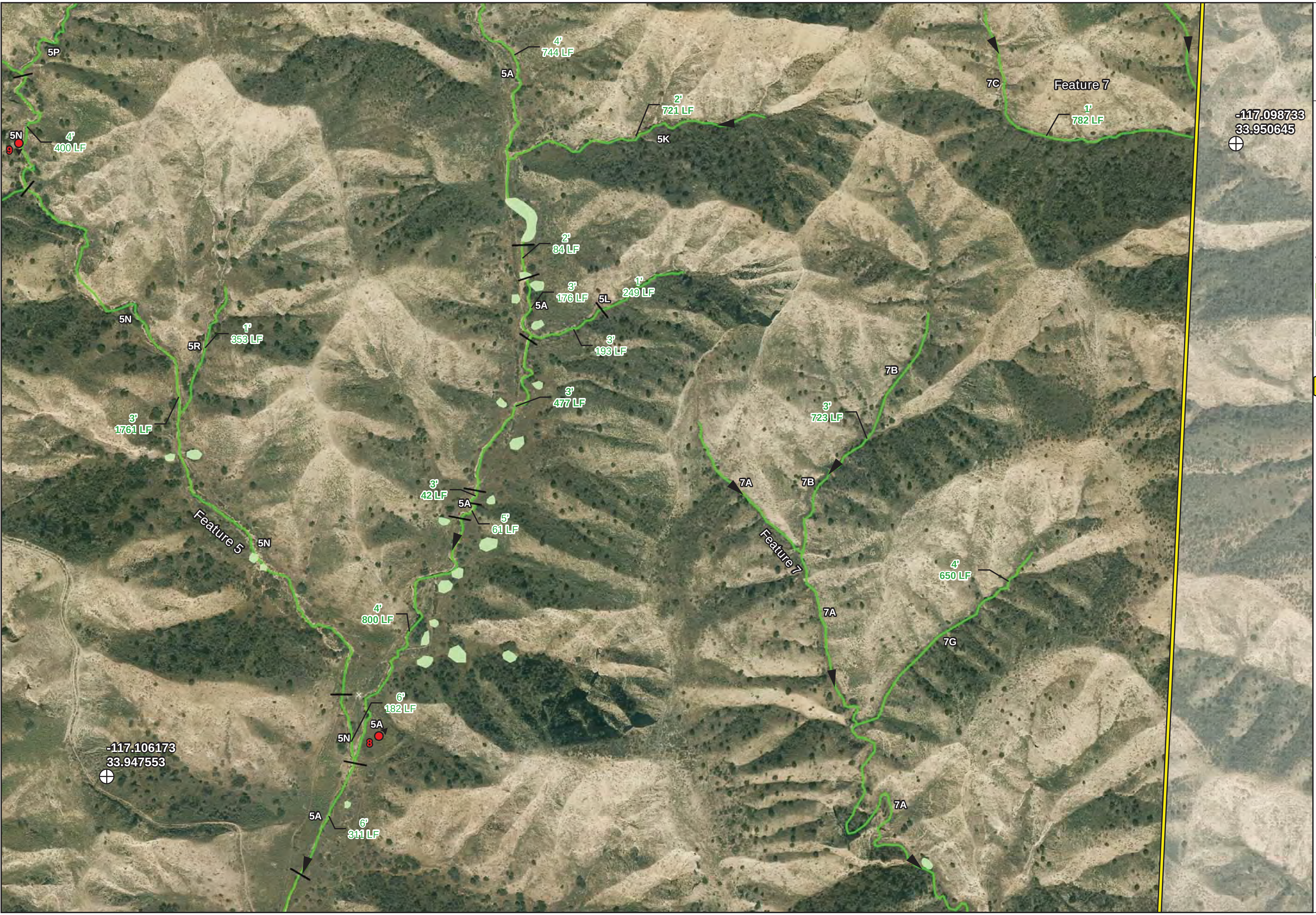

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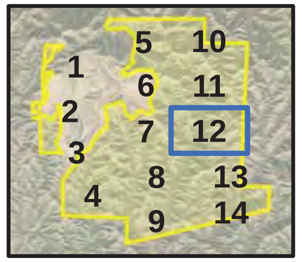

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🟩	Adjacent Riparian Vegetation
☐	Project Site

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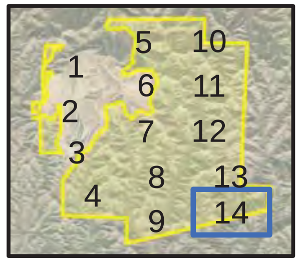

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Appendix B *On-Site Photographs*

Photo 1: Feature 2 (facing downstream/south). The main stem of Feature 2 was incised and filled with dead Russian thistle. The adjoining valleys were primarily vegetated with non-native grasses and did not contain jurisdictional tributary features.

Photo 2: Feature 3 (facing downstream/south). This segment did not exhibit indicators of an OHWM or other fluvial activity indicative of a streambed. These characteristics were common of the lower reaches.

Photo 3: Feature 3 (facing downstream/southeast). Near the downstream limits of the project site, this area was representative of Feature 3, showing an eroded drainage feature with a mulefat corridor within and adjacent to the drainage.

Photo 4: Non-jurisdictional feature (facing north-northeast). Representative photograph of a non-jurisdictional area in an adjoining valley in the lower reaches of the watershed.

On-Site Photographs - Appendix B

Photo 5: Feature 4 (facing upstream/northwest). The relict access road in this valley obscured the drainage feature at times, leaving traces of the former flow path visible on aerial imagery. This portion of the drainage followed the abandoned access road.

Photo 6: Feature 4 (facing downstream/south). This type of narrow canyon was typical of the headwaters within the project site.

Photo 7: Feature 5 (facing upstream/northeast). The lower portion of Feature 5 consisted of a single, narrow drainage that meandered through a flat valley of non-native grasses. These characteristics were typical of many of the features in the lower watershed.

Photo 8: Feature 5 (facing upstream/northeast). Incised and primarily unvegetated drainage feature.

Photo 9: Feature 5 (facing downstream/south). Small and incised tributary of Feature 5 showing typical characteristics of the upper watershed.

Photo 10: Feature 5 (facing upstream/northwest). Small and incised tributary of Feature 5 showing typical characteristics of the upper watershed.

Photo 11: Feature 7 (facing upstream/northwest). A grassy valley that did not exhibit indicators of an OHWM or other fluvial activity indicative of a streambed. These characteristics were common of the lower reaches.

Photo 12: Feature 7 (facing downstream/south). Riparian corridor associated with Feature 7. Two soil pits (SP-2 and SP-3) were dug in this area to investigate potential wetland indicators.

Photo 13: Feature 9 (facing downstream/north). Small and incised tributary of Feature 9 showing typical characteristics of the upper watershed.

Photo 14: Feature 9 (facing upstream/west). This upper reach of Feature 9 was less incised than other tributaries in the project site due to the flat valley floor.

Photo 15: Feature 10 (facing upstream/east). This small and incised tributary of Feature 10 was obscured by an abundance of non-native grasses.

Photo 16: Feature 10 (facing upstream/southeast). The main stem of Feature 10 was deeply incised and filled with dead Russian thistle. Hydrology in this area was significantly altered due to an abandoned off-road vehicle course.

Appendix C *Wetland Determination Forms*

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Badlands Landfill City/County: Riverside County Sampling Date: 3/10/2016
Applicant/Owner: Riverside County Department of Waste Resources State: CA Sampling Point: SP-1
Investigator(s): D. Cardoza, T. McGill, S. Anderson Section, Township, Range: T4S, R2W, S5
Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 1
Subregion (LRR): C - Mediterranean Lat: 33.9399 Long: -117.1187533 Datum: NAD83
Soil Map Unit Name: Metz loamy sand, channeled, 0 to 15 percent slopes NWI classification: None
Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)
Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ____
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ✓
Hydric Soil Present? Yes ____ No ✓
Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

Soil pit location is within an area that contains a high concentration of Baccharis salicifolia, within the active floodplain adjacent to the drainage feature.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 30')			
1. N/A			
2.			
3.			
4.			
= Total Cover			
Sapling/Shrub Stratum (Plot size: 10')			
1. Baccharis salicifolia	40	Y	FAC
2. Artemisia californica	5	N	UPL
3.			
4.			
5.			
= Total Cover	45		
Herb Stratum (Plot size: 10')			
1. Bromus madritensis ssp. rubens	2	Y	UPL
2. Bromus diandrus	1	Y	UPL
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	3		
Woody Vine Stratum (Plot size: N/A)			
1.			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)
Total Number of Dominant Species Across All Strata: 3 (B)
Percent of Dominant Species That Are OBL, FACW, or FAC: 33% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species	40	x 3 =	120
FACU species		x 4 =	
UPL species	8	x 5 =	40
Column Totals:	48 (A)		160 (B)

Prevalence Index = B/A = 3.33

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ____ No ✓

Remarks:

None

SOIL

Sampling Point: SP-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10 YR 4/4	100					Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock

Depth (inches): 6"

Hydric Soil Present? Yes ___ No ✓

Remarks:

Soil sample comprised entirely of coarse sand with a significant amount of organic material (i.e., roots). No visible redoximorphic features or hydric soil indicators observed. This area was the most likely area to contain wetland soils within this drainage feature.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ✓ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ✓ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___

Water Table Present? Yes ___ No ✓ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Badlands Landfill City/County: Riverside County Sampling Date: 3/14/2016

Applicant/Owner: Riverside County Department of Waste Resources State: CA Sampling Point: SP-2

Investigator(s): D. Cardoza, D. Rosie, S. Anderson Section, Township, Range: T4S, R2W, S4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): C - Mediterranean Lat: 33.941468 Long: -117.0980616 Datum: NAD83

Soil Map Unit Name: Metz loamy sand, channeled, 0 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are “Normal Circumstances” present? Yes ✓ No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ____

Hydric Soil Present? Yes ____ No ✓

Wetland Hydrology Present? Yes ✓ No ____

Is the Sampled Area within a Wetland? Yes ____ No ✓

Remarks:

Soil pit location is within an area that contains a dense cover of riparian trees, within the active floodplain bordering the drainage feature.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 20')			
1. Salix lasiolepis	50	Y	FACW
2.			
3.			
4.			
	50 = Total Cover		
Sapling/Shrub Stratum (Plot size: 10')			
1. Salvia mellifera	15	N	UPL
2. Baccharis salicifolia	5	N	FAC
3.			
4.			
5.			
	20 = Total Cover		
Herb Stratum (Plot size: 10')			
1. Bromus diandrus	5	N	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
	5 = Total Cover		
Woody Vine Stratum (Plot size: N/A)			
1. None			
2.			
	____ = Total Cover		

% Bare Ground in Herb Stratum 80 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	50	x 2 =	100
FAC species	5	x 3 =	15
FACU species		x 4 =	
UPL species	20	x 5 =	100
Column Totals:	75 (A)		215 (B)

Prevalence Index = B/A = 2.86

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ____

Remarks:

SOIL

Sampling Point: SP-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 5/3	99	5 YR 5/8	1	C	PL, M	LoSa	

[1] Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2] Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock
Depth (inches): 12"

Hydric Soil Present? Yes ___ No ✓

Remarks:

No visible redoximorphic features or hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
✓ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

✓ Water Marks (B1) (**Riverine**)
✓ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
✓ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ___ No ✓ Depth (inches): ___
Water Table Present? Yes ___ No ✓ Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No ✓ Depth (inches): ___

Wetland Hydrology Present? Yes ✓ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

None

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Badlands Landfill City/County: Riverside County Sampling Date: 3/14/2016

Applicant/Owner: Riverside County Department of Waste Resources State: CA Sampling Point: SP-3

Investigator(s): D. Cardoza, D. Rosie, S. Anderson Section, Township, Range: T4S, R2W, S4

Landform (hillslope, terrace, etc.): Floodplain Local relief (concave, convex, none): Concave Slope (%): 1

Subregion (LRR): C - Mediterranean Lat: 33.942523 Long: -117.098098 Datum: NAD83

Soil Map Unit Name: Metz loamy sand, channeled, 0 to 15 percent slopes NWI classification: None

Are climatic / hydrologic conditions on the site typical for this time of year? Yes ✓ No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? Are "Normal Circumstances" present? Yes ✓ No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ✓ No ___

Hydric Soil Present? Yes ___ No ✓

Wetland Hydrology Present? Yes ✓ No ___

Is the Sampled Area within a Wetland? Yes ___ No ✓

Remarks:

Soil pit location is within an area that contains a dense cover of riparian trees, within the active floodplain bordering the drainage feature.

VEGETATION – Use scientific names of plants.

	Absolute % Cover	Dominant Species?	Indicator Status
Tree Stratum (Plot size: 20')			
1. Populus fremontii	75	Y	FACW
2.			
3.			
4.			
= Total Cover	75		
Sapling/Shrub Stratum (Plot size: 10')			
1. Salix lasiolepis	50	Y	FACW
2. Nicotiana glauca	5	N	UPL
3.			
4.			
5.			
= Total Cover	55		
Herb Stratum (Plot size: 10')			
1. Bromus diandrus	70	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
= Total Cover	70		
Woody Vine Stratum (Plot size: N/A)			
1. None			
2.			
= Total Cover			

% Bare Ground in Herb Stratum 30 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC:	2	(A)
Total Number of Dominant Species Across All Strata:	3	(B)
Percent of Dominant Species That Are OBL, FACW, or FAC:	66%	(A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species	125	x 2 =	250
FAC species		x 3 =	
FACU species		x 4 =	
UPL species	5	x 5 =	25
Column Totals:	130 (A)		275 (B)

Prevalence Index = B/A = 2.12

Hydrophytic Vegetation Indicators:

- ✓ Dominance Test is >50%
- ✓ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✓ No ___

Remarks:

SOIL

Sampling Point: SP-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		
0-4	10 YR 4/3	100					SiCl	
4-12	10 YR 5/3	100					LoSa	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Stratified Layers (A5) (**LRR C**)
___ 1 cm Muck (A9) (**LRR D**)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)
___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

___ 1 cm Muck (A9) (**LRR C**)
___ 2 cm Muck (A10) (**LRR B**)
___ Reduced Vertic (F18)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: Rock
Depth (inches): 12"

Hydric Soil Present? Yes ______ No ✓

Remarks:

No visible redoximorphic features or hydric soil indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1) (**Nonriverine**)
___ Sediment Deposits (B2) (**Nonriverine**)
___ Drift Deposits (B3) (**Nonriverine**)
✓ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Water-Stained Leaves (B9)
___ Salt Crust (B11)
___ Biotic Crust (B12)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Thin Muck Surface (C7)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water Marks (B1) (**Riverine**)
___ Sediment Deposits (B2) (**Riverine**)
___ Drift Deposits (B3) (**Riverine**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Crayfish Burrows (C8)
___ Saturation Visible on Aerial Imagery (C9)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes ______ No ✓ Depth (inches): ____________
Water Table Present? Yes ______ No ✓ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes ______ No ✓ Depth (inches): ____________

Wetland Hydrology Present? Yes ✓ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

None

Remarks:

None

Paleontological Assessment and Cultural Resource Reports

Paleontological Assessment of
The Badlands Landfill Integrated Project
Riverside County, California

El Casco, CA. USGS 7.5' Topographic Quadrangle Maps

San Bernardino Base and Meridian
Township 2 South, Range 2 West; all or portions of Section 31, 32 and 33
Township 2 South, Range 3 West; portions of Section 4 and 5

1,115-Acre Study Area.

Developmental Case Number: None Required

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Fieldwork Conducted By: K.J. Lord, PhD, M.H. Dice M.A. and A. Said-Abdelwahed
Fieldwork Conducted On: July 21, 2010
Report Date: April 2011

Keywords: The Badlands, RCWMD Badlands Landfill, San Timoteo Formation

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LIST OF EXHIBITS

SECTION 1: MANAGEMENT SUMMARY

This paleontological report has been prepared for the Riverside County Waste Management Department (RCWMD) to describe the results of a study conducted by MBA in 2010 that included paleontological records review and field evaluation of the area defined under the Badlands Landfill Integrated Project (BLIP), referred to, herein, as the "Project Area." The Project Area is located, generally, in portions of Sections 4 and 5 of T3S; R2W; and portions of Sections 31, 32 and 33 of T2S; R2W of the San Bernardino Base and Meridian (SBBM), as shown on the *El Casco, CA.* 7.5' United States Geological Survey (USGS) quadrangle topographic map, and specifically, off Ironwood Avenue east of the City of Moreno Valley and north of SR 60 in the San Timoteo Badlands, County of Riverside, California.

The goal of the study was to provide information to RCWMD on the potential occurrence of paleontological resources within the BLIP and to locate recorded and new fossil localities. Based on the results of the assessment, feasible mitigation measures were developed to reduce potential impacts to any significant paleontological resources within the BLIP.

A records search of the archives and collections of the San Bernardino County Museum (SBCM) and Los Angeles Museum of Natural History (LAMNH) revealed a single lithologic unit (San Timoteo Formation) underlying the Project Area. Portions of the Project Area are capped with a thin veneer of Holocene alluvium and landslide debris associated with the unstable conditions. Steep slopes generally exhibited exposures of the upper and middle members of the San Timoteo Formation. The records search also identified several recorded localities in the northeastern portion of the current landfill area (Smith 1982; Albright 1999). In addition to the formal records search, the author contacted Robert Reynolds who provided a map of localities within the De Anza Cycle Park Expansion, but outside of the boundaries of this survey (personal communication Reynolds May 2011)

The rock formations observed in the Project Area have high potential for the presence of significant fossils, including both large and small vertebrates, based on the known fossil localities and finds within the same rock formations in the surrounding area (Reynolds and Reeder 1986 and 1991; Albright 1997 and 1999; McCleod 2010; and Scott 2010). Therefore, the entire Project Area has high paleontological sensitivity.

A field survey of the Project Area was conducted by MBA in July 2010. Transect surveys were conducted in the area to the south of the active landfill operation to look for appropriate geologic formations and to identify any exposed fossil localities. No new localities were identified in these transects. A more intensive survey was conducted in the northeastern portion of the current active landfill area. This effort was undertaken to locate previously recorded localities in the area by Smith (1982) and Albright (1999), to assess the conditions of the localities, if found, and to determine if any fossils were still present. One vertebrate fossil locality consisting of a cast of a distal humerus of *Equus* sp. was identified. This find may have been a portion of a previously recorded find/locality by Smith (SBCM 5347, see Exhibit 4). None of the other localities previously recorded in either Smith (1982) or Albright (1999) were positively identified in this study. It is possible that the existing landfill activities may have removed any evidence of those localities. Large portions of the project site along the eastern margins were not visited due to severe access constraints and very steep terrain.

A comprehensive mitigation program was recommended to adequately protect significant paleontological resources from being destroyed by earthmoving activities during project implementation, in compliance with both CEQA and NEPA. The mitigation program will entail paleontological monitoring of earthmoving activities in sediments of the San Timoteo Formation and allow for recovery and preservation of some of the important fossil remains and the associated scientific data that might otherwise been lost. Implementation of the mitigation program will reduce the potential significant impact of the Project on paleontological resources.

SECTION 2: INTRODUCTION AND PROJECT SETTING

2.1 - Introduction

This paleontological report has been prepared for the RCWMD to describe the results of a study conducted by MBA in 2010 that included paleontological records review and field evaluation of the area defined under the BLIP, referred to, herein, as the "Project Area." The Project Area is located, generally, in portions of Sections 4 and 5 of T3S; R2W; and portions of Sections 31, 32 and 33 of T2S; R2W of the SBBM, as shown on the *El Casco, CA.* 7.5' USGS quadrangle topographic map, and specifically, off Ironwood Avenue east of the City of Moreno Valley and north of SR 60 in the San Timoteo Badlands, County of Riverside, California.

2.2 - Study Objectives

The objectives of this paleontological study are:

1. Identification of all known paleontological resources within and near the Project Area.
2. Evaluation of the potential for impacts by the BLIP to significant paleontological resources.
3. Recommendations of feasible mitigation measures to reduce the impacts to insignificance level.

The paleontological study is consisted of:

1. A paleontological records search that identifies previously recorded significant fossil bearing formations underlying the Project Area and surrounding areas; and
2. A paleontological field reconnaissance in the form of a focused pedestrian survey that examines lithologic units in accessible locations of the Project Area for exposed fossils and confirms locations of existing fossil localities.

2.3 - Location

The Project Area is situated in the west-central portion of the County of Riverside, north of SR60 at the terminus of Ironwood Avenue (Exhibit 1). The boundaries of the Project Area can be found within the *El Casco, CA.* United States Geological Survey (USGS) 7.5-minute topographic quadrangle maps, in portions of Section 31, 32 and 33 in Township 2 South, Range 2 West and portions of Section 4 and 5 in Township 3 South, Range 2 West of the SBBM (Exhibit 2). Specifically, the Project Area includes all or part of 15 individual parcels: Assessor's Parcel Number (APN) APN#421-140-009, -011, -022, -023, -024, -025, -030, -033, -034, -036; 422-030-011, -014, -015; 422-050-014 and -027.

The Badlands Landfill, which has been in operation since 1966, is currently owned and operated by the RCWMD. The existing Badlands Landfill property encompasses 1,168 acres and exhibits deep canyons, steep slopes, narrow ridgelines, ephemeral drainages, manufactured fill and hillsides, contoured 1:1 cut slopes, roads, structures, and environmental protection components. Of the 1,168 acres, 246 acres are permitted for landfill operation, while the remaining 922 acres are currently undisturbed. A 218-acre block of undisturbed land, located immediately east of the current landfill property and an essential component of the BLIP, is being considered for acquisition. Thus, the overall Project Area will encompass 1,386 acres, once the adjacent land is acquired.

Because a portion of the existing landfill property has been recently surveyed for paleontological resources (LSA 2009), this study is restricted to 890 acres of undisturbed and un-surveyed land (i.e., those portions of the landfill property outside of the current 246-acre permitted landfill area and previously surveyed acreage), plus the proposed 218-acre acquisition land and 7 acres of interior roads or other disturbance. In sum, 1,115 acres were examined during the fieldwork effort (see Exhibit 3).

2.3.1 - The Project

The Badlands Landfill has been in operation since 1966 and is currently permitted to receive 4,000 tons per day of municipal solid waste (MSW). The existing landfill operation is located on 1,168 acres of County-owned property. RCWMD plans to acquire 218 acres of land east of the landfill in Section 33 (Exhibit 3). For the purposes of this report and the California Environmental Quality Act (CEQA)- and National Environmental Policy Act (NEPA)-level environmental analyses, it is assumed that the acquired land will be entirely utilized for landfill development.

The BLIP may consist of, but is not limited to, the following integrated waste management activities, facilities, and land uses: MSW disposal; composting; processing of greenwaste, waste tires, and construction and demolition waste; beneficial reuse and recycling; soil stockpiling; landfill gas and groundwater monitoring and treatment; gas-to-energy conversion; equipment maintenance; material storage; sedimentation basins; environmental mitigation; land surveys; engineering field studies; household hazardous materials handling and storage; and construction of interior roads, new office buildings, and other structures, such as perimeter fences.

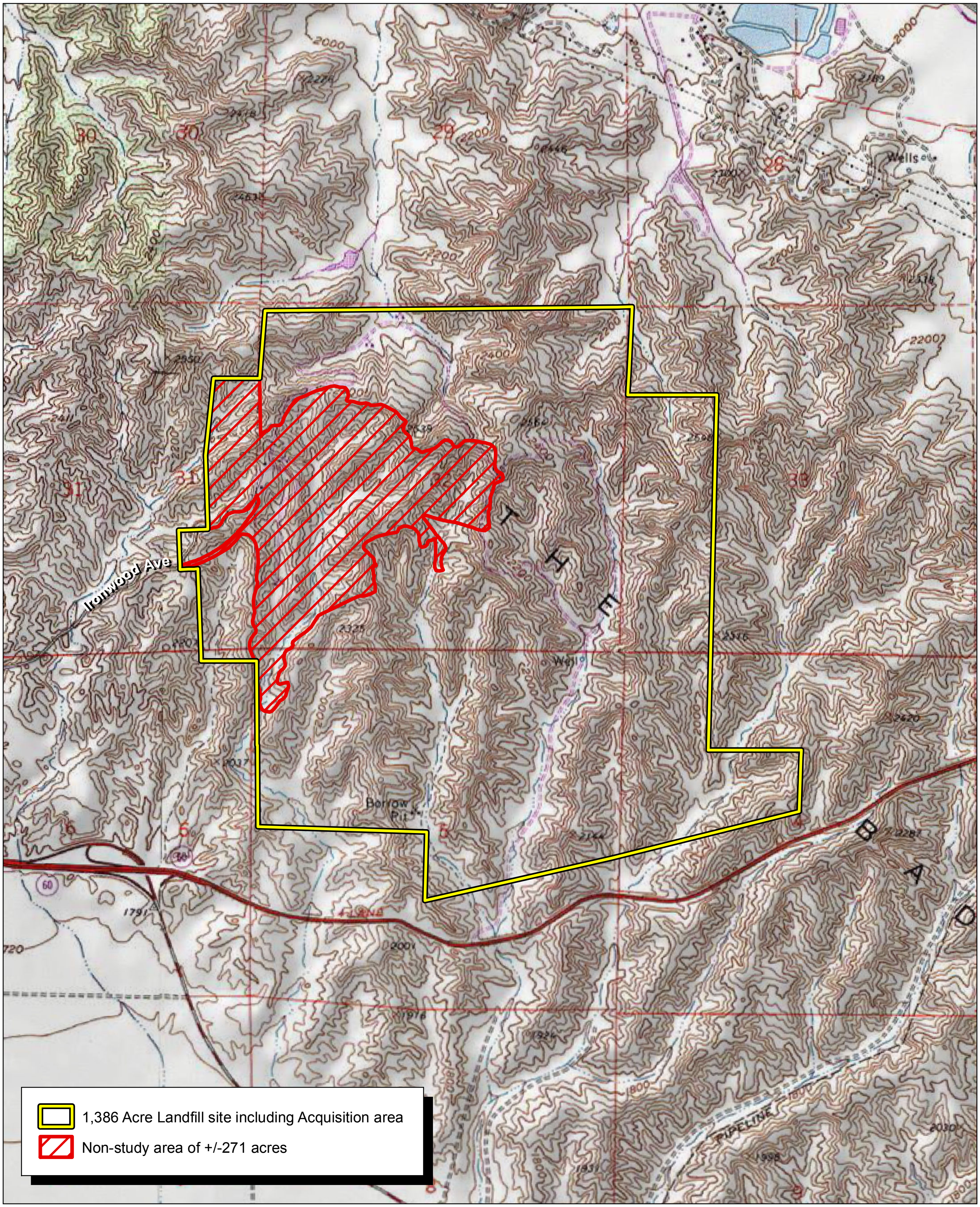
Source: Census 2000 Data, The CaSIL, MBA GIS (2010).

Michael Brandman Associates

Exhibit 1
Regional Location Map

23100004 • 09/2010 | 1_regional.mxd

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT • BADLANDS LANDFILL
PALEONTOLOGICAL RESOURCE ASSESSMENT



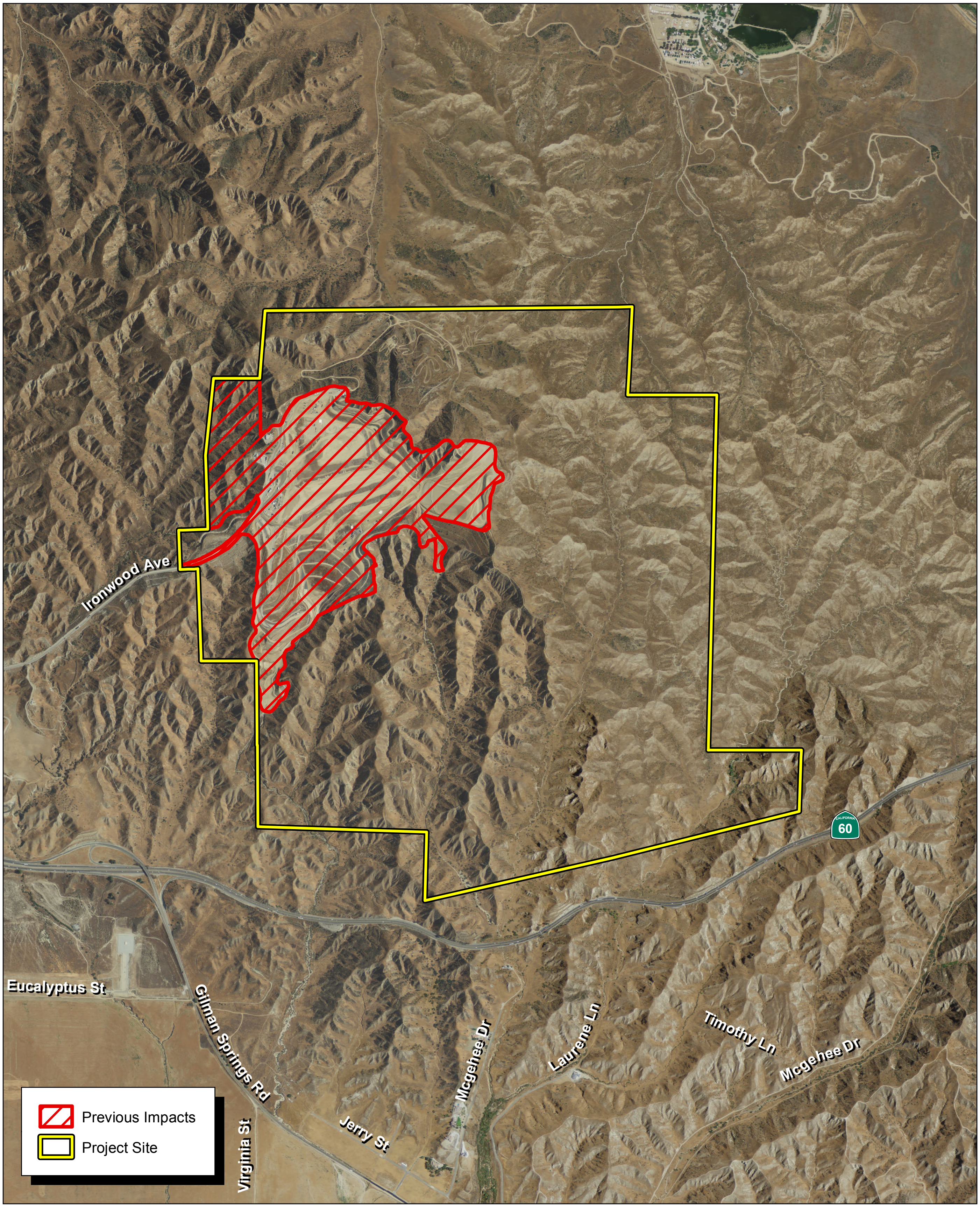
Source: TOPO! USGS El Casco (1979) & Sunnymead (1980) 7.5' DRGs.

Michael Brandman Associates

NORTH

2,000 1,000 0 2,000
Feet

Exhibit 2
Local Vicinity Map
Topographic Base



Source: NAIP for Riverside County (2009); ESRI (2008).

Exhibit 3
Local Vicinity Map
Aerial Base

Michael Brandman Associates

2.4 - Geology/Topography

The Project Area is located within a geological formation known as the San Timoteo Badlands, a highly complex but recent tectonic zone with numerous faults and fault strands. The San Jacinto Fault Zone is part of the larger San Andreas system and separates the San Jacinto Block to the northeast from the Perris Block to the southwest. The Perris Block is an eroded mass of Cretaceous and older crystalline rock that lies between the Los Angeles Basin to the west and the San Jacinto Mountains to the east; the latter are marked by an elevated, low-gradient valley system (Woodford et al 1971). During the Pliocene (5.33 to 2.58 million years ago, [MYA]) and Pleistocene Epochs (2.58 MYA to 12,000 years before present, [YBP]), the Los Angeles Basin sank many thousands of feet, while the San Jacinto Mountains rose considerably through compressional forces, and the Perris Block oscillated vertically (ibid). The vertical tectonics are indicated by right-lateral strike-slip faulting on the San Jacinto fault system, creating a broad anticline in the region known as the San Timoteo Anticline (Manson et al 2002). The San Jacinto Fault Zone and a smaller element known as the Claremont Fault strand is nearest named fault to the Project Area, with the Casa Loma Fault located in the floor of the San Jacinto Valley between the Lakeview Mountains and the southeastern section of the Badlands. Large earthquakes associated with the faults have been recorded historically in this area: on Christmas morning in 1899, a massive earthquake rocked the San Jacinto area killing at least six older women at the Soboba village.

No modern on-line geological map is available for the El Casco 7.5’ topographic quadrangle. The 1:120,000 Santa Ana Sheet reveals unpublished portions at greater scales. Published geological research has been undertaken in the Badlands since 1921 and continues to the present day (see Frick 1921, Fraser 1931, English 1953, Morton and Matti 1993, Albright 1997, Albright 1999, Morton and Matti 2001, Onderdonk et al 2010). According to Scott (2010), the previous geological mapping (Rogers 1965, Morton and Matti 2001, Morton 2004) indicates that the Project Area encompasses surface exposures of middle member of the San Timoteo Formation (“Tstm” and “Tstd”) overlain in arroyos and gullies by Holocene sediments consisting of alluvium (“Qya_5” and Qyf_5”) and landslide debris (“Qyls”).

The tops of the Badlands are in some places nearly 2,000 feet above the floor of the San Jacinto Valley, the floor of which may be in some places 3,000 meters deep before bedrock is reached (Morton and Matti 2001). The extreme youthfulness of the hills, combined with an estimated 100km of displacement along the various strands of faults in the San Jacinto system (Matti et al 2003), and sporadic but intense nature of fluvial erosion has created a maze of steep walled valleys, sharp ridges, and numerous landslide slumps throughout the Project Area (Manson et al 2002). Soils inside the Badlands area are typically thin, except in the floors of the larger canyons. Most of the landslides in this region are small, but well studied (see Morton 1989), and generally the result of rainstorms rather than earthquakes. Washes and arroyos in the Project Area exhibit landslide alluvium and Holocene alluvial fan deposits, which are not fossiliferous (Scott 2010.)

The Project Area exhibits the characteristic steep topography of the Badlands. There is extremely limited access outside of the existing 246-acre landfill area. The abandoned De Anza Motorcycle Park is located in the northeast margin of the Project Area. This area contains several dirt roads that can be accessed by 4x4 vehicles. Marginal roads (blocked by deep arroyo cuts) to the old park originating off SR 60 can be seen on aerial photographs.

2.5 - Vegetation

The Project Area is dominated by non-native grasslands on the ridges with a mixture of riparian species in some of the deeper drainage bottoms. There is some evidence of wildland fire in the past (prior to 2005). The entire Project Area contains sparse Riversidean sage scrub, ruderal grasses and weeds on disturbed areas and native shrubs of various types in the arroyo bottoms. A large coyote and numerous birds, including California quail, mourning dove, and mocking bird and lizards, were observed during the field reconnaissance. No springs were seen in any of the drainages, nor are any recorded on the El Casco topographic map.

SECTION 3: RESEARCH DESIGN AND METHODS

Paleontological resources are fossilized representations of once living organisms in rock. Fossils can be preserved as either impressions of soft or hard parts, mineralized remains of hard parts, tracks burrow, or other trace fossils, coprolites, seeds or pollen and other microfossils. These organisms may have been terrestrial, aquatic, or aerial in nature.

Fossils are an important resource to science as they are useful for determining past evidence of the environment and provide valuable information on the evolution of various organisms. Fossils enable geologists to reconstruct the environment through a combination of types of organisms present (terrestrial, aquatic, etc), information on the habitat (based on plant remains, species composition, etc) and providing a relative (and sometimes direct) age on the geologic formations. Paleontological resources have been protected under federal laws and regulations since 1906 (Antiquities Act of 1906). This law and others were designed to protect resources on federal lands and provide information that allows the public to appreciate and protect the environmental quality of a region. In California, paleontological resources are protected under the CEQA (CEQA Guidelines Appendix G Environmental Checklist Form).

Potential adverse environmental impacts from the BLIP on paleontological resources (e.g. unrecorded fossil sites and remains) were assessed, and mitigation measures developed to reduce potentially significant impacts in this study, in compliance with the 1995 Society of Vertebrate Paleontology standard guidelines for reducing the potential adverse impact of construction on paleontological resources.

3.1 - Assessment Criteria

The paleontological sensitivity of a rock formation is a measurement of the sensitivity for resources and provides an assessment of the potential productivity and importance of the fossils within a particular study area. The procedures are well documented. In Riverside County, paleontological assessments can be made through the Riverside County Land Information System (RCLIS) (http://www3.tlma.co.riverside.ca.us/pa/rclis/index.html). The potential productivity of a rock formation is measured based upon the densities of fossil specimens or localities within or near an area. Exposures of a particular geologic formation within a study area may yield fossils similar in number and kind to those previously recorded from the geologic formation in the surrounding area and may contain a similar density of fossil sites. Paleontological sensitivity criteria in Riverside County are described below:

- **High Potential –** Formation contains a high density of fossil sites and/or has produced numerous remains locally and is very likely to yield additional remains.
- **Low Potential** – Poorly exposed or studied formation that contains a very low density of recorded fossil localities and has produced little remains locally.

- **Unknown Potential** – Formations for which no data or insufficient data exists for the immediate vicinity to allow an accurate assessment of its potential for yielding important fossil remains within the study area.
- **No Potential -** Unfossiliferous igneous or metamorphic rock units with no potential for yielding and fossil remains, or Recent to sub-Recent sedimentary deposits that are too young to yield organic remains greater than 10,000 years old.

Our review of the Project Area using the RCLIS shows that the entirety of the Project Area has high paleontological potential. The RCLIS is a geographic information system-based program that produces reports and maps of selected County parcels. The system has information on geologic formations throughout the County with a sensitivity rating. This system allows the county to make recommendations for the potential for paleontological formation information to aid researchers and others on decisions for CEQA-related documentation.

3.2 - Paleontological Records Search and Collections Search

Geologic and paleontological literature, including reports, papers, and maps that cover the geographic area in this region of Riverside County, were reviewed to determine what lithologic unit or units underlie the site. It was then determined whether these units have produced fossils in the past. A records search and an examination of the contents of the paleontological collections at the SBCM and LAMNH were conducted to determine if previous records or formal fossil localities exist on or in the vicinity of the project site. These searches were further expanded outside of the project area to include materials on the full De Anza Cycle Park survey area, provided by Robert Reynolds (personal communication May 2011). This map more than doubled the localities in the area in accessible areas of the Cycle Park to the east approximately one mile of the eastern boundary of the Landfill Expansion. The results of these reviews were used to develop a baseline inventory strategy of the parcel.

3.3 - Paleontological Fieldwork Procedure

MBA County Certified Paleontologist, Kenneth J. Lord, with the assistance of Michael Dice and Arabesque Said-Abdelwahed, conducted a pedestrian field survey of the parcels to determine what lithologic units underlying the site and examine if fossils were exposed at the surface. A field examination provided information essential for the evaluation of the potential for an area to produce significant fossil materials. The methodology consisted of linear north-south transects in the south-central portion of the Landfill and re-examination of a portion of the De Anza Cycle Park. Access restricted transect studies in the eastern margins of the proposed expansion.

SECTION 4: RESULTS

4.1 - Paleontological Records Search

A records search of the archives and collections of the SBCM and LAMNH revealed that previous geologic mapping (Morton, 1965; Morton and Matti, 2001; Morton 2004) indicates that the proposed Project Area encompasses surface exposures of middle members of the San Timoteo Formation (unit Tstm and Tstd) overlain in arroyos and erosional features by Holocene alluvium (Qya5, Qyf5) and landslide debris (Qyls)(Appendix B).

The curators and collection managers of the SBCM and LAMNH indicated that 13 localities were recorded within and near the boundaries of the Project Area. These localities include the localities identified in the 1999 Albright report, which indicates that Sites 304 (RV9613), 311(RV9614), 313 (RV9615), and HTS (RV9617) occur within the landfill proper and produced several small mammal taxa. Exhibit 4 shows fossil localities within and near the Project Area. Mr. Robert Reynolds provided information on a map of the full De Anza Cycle Park (personal communication). This map added 13 additional localities to the information provided by SBCM and LAMNH. Details on the localities recorded at the SBCM are provided in Appendix B. Each locality has information on the location, date recorded, brief description, geologic formation and objects found. The level of detail for the locality from the LANHM does not provide the same level of detail nor does information in the Albright report (1999: Appendix 108) provide site specific information on the localities. Contact with Dr. McLeod of the LANHM provided more detailed information on the location of LACM 7622. The information on the Albright finds were based on a review of the report, existing landmarks and coordinates provided in the report. The accuracy of all the localities was limited to available technology at the time of recordation (i.e, GPS systems were not yet available).

4.1.1 - San Timoteo Formation

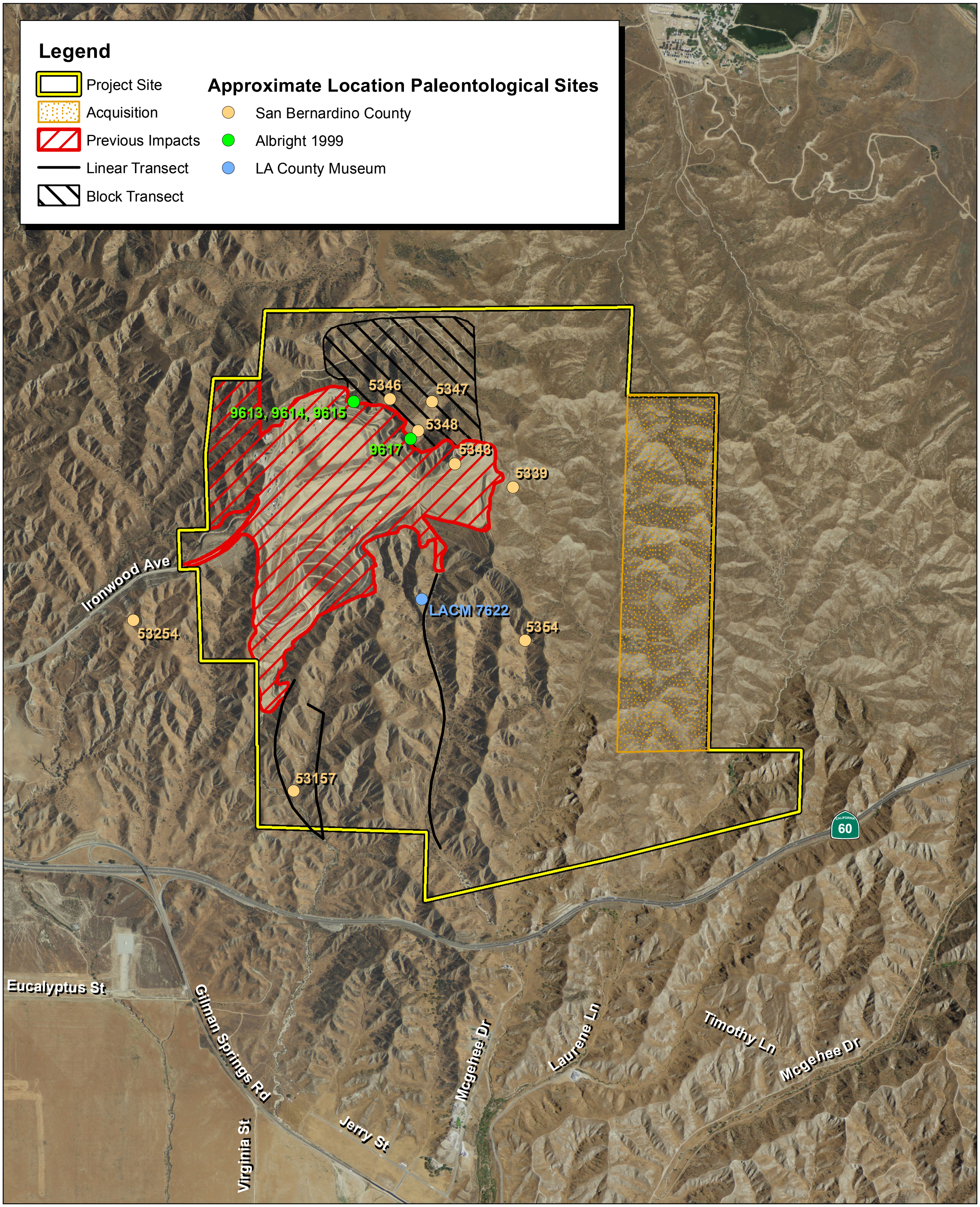
The San Timoteo Formation consists of a lithogically diverse sandstone, conglomeritic sandstone, and conglomerate. Nearly all of the sandstone is arkosic and much is lithic. The San Timoteo Formation is a Pliocene-Pleistocene, vertebrate-bearing non-marine strata in the San Timoteo Canyon and surrounding areas. The upper part of the San Timoteo beds contains vertebrate fauna of the Pliocene or the earliest Pleistocene and is referable to the Blancan North American Land Mammal Age (Savage and Russell 1983, Bell et al 2004) and the early Irvingtonian North American Stage (Savage and Russell 1983, Reynolds and Reeder 1986 and 1991, Repenning 1987, Albright and Woodburne 1993, Albright 1997 and 1999, Bell et al 2004). In sum, the San Timoteo Formation is extremely fossiliferous.

The San Timoteo Formation has been divided into three informal members and five subdivisions of members:

- **Upper Member (Pleistocene)(Qstu)** This member consists of gray coarse-grained, moderately indurated sandstone and conglomerate that erodes to form sharp-ridged badlands topography. It contains early Pleistocene Irvingtonian fossils. It is sub-divided into:
    - Conglomeritic sandstone beds (**Qsts**) that appear to be derived from adjacent sedimentary beds. It is generally manifested as a small lens-shaped body along a crest of anticline in the western part of the San Timoteo Badlands and likely a part of the Project Area, and
    - Quartzite-bearing conglomerate beds (**Qstcq**) which contain distinctive, well-indurated, conglomerate consisting of large clasts derived from the central part of the San Bernardino Mountains. The beds are found in the upper part of the member and also contain early Pleistocene Irvingtonian fossils.
- **Middle Member (Pliocene (Tstm).** This member consists of light gray pebbly to cobbly, moderately to well indurated, medium to coarse-grained sandstone containing conglomerate beds up to 9 meters thick. Overall, the member consists of 70 percent sandstone and 30 percent conglomerate, with the conglomerate more predominate near the top of the member. It includes common reddish-brown stratigraphic intervals consisting of oxidized sandstone and reddish-brown clay-rich intervals that may represent paleosols. Like the Upper Member, it erodes to form sharp-ridged badlands topography. Within the Middle Member, **Tstd** is a highly deformed sandstone, pebbly sandstone and conglomerate generally confined to the western part of the Badlands and adjacent to the San Jacinto fault zone.
- **Lower Member (Pliocene (Tstl).** This member is mostly gray, moderately well indurated, well-sorted fine-grained sandstone containing subordinate pebble lenses and sparse medium-grained sandstone beds. This member is speculated to represent distal flood plain deposits. It erodes to form slightly more rounded badlands than the younger San Timoteo beds. Within the Lower Member are Tstl1, an interval with reddish-brown fine to thick-bedded coarse-grained arkosic sandstones with a greenish-gray claystone and siltstone with thick and crudely bedded coarse-grained sandstone with ripple lamination **(Tstl2)**.

The current landfill area contains numerous demonstrated fossil remains, particularly along the north and northeastern margins. A 1982 archaeological and paleontological survey of the old De Anza Motorcycle Park found 13 fossil localities (Smith 1982). Five of these fossil localities (SBCM 5.3.39, 5.3.43, 5.3.46, 5.3.47, and 5.3.48) lie within the proposed boundaries of the BLIP (Appendix B- It appears that the Smith 1982 data was not entered into the SBCM system until the 1990s). The remaining localities lie approximately one mile to the east of the project boundaries (Reynolds personal communication May 2011). All of the finds are large mammals, with three of the localities identifying remains as *Equus* sp. All five localities have been identified as occurring in the Upper San Timoteo Formation **(Qstu)**.

Three additional localities were identified in the SBCM records search. These included a locality with large mammals (*Equus* sp., Camelidae, Artiodactyla)(SBCM 5.3.54); a locality with small mammals (Leporidae)(SBCM 5.3.254); and a locality with Sphaeriidae, a small freshwater clam (SBCM 5.3.157).



Source: NAIP for Riverside County (2009); ESRI (2008).

Exhibit 4
Locality Map
Aerial Base

Michael Brandman Associates

NORTH

2,000 1,000 0 2,000 Feet

23100004 • 05/2011 | 4_Locality_Map.mxd

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT • BADLANDS LANDFILL
PALEONTOLOGICAL RESOURCE ASSESSMENT

Albright (1999) conducted extensive work in the current landfill and has completed a number of transects with the collection of tons (overall 49,150 pounds) matrix from the landfill and surrounding areas (Albright 1999). Two sites, #304 and #311, produced significant fossil assemblages (see Localities #9613 and #9614 in Albright). Two other sites, #313 (RV9615) and HTS (RV9617), produced a lesser amount of small rodent fossils, with RV9617 possibly being in the same stratigraphic level as the extensive RV9614. Albright states that the Riverside County Landfill-El Casco composite section (now called the Badlands Sanitary Landfill) is entirely located within the San Timoteo Formation and that it is at least 700 meters thick. Fossils recovered from the region represent the Blancan and Irvingtonian Periods with a date range from 1.5 to 3.0 million years.

Of particular interest are the number and varieties of rodent fossils and small mammal taxa. Finds in Locality #9613 included *Prodipodomys* sp., *Dipodomys* sp., *Peromyscus* sp., and *Neotoma* sp. Locality #9614 had the above species as well as *Sylvilagus* sp., *Thomomys* sp., *Perognathus* sp., and *Sigmodon* sp. (Albright 1999 Appendix page 108).

4.2 - Field Survey

The survey conducted by MBA in 2010 covered two extensive north-south transects south of the existing landfill generally following the north-south trending valleys south of the active landfill (see Exhibit 4). These linear transects were also designed to explore existing localities previously documented. The old De Anza Motorcycle Park area north of the current active landfill, where numerous fossil localities were identified in past research (Smith 1982 and Albright 1999), was also extensively examined, using a more traditional block transect methodology, to determine if any of the previously recorded localities could be identified. Access to the more eastern portions of the project site was limited due to access issues across lands not controlled by the Landfill and extremely steep terrain.

Similar to the previous studies by Smith and Albright, the MBA transect survey was within the San Timoteo Formation which was determined to contain all three, namely, upper, middle and lower, members of the formation. This determination was based on examination of exposed formations along the ridges and canyons traversed during the transect survey and comparison with descriptions of the formation types as noted in Morton (2004).

A single fossil (*Equus* sp.) was found along a motorcycle trail road cut in the old De Anza Motorcycle Park. This fossil could be a remnant of SBCM 5347, in light of the fact that the find location is near the general area of the recorded locality, and that SBCM 5347 is known to contain *Equus* sp. fossils, (Appendix B). The fossil was exposed in the road cut, eroded, and in poor condition (see Appendix A – Photo 9). No other exposed fossils were identified during the survey.

SECTION 5: PROJECT SUMMARY AND MITIGATION RECOMMENDATIONS

The rock formations in the Project Area have high potential for the presence of significant fossils, including both large and small vertebrates, based on the known fossil localities and finds within the same rock formations in the surrounding area (Reynolds and Reeder 1986 and 1991; Albright 1997 and 1999; McCleod 2010; and Scott 2010). This is based upon a combination of the transect surveys across the south-central portion of the Project Area, the block surveys in the northeastern area and inferred from the surveys conducted by past researchers listed above that occurred to the east. Therefore, the entire Project Area has high paleontological sensitivity.

A single fossil (*Equus* sp.) was found along a motorcycle trail road cut in the old De Anza Motorcycle Park. This fossil could be a remnant of SBCM 5347 (Appendix B), judging that the two locations were within 100 to 200 meters of each other— a close proximity well within the margin of error of the old locality plotting method that primarily used topographic and other environmental features as signposts. The MBA find was exposed in the road cut, eroded, and in poor condition, and thus it does not represent a significant find (see Appendix A – Photo 9). No other exposed fossils were identified during the survey.

None of the other recorded localities, including those related to Smith (1982) or Albright (1999), SBCM 53125, and LACM 7622, was positively identified in this study. It is possible that the existing landfill activities may have removed any evidence of those localities.

5.1 - Project Mitigation Measures

The procedures recommended below will mitigate adverse impacts on paleontological resources that may occur as a result of the BLIP. The procedures will allow for recovery and preservation of some of the important fossil remains and the associated scientific data that might otherwise been lost as a result of earthmoving activities associated with the BLIP. The recommended level of mitigation effort in a particular area reflects the paleontological importance of the underlying rock unit, the type and magnitude of the impacts, and the potential loss of fossil specimens and associated geologic data.

When appropriate mitigation measures are initiated, earthmoving activities could prove beneficial by exposing fresh rock and allowing the collection of fossil remains and associated data that might otherwise remain unexamined. Mitigation programs containing measures similar to those presented below have resulted in the recovery of abundant fossil remains from a variety of construction or land disturbance activities. Similar programs have been outlined by Scott and Springer (2003) as well as by the guidelines of the Society of Vertebrate Paleontology.

The recommended mitigation measures below represent a comprehensive mitigation program designed to adequately protect significant paleontological resources, in compliance with both CEQA and NEPA. The goal of the mitigation program is to reduce potential adverse impacts of construction activities associated with the BLIP to important paleontological resources to an insignificant level. This goal will be achieved through documentation and curation of fossils encountered during earthmoving activities. Additionally, beneficial effects could result from the mitigation program as it might recover and preserve some significant fossils from the Badlands area that have not previously been exposed.

Mitigation Measures:

1. If any earthmoving activities in the Badlands Landfill Integrated Project (BLIP) Area occur in the general areas identified as having previously recorded paleontological localities, a qualified paleontologist shall be retained by the landfill operator to determine if any of the previously identified localities are still extant and assess the condition of the localities, if extant. If localities are present and determined significant, a locality specific treatment plan shall be developed. The treatment plan(s) shall address appropriate sampling, analysis, and documentation methodologies/techniques used to obtain scientific information associated with each of the potentially impacted localities. The plan(s) shall require that all collected specimens be placed in an acceptable museum, repository or accredited institution.
2. Prior to any earthmoving in the Badlands Landfill Integrated Project (BLIP) Area, a qualified vertebrate paleontologist shall be retained by the landfill operator to develop a storage agreement with an appropriate repository to allow for the permanent storage and maintenance of any fossil remains recovered during implementation of the BLIP.
3. Prior to any earthmoving in the Badlands Landfill Integrated Project (BLIP) Area, the landfill operator shall retain a qualified paleontologist to develop a discovery/treatment plan for any fossil remains encountered during earthmoving activities. The plan shall outline the standard procedures for the identification, treatment, and assessment of specimen and site data associated with any paleontological find. The mitigation plan shall also include a paleontological resources awareness training program for the BLIP's earthmoving staff, including equipment operators, to raise their awareness of and alertness to potential fossil resources. At a minimum, the program shall require initial training of all new staff and refresher training of existing staff.
4. Paleontological monitoring shall be conducted during earthmoving activities in sediments of the San Timoteo Formation. Earthmoving activities in areas where previously disturbed strata will be buried but not otherwise disturbed need not be monitored. The supervising paleontological monitor shall have the authority to reduce or terminate monitoring once it is determined that the probability of encountering fossils is low.
5. If fossil remains are encountered when a paleontological monitor is not present, the landfill operator shall immediately divert the earthmoving activities to another area and then contact the supervising paleontologist to assess the find and determine the appropriate recovery. Earthmoving activities within the fossil recovery area shall not resume until all fossil

recovery work is completed and a written clearance for continued Project operation is received from the supervising paleontological monitor.

6. The paleontological monitor on duty shall have the authority to immediately cease earthmoving activities in and around the area where fossils are encountered. The fossil recovery site shall be delineated by yellow tape, or other appropriate means, at a distance of no greater than 50 feet from the find. Earthmoving activities within the fossil recovery area shall not resume until all fossil recovery work is completed and a written clearance for continued Project operation is received from the supervising paleontological monitor.
7. If significant fossil remains are found, approximately 6,000 pounds of the surrounding rock matrix shall be recovered from the fossil site to allow for the recovery of smaller fossil remains. All samples of vertebrate fossil and representative samples of mega-invertebrate and plant fossil shall be collected, processed, and curated.
8. The supervising paleontological monitor shall determine the paleontological importance of the rock units being monitored for consideration of periodic examination of the rock units for presence of microfossils. All microfossil remains identified and determined as important by the supervising paleontological monitor shall be collected, processed, and recovered.
9. All recovered fossil remains shall be prepared to the point of identification to the lowest taxonomic level possible by a qualified paleontologist. These items shall then be curated at an approved repository following standard museum accession standards.
10. At the conclusion of the earth excavation operation in each landfill development phase, a final report outlining the results and findings of the mitigation monitoring program for the project phase shall be prepared by the supervising paleontologist and submitted to the County of Riverside Planning and Waste Management Departments, as well as the designated museum repository following accessing of the fossil collection. Interim monitoring reports shall be prepared throughout the BLIP life, including the final landfill closure phase. The reports shall consist of, but are not limited to, the following components; a) a description of the geology and stratigraphy of each monitored paleosol, or fossil bearing rock unit; b) a summary of field and laboratory methods used; c) a faunal list of species recovered and an inventory of cataloged fossil specimens; d) an evaluation of the scientific importance of the recovered specimens; and e) a discussion of the relationship of the newly recorded fossil sites in the Badlands Landfill Integrated Project Area with those previously recorded sites in the general area.

SECTION 6: CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date: May 16, 2011 Signed: ______________________

Kenneth J. Lord, PhD
Michael Brandman Associates
San Bernardino, CA

SECTION 7: REFERENCES

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Appendix A:
Site Photographs

Photograph 1. Tstd at Point 45 – Middle Member of San Timoteo Formation.

Photograph 2. Qstcq at Point 47 – Upper Member San Timoteo with Quartzite conglomerate.

Source: Michael Brandman Associates, 2011

Michael Brandman Associates

Appendix A: Site Photographs
The Badlands Landfill Integrated Project

Photograph 3. Tstd at Point 48 – Middle Member of San Timoteo Formation.

Photograph 4. Tstd at Point 50 – Middle Member of San Timoteo Formation.

Source: Michael Brandman Associates, 2011

Michael Brandman Associates

Appendix A: Site Photographs
The Badlands Landfill Integrated Project

Photograph 5. Qsts at Point 51 – Upper Member San Timoteo with conglomeratic sandstone.

Photograph 6. Tstl at Point 53 Lower Member San Timoteo.

Source: Michael Brandman Associates, 2011

Photograph 7. Point 56 Example of Landslide of Upper Member San Timoteo over Middle Member.

Photograph 8. Tstl at Point 57 – Lower Member San Timoteo.

Source: Michael Brandman Associates, 2011

Michael Brandman Associates

Photograph 9. Qstu at Point 61 – Upper Member of San Timoteo.

Photograph 10. Fossil remains of large mammal distal humerus.

Source: Michael Brandman Associates, 2011

Michael Brandman Associates

Appendix A: Site Photographs
The Badlands Landfill Integrated Project

Appendix B:
Paleontology Records Searches

Natural History
Museum of Los Angeles County

900 Exposition Boulevard • Los Angeles, CA 90007

Vertebrate Paleontology Section
Telephone: (213) 763-3325
FAX: (213) 746-7431
e-mail: smcleod@usc.edu or smcleod@nhm.org

17 August 2010

Michael Brandman Associates
220 Commerce, Suite 200
Irvine, CA 92602

Attn: Kenneth J. Lord, Director of Natural and Cultural Resources

re: Paleontological Resources for the proposed Redlands and Lamb Canyon Landfills Project, near Beaumont, Riverside County, project area

Dear Kenneth:

I have conducted a thorough search of our vertebrate paleontology records for the locality and specimen data for the proposed Redlands and Lamb Canyon Landfills Project, near Beaumont, Riverside County, project area as outlined on the portions of the El Casco and Beaumont USGS topographic quadrangle maps that you sent to me via e-mail on 28 July 2010. We have one vertebrate fossil locality that lies within the boundaries of the proposed project area, and we have other localities nearby from the same sedimentary deposits that occur within the proposed project areas.

In the southwestern portion of the southeastern parcel of the proposed project areas there are exposures of the late Miocene Mt. Eden Formation. Our closest vertebrate fossil localities in the Mt. Eden Formation are LACM 1118-1120, and 5377, situated west to west-northwest of the southeastern parcel of the proposed project areas near Mount Eden, that produced fossil specimens of rhinoceros, *Teleoceras hicksi*, horse, Equidae, deer, Cervidae, and camel, *Pliauchenia merriami* and *Titanotylopus*. A fossil specimen of the rhinoceros *Teleoceras hicksi* from locality LACM 1118 was published in the scientific literature by L. B. Albright in 1999 (Biostratigraphy and Vertebrate Paleontology of the San Timoteo Badlands, Southern California. University of California Publications in Geological Sciences, 144:1-121) and by D. R. Prothero in 2005 (The Evolution of North American Rhinoceroses. Cambridge University Press, Cambridge, UK). A fossil specimen of the camel *Titanotylopus* from locality LACM 1120 was published in the scientific literature by S. D. Webb (1965. The Osteology of *Camelops*. LACM Science Bulletin, 1:1-54). Due east of the southeastern parcel of the proposed project areas near Potrero Creek, we also have localities in the Mt. Eden Formation including LACM 6596, that produced a nearly complete skeleton of the mastodon *Pliomastodon* as well as LACM 1014 & 1016 that produced fossil cones and algae including type specimens (name bearing specimens of species new to science) of the fossil plants *Pinus pretuberculata*, *Pinus hazeni*, *Pseudotsuga premacrocarpa*, and *Prunus prefremontii* (see D. I. Axelrod, 1937. A Pliocene Flora from the Mount Eden Beds, Southern California. Carnegie Institution of Washington Publication, 476(3):125-183).

The remainder of the southeastern parcel, as well as the entire northwestern parcel of the proposed project areas, has exposures of the Plio-Pleistocene San Timoteo Formation. We have one vertebrate fossil locality, LACM 7622, that occurs in the middle of the northwestern parcel of the proposed project areas. Locality LACM 7622 produced fossil specimens of horse, *Equus*, and even-toed ungulate, Artiodactyla. Around the southern portion of the northwestern parcel of the proposed project areas and slightly farther south of the Moreno Valley Freeway (Highway 60), we have additionally the vertebrate fossil localities LACM (CIT) 133, LACM (CIT) 515 and LACM 7618-7621 that produced additional specimens of fossil horse, Equidae, and camel, Camelidae.

Any excavations in the late Miocene Mount Eden Formation or the Plio-Pleistocene San Timoteo Formation deposits exposed throughout the proposed project areas may well encounter significant vertebrate fossils. Thus the paleontological sensitivity of the proposed project area is rated high. Any substantial excavations in the proposed project areas, therefore, should be monitored closely to quickly and professionally recover any fossil remains discovered while not impeding development. Any fossils recovered during mitigation should be deposited in an accredited and permanent scientific institution for the benefit of current and future generations.

This records search covers only the vertebrate paleontology records of the Natural History Museum of Los Angeles County. It is not intended to be a thorough paleontological survey of the proposed project area covering other institutional records, a literature survey, or any potential on-site survey.

Sincerely,

Samuel A. McLeod

Samuel A. McLeod, Ph.D.
Vertebrate Paleontology

enclosure: draft invoice

23 June 2010

Michael Brandman Associates
attn: Kenneth J. Lord, Ph.D.
220 Commerce, Suite #200
Irvine, CA 92602

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re: **PALEONTOLOGY LITERATURE AND RECORDS REVIEW, BADLANDS LANDFILL EXPANSION AREA, RIVERSIDE COUNTY, CALIFORNIA**

Dear Dr. Lord,

The Division of Geological Sciences of the San Bernardino County Museum (SBCM) has completed a literature review and records search for the above-named project in the San Timoteo Badlands region of Riverside County, California. The proposed landfill expansion project is located in portions of sections 31, 32, and 33, Township 2 South, Range 2 West, as well as sections 4 and 5, Township 3 South, Range 2 West, San Bernardino Base and Meridian, as shown on the El Casco, California (1967 edition, photorevised 1979) and the Sunnymead, California (1956 edition, photorevised 1972) 7.5' United States Geological Survey topographic quadrangle maps.

Previous geologic mapping (Rogers, 1965; Morton and Matti, 2001; Morton, 2004) indicates that the proposed project area encompasses surface exposures of the middle member of the fossiliferous San Timoteo Formation (unit = **Tstm** and **Tstd**), overlain in arroyos and gullies by Holocene alluvium (= **Qya**$_5$, **Qyf**$_5$) and landslide debris (= **Qyls**). The Holocene sediments have low potential to contain significant fossil resources, and so are assigned low paleontologic sensitivity. In contrast, surface and subsurface sediments of the San Timoteo Formation have high potential to contain significant nonrenewable paleontologic resources, and so are assigned high paleontologic sensitivity.

The San Timoteo Formation is extremely fossiliferous and has a high potential to contain significant nonrenewable paleontologic resources subject to adverse impacts by excavation during development, as determined by numerous previous geologic and paleontologic investigations in the area including those by Frick (1921, 1933), May and Repenning (1982), Axelrod (1937, 1950, 1966) Reynolds and Reeder (1986, 1991), Morton and Matti (1993) Albright and Woodburne (1993) and Albright (1997, 2000). Fossil mammals recovered from the San Timoteo Formation include mastodon, horse, camel, antelope, dog, bear, rodent and rabbit. These vertebrate fossils are Pliocene or early Pleistocene in age, and are referable to the Blancan North American Land Mammal Age (Savage and Russell, 1983; Bell and others, 2004) and the early Irvingtonian NALMA (Savage and Russell, 1983; Reynolds and Reeder, 1986, 1991; Repenning, 1987; Albright and Woodburne, 1993; Albright, 1997, 2000; Bell and others, 2004). These fossils may have been deposited between 1.3 million years ago (mya) and 4.0 mya.

As noted, certain portions within the proposed project study area are mapped (Rogers, 1965; Morton, 2004) as Quaternary younger alluvium and recent landslide debris. These lithologic units have low potential to contain significant nonrenewable paleontologic resources subject to adverse impact by development-related excavation, and are therefore assigned low paleontologic sensitivity. However, these sediments overlie subsurface sediments of the San Timoteo Formation. Where such older Plio-Pleistocene sediments are present at depth within the study area, they would have high potential to contain significant nonrenewable paleontologic resources.

For this review, I conducted a search of the Regional Paleontologic Locality Inventory (RPLI) at the SBCM. The results of this search indicate that several paleontologic resource localities are recorded by the SBCM within the boundaries of the proposed landfill expansion project. These localities (SBCM 5.3.39, 5.3.43, 5.3.46 - 5.3.48, 5.3.54, 5.3.157, and 5.3.254) yielded fossil remains of extinct horse (*Equus* sp.), camel (Camelidae), and other large and small vertebrates. Locality data are appended. Additionally, several dozen paleontologic resource localities are recorded from within just a few miles to the east and southeast of the proposed project property, all recorded from the San Timoteo Formation. The proximity of these numerous localities to the study area demonstrates the very high paleontologic sensitivity of the exposures of the San Timoteo Formation in this region.

Recommendations

The results of the literature review and the check of the RPLI at the SBCM demonstrate that excavation in Plio-Pleistocene sediments of the San Timoteo Formation present in the study area has high potential to impact significant paleontologic resources. This formation, where not previously disturbed by development, therefore have has paleontologic sensitivity. Excavation into the San Timoteo Formation requires development and implementation of a program to mitigate excavation impacts to paleontologic resources (see below).

Quaternary younger alluvium and recent landslide deposits present within the study area have low potential to contain significant nonrenewable paleontologic resources. These sediments have low paleontologic sensitivity, and no program to mitigate excavation impacts to paleontologic resources is recommended for either of these lithologic units. However, as stated, these sediments may overlie older Plio-Pleistocene deposits of the San Timoteo Formation.

For excavation in the San Timoteo Formation, a qualified professional vertebrate paleontologist will need to develop a plan to mitigate adverse impacts to paleontologic resources present in these geologic units. This mitigation program would need to be consistent with the provisions of the California Environmental Quality Act (Scott and Springer, 2003), as well as with regulations implemented by the County of Riverside and with the proposed guidelines of the Society of Vertebrate Paleontology. This plan should include, but not be limited to:

1. Monitoring of all excavation activities in any and all areas identified as likely to contain paleontologic resources by a qualified paleontologic monitor. Based upon the results of this review, areas of concern within the boundaries of this project include any sediments of the fossiliferous San Timoteo Formation. Paleontologic monitors must be equipped to salvage fossils as they are unearthed, to avoid construction delays, and to remove samples of sediments that are likely to contain the remains of small fossil invertebrates and vertebrates. Monitors must be empowered to temporarily halt or divert equipment to allow removal of abundant or large specimens.

2. Preparation of all recovered specimens to a point of identification and permanent preservation, including washing of sediments to recover small invertebrates and vertebrates. Preparation and stabilization of all recovered fossils are essential in order to fully mitigate adverse impacts to the resources (Scott and others, 2004).

3. Identification and curation of all specimens into an established, accredited museum repository with permanent retrievable paleontologic storage (e.g., SBCM). These procedures are also essential steps in effective paleontologic mitigation (Scott and others, 2004) and CEQA compliance (Scott and Springer, 2003). The paleontologist must have a written repository agreement in hand prior to the initiation of mitigation activities. Mitigation of adverse impacts to significant paleontologic resources is not considered complete until such curation into an established museum repository has been fully completed and documented.

4. Preparation of a report of findings with an appended itemized inventory of specimens. The report and inventory, when submitted to the appropriate Lead Agency along with confirmation of the curation of recovered specimens into an established, accredited museum repository, will signify completion of the program to mitigate impacts to paleontologic resources.

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Please do not hesitate to contact us with any further questions you may have.

Sincerely,

Eric Scott, Curator of Paleontology
Division of Geological Sciences
San Bernardino County Museum

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.39 **PROJECT:** De Anza Park #1

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 490095 **Meters North:** 3756870

Elevation Feet: 2120. **Elevation Meters:** 646.18

PM: San Bernardino Meridian **T** 2S **R** 2W **Sections:** 32 S2 NE4 SE4 SW4 NE4

Field Number: 20-1

Other Number:

Repository: **Collector:**

Description: Cut runs through tan silty sandstone, but bone in center of road iscoated with pale blue-gray silt.

Cycle trail cut by dozer along north side of east-running ridge. Cut runs through tan silty sandstone, but bone in center of road iscoated with pale blue-gray silt.

Formation: San Timoteo Formation **Unit/Member:** QTs

Geologic Age: Pleistocene

Pleistocene

Data Entry: S 05/29/1992

Taxa/Object Found: Equus sp.

Notes: "Object\Taxa Found" field updated ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.43 **PROJECT:** De Anza Park #2

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 489790 **Meters North:** 3756910

Elevation Feet: 2500. **Elevation Meters:** 762.

PM: San Bernardino Meridian **T** 2S **R** 2W **Sections:** 32 SE4 SW4 SW4 SW4 NE4

Field Number: 22-1

Other Number:

Repository: SBCM **Collector:**

Description: crumbly weathering green fine-grained sandstone on south facing cliff face 70' above canyon bottom

crumbly weathering green fine-grained sandstone on south facing cliff face 70' above canyon bottom

Formation: San Timoteo Formation **Unit/Member:** QTs

Geologic Age: Pleistocene

Pleistocene

Data Entry: S 05/29/1992

Taxa/Object Found: Mammalia (large)

Notes: "Object\Taxa Found" field updated ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.46 **PROJECT:** De Anza Park #3

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 489480 **Meters North:** 3757230

Elevation Feet: 2450. **Elevation Meters:** 746.76

PM: San Bernardino Meridian **T** 3S **R** 2W **Sections:** 32 NE4 NE4 NW4 SE4 NW4

Field Number: 24-2

Other Number:

Repository: SBCM **Collector:**

Description: Cycle roads cut by dozer into north facing slope of greenish-gray sandy siltstone.

Cycle roads cut by dozer into north facing slope of greenish-gray sandy siltstone.

Formation: San Timoteo Formation **Unit/Member:** QTs

Geologic Age: Pleistocene

Pleistocene

Data Entry: S 05/29/1992

Taxa/Object Found: Equus sp.

Notes: "Object\Taxa Found" field updated ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.47 **PROJECT:** De Anza Park #4

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 489620 **Meters North:** 3757260

Elevation Feet: 2300. **Elevation Meters:** 701.04

PM: San Bernardino Meridian **T** 2S **R** 2W **Sections:** 32 S2 SE4 NE4 NW4

Field Number: 24-2

Other Number:

Repository: SBCM **Collector:**

Description: fossils with a pinkish cast weathering from a dozer cut cycle trail through greenish gray silty sandstone

fossils with a pinkish cast weathering from a dozer cut cycle trail through greenish gray silty sandstone

Formation: San Timoteo Formation **Unit/Member:** QTs

Geologic Age: Pleistocene

Pleistocene

Data Entry: S 05/29/1992

Taxa/Object Found: Equus sp.

Notes: "Object\Taxa Found" field updated ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.48 **PROJECT:** De Anza Park #5

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 489545 **Meters North:** 3757135

Elevation Feet: 2460. **Elevation Meters:** 749.81

PM: San Bernardino Meridian **T** 2S **R** 2W **Sections:** 32 SE4 SW4 NW4 NE4 SE4 NW4

Field Number: 24-3

Other Number:

Repository: SBCM **Collector:**

Description: light tan silty sandstone toward top of hill in dozer cut bike trail
toward top of hill in dozer cut bike trail

Formation: San Timoteo Formation **Unit/Member:** QTs

Geologic Age: Pleistocene

Pleistocene

Data Entry: S 05/29/1992

Taxa/Object Found: Mammalia (large)

Notes: "Object\Taxa Found" field updated ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.54 **PROJECT:** Well Canyon #1

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 490070 **Meters North:** 3756350

Elevation Feet: . **Elevation Meters:** .

PM: San Bernardino Meridian **T** 2S **R** 2W **Sections:** 32 NE4 NE4 NE4 SW4 SE4

Field Number:

Other Number: LACM (CIT) 133-6 A

Repository: SBCM **Collector:**

Description:

Formation: San Timoteo Formation **Unit/Member:**

Geologic Age: Blancan

Irvingtonian

Pleistocene

Pliocene

Data Entry: S 02/22/1993

Taxa/Object Found: Equus sp.; Camelidae; Artiodactyla

Notes: "Object\Taxa Found" field updated from RPLI cards ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.157 **PROJECT:** Guthrie Survey

Name: **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: El Casco, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 489120 **Meters North:** 3755390

Elevation Feet: 1910. **Elevation Meters:** 582.17

PM: San Bernardino Meridian **T** 3S **R** 2W **Sections:** 5 SE4 NW4 SE4 SW4 NW4

Field Number: 92JB6-18.1

Other Number:

Repository: SBCM **Collector:** James K. Bowden

Description: white gravelly sand bed: green silty clay below & red silty clay above

Formation: San Timoteo Formation **Unit/Member:**

Geologic Age:

Blancan

Irvingtonian

Pleistocene

Pliocene

Data Entry: S 07/08/1992

Taxa/Object Found: Sphaeriidae

Notes: "Object\Taxa Found" field updated from RPLI cards ES 22 June 2010

SAN BERNARDINO COUNTY MUSEUM REGIONAL PALEONTOLOGIC LOCALITY INVENTORY

SBCM: 5.3.254 **PROJECT:** Ironwood Avenue Expansion

Name: Ironwood Avenue Expansion 11 **Area:** San Timoteo Badlands

County: Riverside County **State:** California **District:**

USGS Map: Sunnymead, CA; 7.5' 1967

Utm Zone: 11 **Utm Datum:** NAD1927 **Meters East:** 488330 **Meters North:** 3756300

Elevation Feet: 2121.7 **Elevation Meters:** 646.69

PM: San Bernardino Meridian **T** 2S **R** 2W **Sections:** 31 NE, SE, NE, SW, SE

Field Number: 98SK12-16.1

Other Number:

Repository: SBCM **Collector:** Steven M. Kesler

Description: light olive grey (5y 6/2 dry), moderatly well indurated, poorly sorted, subangular to subrounded, massive, silt to medium grained sandstone

Formation: San Timoteo Formation **Unit/Member:**

Geologic Age:

PLIO-PLEISTO

Data Entry: KMS 05/26/1999

Taxa/Object Found: Leporidae, Vertebrata (micro-sized)

Notes: "Object\Taxa Found" field updated ES 22 June 2010

Appendix C:
Resume for Kenneth J. Lord, Ph.D.

Kenneth J. Lord, Ph. D., RPA

Director, Natural/Cultural Resources

Michael Brandman Associates

Education
Ph.D., Archaeology/Vertebrate Paleontology, University of Texas, Austin

B.A., Anthropology, University of Pittsburgh

Professional Affiliations
Association of Environmental Professionals

Registry of Professional Archaeologists

Experience Summary

Dr. Lord has over twenty eight years of professional experience in environmental consulting, cultural resources management and environmental assessment of major transmission and development projects. In this capacity, he has managed multi disciplinary teams preparing EISs and EIRs that have been used by the FERC, US Army Corps of Engineers and State of California agencies in licensing pipeline projects in California and the western United States. He has also been involved in management of the construction/ environmental compliance monitoring associated with a variety of development projects. Other experience includes assignments as project manager or deputy project manager for a variety of state and federal projects. His experience encompasses the reconnaissance, feasibility, and environmental impact aspects of a variety of project types. He is knowledgeable about California county environmental documentation procedures and regulations, as well as other federal and state environmental laws, regulations, and guidelines. He has prepared and supervised the preparation of EIRs, EISs and Biological Assessments in accordance with NEPA and CEQA rules and regulations.

As Director of MBA's Natural and Cultural Resources Departments, Dr. Lord oversees the operations and staff responsible for performing all cultural , historical and paleontological resource studies and field work, providing quality assurance and control, and performs the more complex and sensitive natural resource planning, cultural and paleontologic studies and related client services.

Recent Project Experience

Paleontologic Reports

Paleontological Resources Assessment UP Homes TTM 34287, Perris, Riverside County, California. Project Manager and author of a paleontological assessment of 7.14 acres in the City of Perris. A field investigation was completed and a records search determined that the property had the potential to contain significant Pleistocene-aged fossils at depth. Mitigation recommendations were prepared for the project site.

Paleontologic Monitoring and Reports

Spring Mountain Ranch Cultural and Paleontological Resources Monitoring, Highgrove, Riverside County. Project Manager for an extensive mitigation monitoring program for both cultural resources and paleontological resources in the Highgrove area of unincorporated Riverside County. Approximately 785 acres were monitored for both cultural resources and paleontological resources. Mark Roeder of PaleoEnvironmental Associates conducted the original field examination of the property with the Project Manager. Excavations occurred to depths of 60 feet and no paleontological resources were encountered. A summary report on the paleontological efforts were submitted to the applicant and are on file with MBA.

Granite Homes Garbani Road Project – Paleontological Monitoring, Menifee, Riverside County. Project Manager and part-time monitor for an approximately 38 acre project that required paleontological monitoring on specific areas of a project site with the potential to contain Pleistocene fossils. Monitoring occurred over a 2 month period, with a total of 19 days of monitoring. No suitable geological deposits were encountered on the project site.

Phase I Cultural Resources with Paleontologic Component

Kona Road III Project Cultural Resources Survey, French Valley Area. Project Manager for a Phase I cultural resources survey and paleontological review of a 4.65-acre property in the French Valley Area of unincorporated Riverside County, California, for John Laing Homes.

Newport Road Project Cultural Resources Assessment, Menifee Area. Project Manager for a Phase I cultural resources assessment and paleontological records review in Menifee Area, County of Riverside, California, for Granite Equities, LLC.

Taylor-Woodrow Ivy House Project Cultural Resources Assessment, Murrieta. Project Manager for a Phase I cultural resources assessment and paleontological records review in Murrieta, Riverside County, California, for Taylor Woodrow Homes.

Phase I Cultural Resources Survey Report for Watson Land Company, near Euclid and Bickmore Avenue, Chino, County of San Bernardino, California. Project Manager and author of report of a 60 acre parcel in Chino. Extensive paleontological recommendations were made and follow-up surveys and field visits were made at appropriate disturbance depths to check for potential paleontologic resources. This project is on-going.

Cultural Resources Survey Report, San Jacinto. Project Manager for a Phase I cultural resources survey report and paleontological records review for tentative tract 33862 in San Jacinto, County of Riverside, California, for JD Pierce Company.

Pigeon Pass Property Cultural Resources Assessment, Moreno Valley. Project Manager for a Phase I cultural resources assessment and paleontological records review of 37.8-acres in Moreno Valley, Riverside County, California, for Pacific Land Company.

Cultural Resources Assessment, French Valley. Project Manager for a Phase I cultural resources assessment and paleontological records review of Tract 34150 in French Valley, County of Riverside, California, for Granite Equities, LLC.

Menifee Farms Project Cultural Resources Assessment, Menifee Valley. Project Manager for a Phase I cultural resources assessment, Phase II archaeological test and paleontological records review of a 26.14-acre property in Menifee Valley, Riverside County, California for Granite Equities, LLC.

Palmdale Business Center Project Cultural Resources Assessment, City of Palmdale. Project Manager for a Phase I cultural resources survey and paleontological records review for tentative tract 47193 in the City of Palmdale, Los Angeles County, California for Palmdale Business Center, LP.

Victoria 316 Project Cultural Resources Assessment, Victorville. Project Manager for a Phase I cultural resources survey and paleontological records review for tentative tract numbers 17341 and 17356 in Victorville, San Bernardino County, California for Pulte Homes. Prepared a site-specific paleontologic monitoring plan for the project site.

Van Daele Homes Victorville Acres Project Cultural Resources Survey, City of Victorville. Project Manager for a Phase I cultural resources survey and paleontological records review for tentative tract 16847 in the City of Victorville, San Bernardino County, California for Victorville Acres, LLC. Prepared a site-specific paleontologic monitoring plan for the project site.

Van Daele Homes Foxfire Ranch Cultural Resource Survey, City of Victorville. Project Manager for a Phase I cultural resources survey and paleontological records review, including sensitivity statements on the paleontology of the 65-acre property at tentative tract 16574 (including parcel 3094-131-02) in the City of Victorville, San Bernardino County, California for Victorville Acres, LLC. Prepared a site-specific paleontologic monitoring plan for the project site.

Selected Publications

1984 The Zooarchaeology of Hinds Cave (41VV456). Anthropology Research Laboratory, Texas A & M

1979 Meadowcroft Rock Shelter: Retrospect 1977. J. M. Adovasio, J.D. Gunn, J. Donahue, R. Stuckenrath, J. Guilday, and K. Lord, authors. North American Archaeologist, l(l).

1977 Faunal Remains of Meadowcroft Rock Shelter. In Meadowcroft Rock Shelter: Retrospect 1976. J. M. Adovasio, J.D. Gunn, J. Donahue, R. Stuckenrath, authors. Pennsylvania Archaeologist, 47(2-3).

References

Eric Scott , Curator of Paleontology – San Bernardino County Museum escott@sbcm.sbcounty.gov

E. Bruce Lander, Ph.D. PaleoEnvironmental Associates paleo@earthlink.net

Ernest Lundelius, Ph.D., Professor Emeritus, Department of Geological Sciences University of Texas at Austin erniel@mail.utexas.edu

Phase 1 Cultural Resource Assessment

Phase 1 Cultural Resource Assessment of The Badlands Landfill Integrated Project Riverside County, California

El Casco, CA. USGS 7.5' Topographic Quadrangle Maps
Township 2 South, Range 2 West; all or portions of Section 31, 32 and 33
Township 2 South, Range 3 West; portions of Section 4 and 5

1,115-Acre Cultural Resource Study Area.

A CEQA and Section 106 Document.

Developmental Case Number: <u>none required</u>

Prepared on behalf of:

Riverside County Waste Management Department (RCWMD)
14310 Frederick Street
Moreno Valley, CA. 92553

Contact: Ryan Ross, Planner

Prepared by:

Michael Brandman Associates
621 E. Carnegie Drive Suite #100
San Bernardino, CA. 92408
909.884.2255

Contact/Author: Michael H. Dice, M.A. (County-Qualified Archaeologist #101)
Kenneth J. Lord, PhD. (County-Qualified Archaeologist #100)

Fieldwork Conducted By: M.H. Dice M.A., A.A. Said-Abdelwahed, K.J. Lord, PhD
Fieldwork Conducted On: July 21, 2010
Final Report Date: December 6, 2010

Keywords: The Badlands, RCWMD Badlands Landfill, De Anza Motorcycle Park

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MANAGEMENT SUMMARY

This report documents a Phase I archaeological survey for the Badlands Landfill Integrated Project (Project), located within and adjacent to the Badlands Landfill in unincorporated Riverside County, California. Michael Brandman Associates (MBA) has performed this survey for the Riverside County Waste Management Department (RCWMD). The purpose of the study was to determine if cultural resources more than 45 years old were located within the project area, which totals 1,386 acres of land.

The Badlands Landfill, which has been in operation since 1966, is owned and operated by the RCWMD. The existing Badlands Landfill property encompasses 1,168 acres and exhibits deep canyons, steep slopes, narrow ridgelines, ephemeral drainages, manufactured fill and hillsides, contoured 1:1 cut slopes, roads, structures, and environmental protection components. Of the 1,168 acres, 246 acres are permitted for Landfill operation, while the remaining 890 acres are currently undisturbed. 218 acres of adjacent and undisturbed land, located immediately east of the current Landfill property, is being acquired for incorporation into the Landfill. Thus, the overall Landfill area will encompass 1,386 acres, once the adjacent land is acquired. The Landfill therefore will consist of all or part of 15 adjoining parcels (APN#413-140-009, -011, -022, -023, -024, -025, -030, -033, -034, -036; 422-030-011, -014, -015; 422-050-014, and -027).

Because a portion of the Project has either been disturbed or recently surveyed, the survey area associated with this archaeological analysis was restricted to 829 acres of undisturbed land (i.e., those portions of the Landfill property outside of the current 246-acre permitted Landfill area and a 32-acre area that was previously surveyed for cultural resources). It also includes the proposed 218-acre acquisition land and 7 acres of interior roads or other disturbance. In sum, 1,115 acres were examined during the fieldwork efforts.

This report fulfills cultural resource guidelines associated with the County of Riverside Archaeological Memorandum of Understanding (MOU), CEQA, and Section 106 of the National Historic Preservation Act. The Section 106 process is reviewed and discussed herein because this report may be included with an U.S. Army Corps of Engineers (ACOE) 404 permit package.

A records search was performed at the Eastern Information Center (EIC) on May 28, 2010 for known archaeological resources within a radius of one mile from the project area. The results of the records search indicated that no cultural resource site was ever identified within the project area, and that only five (5) cultural resource sites are known within the search radius. In addition, the literature search result suggested that the entire project area may have been archaeologically surveyed by Dr. Gerald Smith in 1982. No subsequent cultural surveys of the area have been performed.

MBA contacted the Native American Heritage Commission (NAHC) on 13 May 2010 requesting a Sacred Lands File search for traditional cultural properties. The NAHC response, dated 7 June 2010, indicated that no sacred lands or traditional cultural properties are known for the project area. To ensure that Native American concerns are addressed at this stage of the proposed project, letters to each of the 13 listed tribal contacts were sent on 6 July 2010. As of the date of this report, two letters have been received: one from the Pala Band (dated 22 July) and another from the Cahuilla Band (dated 24 August). Neither group indicated that important Native American resources were located in the project area.

Review of the project area showed that the characteristic Badlands topography of rugged hills and narrow canyons within the existing Landfill operation area has been transformed into a single, compacted fill mass. This area of disturbance lacks any potential for cultural resources and field surveys of this section of the Landfill are unnecessary. All accessible undisturbed areas within the project site, including washes, exposed boulders in washes, toes of natural slopes, and flats near washes, were examined for the presence of cultural resources. The undisturbed acreage in the project area that exhibited steep and unstable slopes absent of trails was not surveyed by foot; rather it was visually observed with binoculars.

No prehistoric cultural resources were identified during the survey. There were a few minor historic elements noted in the project area (e.g., dirt roads, a borrow pit, and a portion of the De Anza Motorcycle park) that were probably created in the late 1950’s. The borrow pit, located near the southern end of the project area, was recorded as a cultural resource. The motorcycle park exhibits historic farmstead remnants associated with a heretofore unknown landowner: the Park and homestead remnant was recorded as a cultural resource using a Primary record form set. These historic elements are located in the Project area, are not considered significant, and will not be directly impacted by Landfill development in the foreseeable future.

In conclusion, based on the records and literature search and survey results, it is very unlikely that significant cultural resources will be directly impacted by the Project. Therefore, no mitigation-monitoring for cultural resources during project implementation is recommended. In the unlikely event that buried cultural resources are encountered during ground disturbing activities, the landfill operator shall follow the County guidelines for Phase II Cultural Resources Assessment to determine the significance of the uncovered resources and mitigation, as necessary.

SECTION 1: INTRODUCTION

In preparation of the Badlands Landfill Integrated Project (the Project), the Riverside County Waste Management Department (RCWMD) retained MBA to conduct a Phase 1 cultural resource survey of a set of parcels totaling 1,115 acres located within and adjacent to the Badlands Landfill in the San Timoteo Badlands, unincorporated Riverside County, California. 890-acres of undisturbed land, 7 acres of interior roads and other disturbance, plus an additional 218- acre land adjacent to the landfill property constitute the cultural resource survey area for this Project. The purpose of this report is to identify the presence or absence of potentially significant cultural resources within the project area and, if any cultural resources are detected, recommend appropriate mitigation measures needed to reduce the project's impact on cultural resource to an insignificant level.

Federal, state, and local laws and regulations protect significant cultural resources from land use projects. These laws and regulations govern the preservation of historic and archaeological resources of national, state, regional, and local significance. This cultural resource study was performed in compliance with the California Environmental Quality Act (CEQA) and County of Riverside Phase I Archaeological Survey parameters, which are defined in the County MOU for Archaeological Surveys. This report closely follows the California Office of Historic Preservation (OHP) procedures for cultural resource surveys and the OHP's Archaeological Resource Management Report (ARMR) reporting format for archaeological reports. The Project may require water-related permits from the ACOE. Therefore, the report has been written to fulfill Section 106 of the National Historic Preservation Act. MBA staff archaeologists, Mr. Dice (#101) and Mr. Lord (#100), are pre-qualified to perform archaeological surveys on land within the County of Riverside.

The organization of this report is summarized as follows:

- Section 1 introduces the project, the location, and the cultural resources team.
- Section 2 summarizes cultural setting.
- Section 3 presents the research design and investigative methods.
- Section 4 presents cultural resource survey and records search results.
- Section 5 presents recommendations.
- Section 6 contains the project certification.
- Section 7 presents literature references.
- Appendix A provides required cultural resource compliance documents.
- Appendix B provides personnel qualifications.
- Appendix C presents the regulatory framework.
- Appendix D provides recent photographs of the project area.

1.1 - Project Location

Situated in the west-central portion of the County of Riverside, the project area is located north of SR60 at the terminus of Ironwood Avenue (Exhibit 1). The entire project area can be found within the *El Casco, CA.* United States Geological Survey (USGS) 7.5-minute topographic quadrangle map, in portions of Section 31, 32 and 33 in Township 2 South, Range 2 West and portions of Section 4 and 5 in Township 3 South, Range 2 West of the San Bernardino Base and Meridian (Exhibit 2). Specifically, the project area includes all or part of 15 individual parcels: Assessor's Parcel Number (APN) #413-140-009, -011, -022, -023, -024, -025, -030, -033, -034, -036; 422-030-011, -014, -015; 422-050-014, and -027.

Exhibit 2 shows the 1,386 acres with an impacted and an area excluded from survey inside it. The excluded area includes the active Landfill and parcels that have been previously analyzed for impacts to cultural resources but which have not yet been modified for landfill use. The study area for this report totals approximately 1,115 acres and, as shown on Exhibit 3, the cultural resource survey area is vacant and consists of extremely steep canyons and knife-edge ridges with very few flat areas in between. A few dirt roads and ephemeral stream channels are also located within the survey area. Because of the rugged terrain, transect surveys could not be performed. This aspect of the survey was discussed with the County of Riverside Archaeologist, Leslie Mouriquand M.A., in June of 2010, prior to commencement of fieldwork.

1.2 - Project Description and Report Purpose

The Badlands Landfill is a Class III solid waste disposal facility owned and operated by the RCWMD. The Landfill is located at the terminus of Ironwood Avenue, approximately one mile east of Theodore Street in eastern Moreno Valley. The Landfill has been in operation since 1966 and is currently permitted to receive 4,000 tons per day of municipal solid waste (MSW). The existing Landfill operation is located on 1,168 acres of County-owned property. RCWMD plans to acquire 218 acres of land east of the landfill in Section 33 and Section 4 (Exhibit 4). For the purposes of this report and the CEQA and NEPA-level environmental analyses, it is assumed that the acquired land will be utilized for Landfill development, but specifically when direct impacts shall occur is not known as this time.

Impacts to land as a result of the Badlands Landfill Integrated Project may consist of, but is not limited to, the following activities, facilities, and land uses**:** MSW disposal; composting; processing of greenwaste, waste tires, and construction and demolition waste; beneficial reuse and recycling; soil stockpiling; landfill gas and groundwater monitoring and treatment. Gas-to-energy conversion; equipment maintenance and material storage; sedimentation basins; environmental mitigation; land surveys; engineering field studies; household hazardous materials handling and storage; and construction of interior roads, new office buildings, and other structures, such as perimeter fences will also be undertaken.

Source: Census 2000 Data, The CaSIL, MBA GIS (2010).

NORTH

5 2.5 0 5

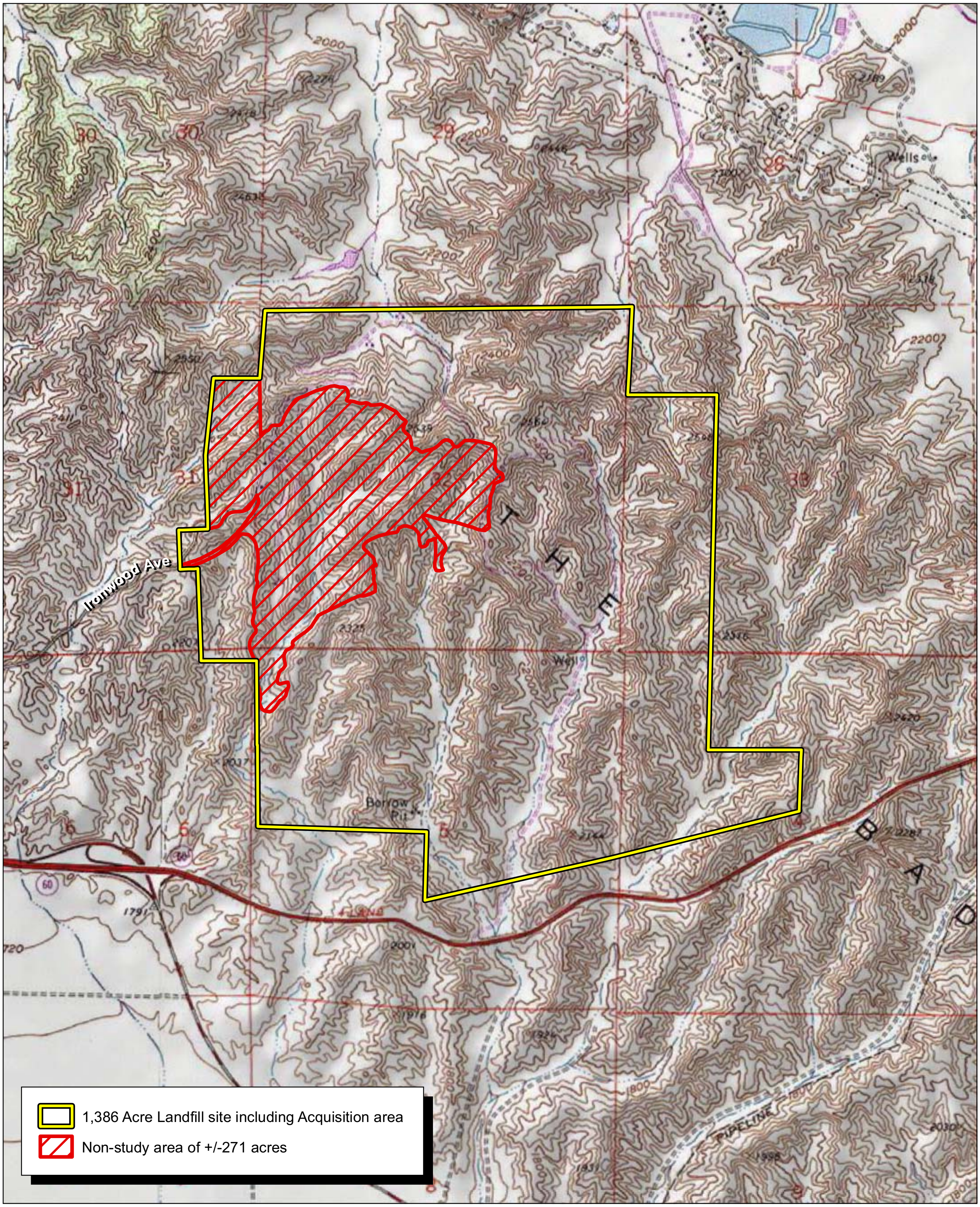
Miles

Michael Brandman Associates

Exhibit 1
Regional Location Map

23100004 • 09/2010 | 1_regional.mxd

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT • BADLANDS LANDFILL
PHASE I ARCHAEOLOGICAL SURVEY



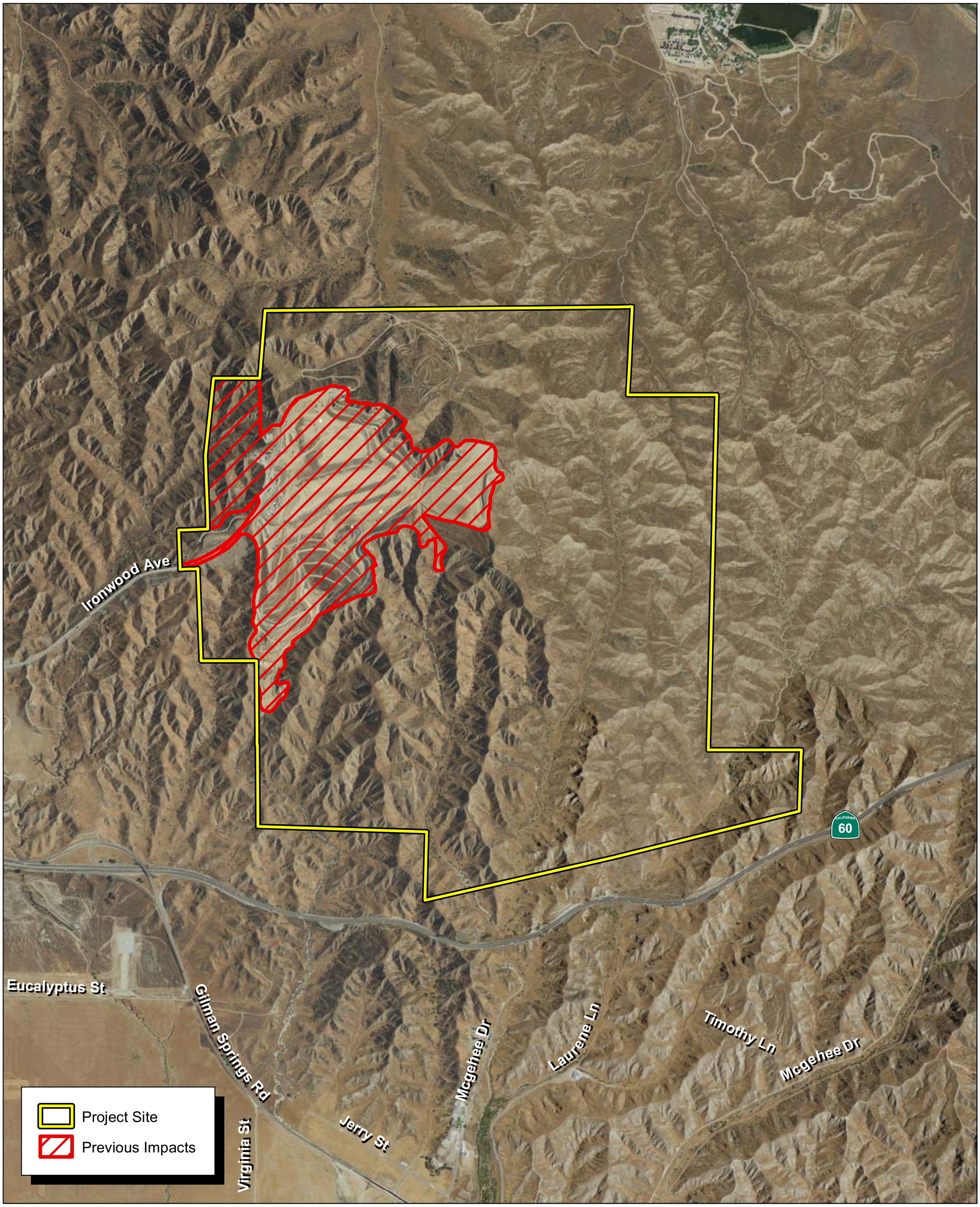
Source: TOPO! USGS El Casco (1979) & Sunnymead (1980) 7.5' DRGs.

NORTH

2,000 1,000 0 2,000 Feet

Michael Brandman Associates

Exhibit 2
Local Vicinity Map
Topographic Base



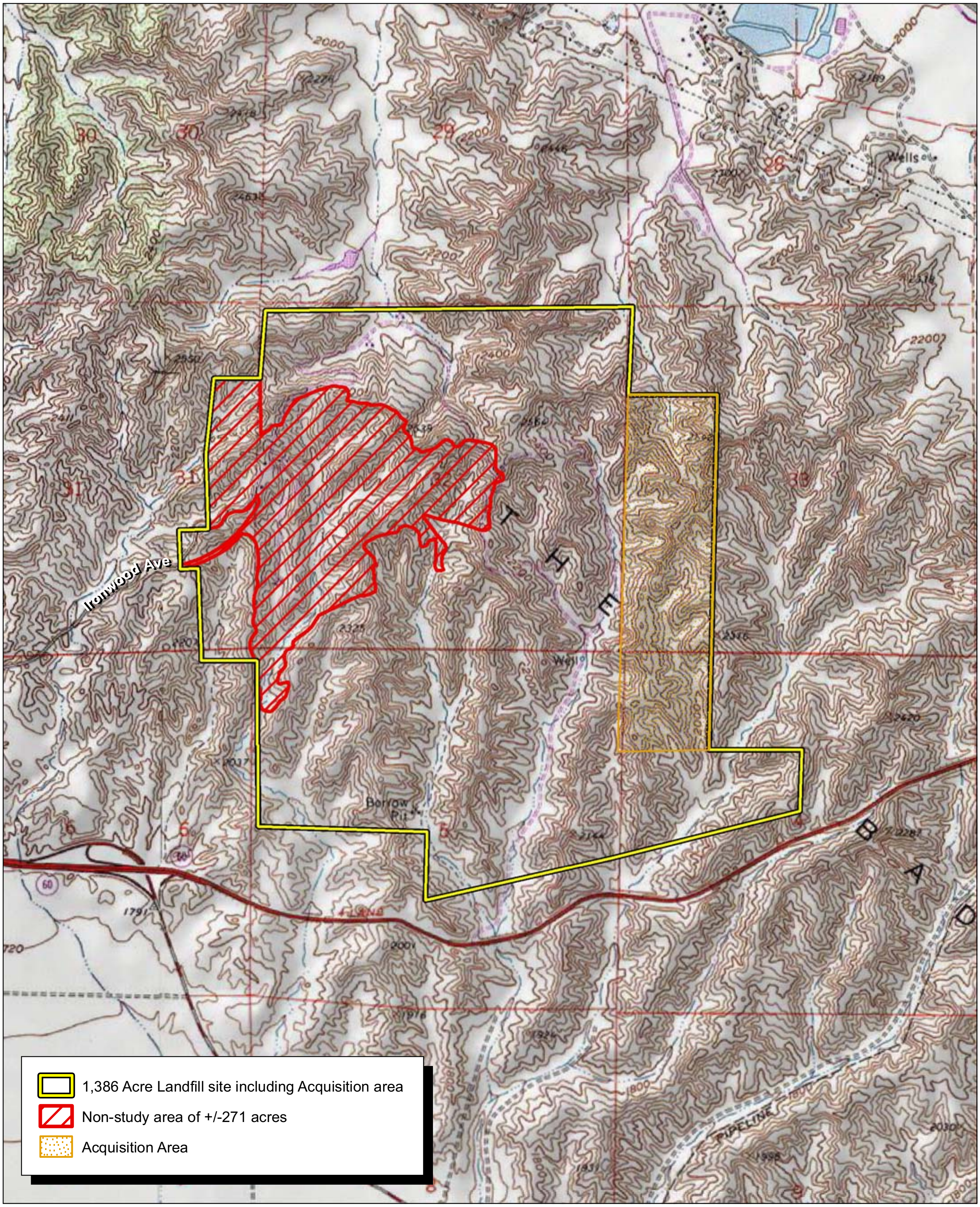
Source: NAIP for Riverside County (2009); ESRI (2008).

Exhibit 3
Local Vicinity Map
Aerial Base

Michael Brandman Associates

23100004 • 09/2010 | 3_Local_Aerial.mxd

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT • BADLANDS LANDFILL
PHASE I ARCHAEOLOGICAL SURVEY



Source: TOPO! USGS El Casco (1979) & Sunnymead (1980) 7.5' DRGs.

Michael Brandman Associates

Exhibit 4
Delineation of Acquisition Area

23100004 • 09/2010 | 4_delineation_acquisition.mxd

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT • BADLANDS LANDFILL
PHASE I ARCHAEOLOGICAL SURVEY

The purpose of this report is to provide cultural resource information and mitigation recommendations (as needed) associated with future development of the Project for integrated waste management land uses. Because the existing Landfill facility was built in 1966, and its history is lacking unique circumstances, none of the Landfill components can qualify as a historic resource under County of Riverside historic significance thresholds. Likewise, the existing Landfill facility is not considered a significant cultural resource under Section 106 (National Register) or CEQA Guidelines (California Register).

1.3 - Environmental Setting

1.3.1 - Topography, Geology, and Soils of the Badlands

The project area is located within a geological formation known as the San Timoteo Badlands, a highly complex but recent tectonic zone with numerous faults and fault strands, including the San Jacinto Fault Zone. The San Jacinto Fault Zone is part of the larger San Andreas fault system and separates the San Jacinto Block to the northeast from the Perris Block to the southwest. The Perris Block is an eroded mass of Cretaceous and older crystalline rock that lies between the Los Angeles Basin to the west and the San Jacinto Mountains to the east; the latter are marked by an elevated, low-gradient valley system (Woodford et al 1971). During the Pliocene (5.33 to 2.58 million years ago [MYA]) and Pleistocene Epochs (2.58 MYA to 12,000 years before present [YBP]), the Los Angeles Basin sank many thousands of feet, while the San Jacinto Mountains rose considerably through compressional forces, and the Perris Block oscillated vertically (ibid). The vertical tectonics are indicated by right-lateral strike-slip faulting on the San Jacinto fault system, creating a broad anticline in the region known as the San Timoteo Anticline (Manson et al 2002). The San Jacinto Fault Zone and a smaller element known as the Claremont Fault strand is nearest named fault to the Project area, with the Casa Loma Fault located in the floor of the San Jacinto Valley between the Lakeview Mountains and the southeastern section of the Badlands. Large earthquakes associated with the faults have been recorded historically in this area: on Christmas morning in 1899, a massive earthquake rocked the San Jacinto area killing at least six older women at the Soboba village (Holmes 1912).

No modern on-line geological map is available for the El Casco 7.5’ topographic quadrangle. The 1:120,000 Santa Ana Sheet reveals the are at greater scales. Published geological research has been undertaken in the Badlands since 1921 and continues to the present day (see Frick 1921, Fraser 1931, Albright 1997, Albright 1999, Morton and Matti 2001). The Badlands are composed mostly of sedimentary rocks that have been uplifted, deformed, and exposed as a result of motion past a restraining left bend along the right-lateral San Jacinto Fault Zone. According to Scott (2010), the previous geological mapping (Rogers 1965, Morton and Matti 2001, Morton 2004) indicates that the project area encompasses surface exposures of middle member of the San Timoteo Formation (“Tstm” and “Tstd”) overlain in arroyos and gullies by Holocene sediments consisting of alluvium (“Qya_5” and Qyf_5”) and landslide debris (“Qyls”).

The tops of the Badlands are in some places nearly 2,000 feet above the floor of the San Jacinto Valley, the soils of which may be in some places 3,000 meters deep before bedrock is reached (Morton and Matti 2001). The extreme youthfulness of the hills, combined with an estimated 100km of displacement along the various strands of faults in the San Jacinto system, and sporadic but intense nature of fluvial erosion, has created a maze of steep walled valleys, sharp ridges, and numerous landslide slumps throughout the project area (Manson et al 2002). Soils inside the Badlands area are typically thin, except in the floors of canyons. Most of the landslides in this region are small, but well studied (see Morton 1989), and are generally the result of rainstorms rather than earthquakes. Washes and arroyos in the project area exhibit landslide alluvium and Holocene alluvial fan deposits, which are not fossiliferous (Scott 2010.)

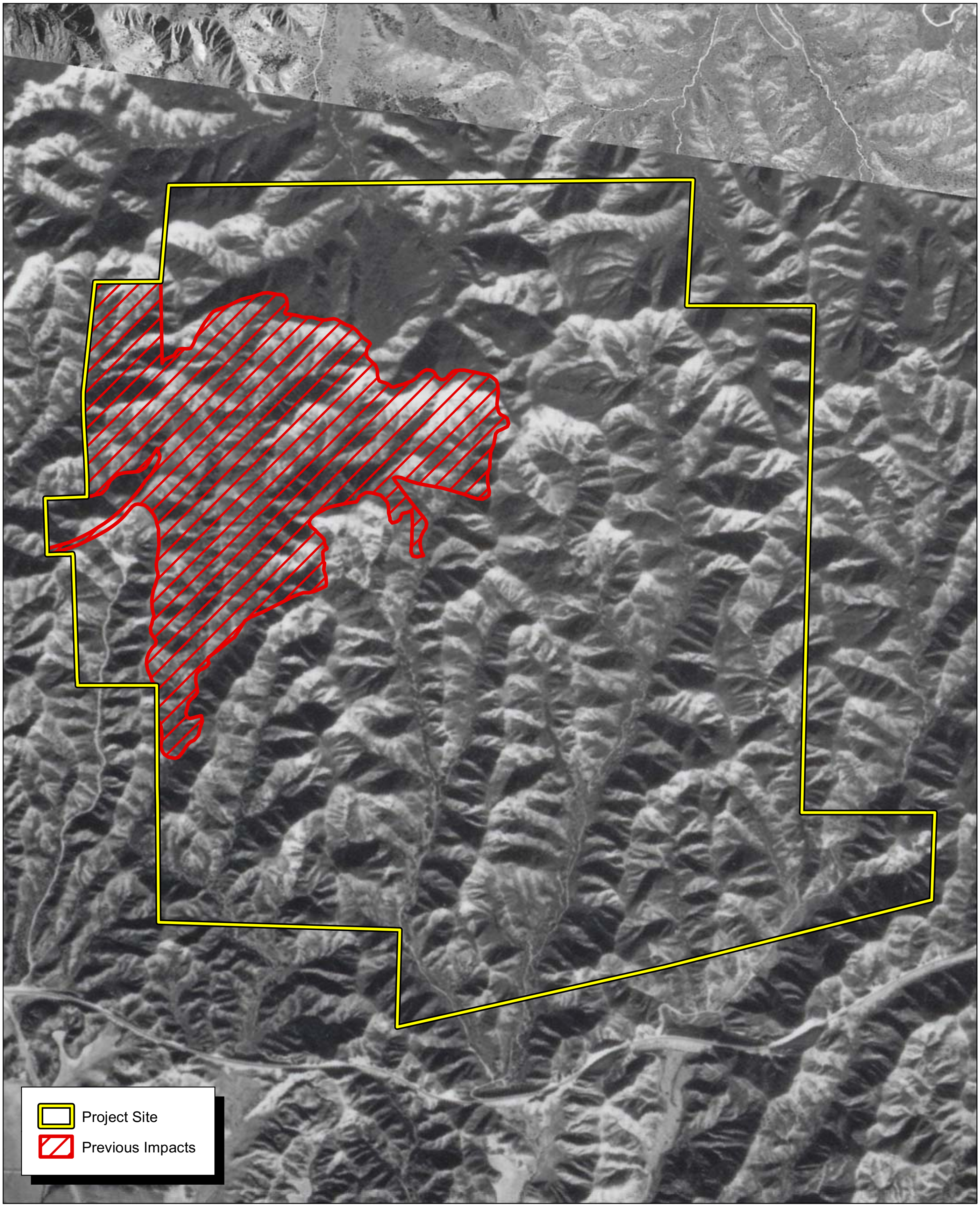
1.3.2 - Vegetation and Wildlife

The entire project area contains sparse Riversidean sage scrub, ruderal grasses and weeds on disturbed areas and native shrubs of various types in the arroyo bottoms. A large coyote and numerous birds and lizards were observed, including tracks of a large canid on land south of the abandoned De Anza motorcycle park. No springs were seen in any of the drainages.

1.3.3 - Land Use

MBA staff reviewed a series of historic aerial photographs from 1940, 1951 and 1967, both on-line and from collections made for other nearby projects (Appendix C reproduces the raw images). The *El Casco, CA.* USGS topographic map shows one road and a few trails leading to mining adits, but otherwise the project area is vacant. The aerial photos do reveal that a few roads or trails entered the project area but the totality of evidence suggest the project area was mostly unutilized until about 1966. The 1951 aerial (Exhibit 5) shows mostly vacant property with a few roads and trails leading into it. In the 1967 photo, several additional roads entered the property including one from a tilled canyon flat south of San Timoteo Creek, one from a borrow pit north of the SR60 freeway and the newly extended Ironwood Avenue. These may have been maintained for use at least until the slope shoulders for the new Landfill could be cut and filling in the canyons began. The private De Anza Motorcycle Park can be seen in younger on-line photos (not in the 1967 photo) and was located on parcels due north of the Landfill. The DeAnza park was located on farmland once used for grazing (Smith etal 1982) and appears to have been developed a few years after the Landfill opened atop a grazed area or water well built to serve the owner of the property.

The Landfill expanded generally eastward from the entrance station and the engineered fill generally filled the highest-altitude sections of the property. The 218-acre acquisition land is vacant and located east of the landfill property as shown in Exhibit 4. It features extremely steep arroyos with no apparent previous impacts. Review of the USGS topographic maps shows that there are no known springs or seeps in the project area.



Source: Whittier-Fairchild Collection (2010); NAIP for Riverside County (2009).

Michael Brandman Associates

Exhibit 5
Historic Aerial: 1951

Assessment Team

MBA Staff Archaeologist Arabesque Said-Abdelwahed conducted a records search on 28 May 2010 at the EIC. MBA archaeologists Kenneth J. Lord, Michael H. Dice, and Ms. Said-Abdelwahed conducted a pedestrian survey of the project area on July 22, 2010. Professional qualifications for all team members are listed in Appendix B.

SECTION 2: CULTURAL SETTING

2.1 - Prehistoric Background

The most accepted regional chronology for coastal and the southern coast of southern California is from Wallace's four-part Horizon format (1955), which was later updated and revised by Warren (1968). Created to place temporal structure upon materialistic phases observed during archaeological syntheses, the advantages and weaknesses of southern California chronological sequences are reviewed by Warren (in Moratto 1984), Chartkoff and Chartkoff (1984), and Heizer (ed. 1978). Regional archaeologists generally follow Wallace's (1955) four-part southern California format when discussing the prehistory of Western Riverside County.

2.1.1 - Early Man Period

Spanning the period from approximately 15000 to 6000 B.C., archaeological assemblages attributed to this horizon are characterized by large projectile points and scrapers. The limited data available suggests that prehistoric populations focused on hunting and gathering, moving about the region in small nomadic groups. Technologies associated with ocean resource gathering would have likely been utilized in coastal areas.

2.1.2 - Millingstone Period

Characterized by the appearance of handstones and millingstones, this horizon tentatively dates to between 6000 and 1000 B.C. Assemblages in the early Millingstone Period reflect an emphasis on plant foods and foraging subsistence systems. For inland locales, it has been assumed that exploitation of grass seeds formed a primary subsistence activity. Artifact assemblages include choppers and scraper planes, but there is a general lack of projectile points in excavated assemblages. The appearance of large projectile points in the late portion of the Millingstone Horizon suggests the development of a more diverse economy. The distribution of millingstone sites reflects the theory that aboriginal groups may have followed a modified central-based wandering settlement pattern. In this semi-sedentary pattern, a base camp would have been occupied for a portion of the year, but small population groups seasonally occupied subsidiary camps in order to exploit resources not generally available near the base camp. Sedentism apparently increased in areas possessing an abundance of resources that were available for longer periods. More arid inland regions would have provided a seasonally and aerially dispersed resource base, restricting sedentary occupation.

2.1.3 - Intermediate Period

Dating between 1000 B.C. and 500 A.D., the Intermediate Horizon represents a transitional period. Little is known about the people of this period, especially those of inland southern California. Site assemblages retain many attributes of the Millingstone Horizon. Additionally, Intermediate Horizon sites contain large-stemmed or notched projectile points and portable mortars and pestles. The mortars and pestles suggest that the aboriginal populations may have harvested, processed, and consumed acorns. Due to a general lack of data, neither the settlement and subsistence systems nor the cultural evolution of this period is well understood. It has been proposed that sedentism increased with the exploitation of storable food resources, such as acorns. The duration and intensity of occupation of base camps increased during this period, especially in the later part of the horizon.

2.1.4 - Late Prehistoric Period

Extending from 500 A.D. to Spanish Contact in 1769 A.D., the Late Prehistoric Horizon reflects an increased sophistication and diversity in technology. Assemblages characteristically contain projectile points, which imply the use of the bow and arrow and many Late sites contain pottery. In addition, assemblages include steatite bowls, asphaltum, grave goods, and elaborate shell ornaments. Use of bedrock milling stations was widespread during this Period. Increased hunting efficiency and widespread exploitation of acorns provided reliable and storable food resources. Cremation was the preferred method of burial and often times elaborate burial practices with extensive grave goods have been found at certain sites. The date of Uto-Aztecan migration into southern California is uncertain, but some authors have used linguistic extrapolations to suggest that earliest part of the Late Period (ie Kroeber 1925: AD 1-500) saw an influx of Shonshonean speakers from the Great Basin.

2.2 - Native American Background

The following section discusses the Cahuilla group as the main tribal entity in the San Timoteo-San Jacinto region during the Pre-contact period, with the knowledge that other tribes may have passed through the area during the Protohistoric period. The Soboba Reservation, home of the Soboba Band of Luiseño Indians, was established in 1883 by Executive Order (Indians Claims Commission records: http://digital.library.okstate.edu/icc/v37/iccv37p416.pdf) and held many Indians from different backgrounds. This reservation is the one nearest to the project area. The Cahuilla traditional use area is vast, with borders extending southeast from the modern City of Riverside in the north to Borrego Springs in the south. From Borrego Springs, the use area trends easterly below the Santa Rosa Mountains, bisecting the Salton Sea, and further inland past the Chocolate Mountains. The Cahuilla northern border then trends southeast from near the modern City of Riverside in the west, along the southern margin of the San Bernardino Mountains to beyond the Chocolate Mountains in the east (Bean 1978). The Badlands Landfill is located several miles south of San Timoteo Creek, which was probably the nearest reliable water supply. The terrain is extreme and probably limited all prehistoric north-to-south passage to easier canyons west of and east of the Project area.

A large village with an excellent spring had been on the Soboba Reservation for many centuries, and, according to certain ethnographers, was first occupied by Cahuilla ancestors (Bean 1972), then by Serrano peoples (Jackson and Kinney 1883). The ethnographically modern village at Soboba is not identified as Cahuilla by Bean (1978), who notes the nearest Cahuilla villages to the Hemet-San Jacinto region are near Anza: these facts reflect displacement of native peoples upon the arrival of the Spanish. The first European sightings of Soboba were recorded in 1774-75 most likely by a member of the Juan Bautista de Anza expedition, Pedro Font. A description of Soboba village (aka *Jaguara*) was later recorded by Father Jose Sanchez as the Anza expedition passed through the Hemet/San Jacinto Valley during Anza's first expedition. Anza and his guides were following established native trails used as trade routes in an attempt to set up an overland route (www.soboba-nsn.gov/index.php?id=history) between Sonora and Mission San Gabriel. The village had been placed under the domination of Mission San Juan Capistrano originally (about 1780), then several years later it was moved into Mission San Luis Rey de Francia control (about 1788-1792). One goal of the Franciscans was to subjugate tribal members by either moving them to the Mission or force them to work at the Mission outposts.

2.2.1 - Cahuilla

Although the Serrano may have used the Badlands during the prehistoric period, the mountainous regions of the Inland Empire near San Timoteo Creek were probably associated with Mountain Cahuillas when the Spanish first arrived. Bean (1978) is the most reliable authority on Cahuilla tribal cultural history excluding the Cahuilla elders themselves: Bean regards the 1883 reservation at Soboba to be composed of mainly Cahuilla tribesmen, a fact which is disputed by some modern Soboba elders. According to Bean and Shipek (1976), territory located slightly west of the ancestral villages at Soboba and Anza are in the ancestral territory of Cahuilla, and not Luiseño, groups. This was because the original ethnographic analyses were derived from linguistic studies and there were few speakers of the original languages left by the late 1800’s (see Sparkman 1908 or White 1963). Those who remained were asked about the tribal territory and indicated that the Luiseño did not have place names for inland areas east of Lake Elsinore, which forced Sparkman (1908) to state that that the Luiseños were primarily a coastal people. In addition, the historical effect of Helen Hunt Jacksons book *Ramona* (1883), have obscured the nature of the villages at Soboba. In sum, we believe that the nature of the tribesman at Soboba during the 1880-1900 period probably reflected a mix of tribal elements from Luiseño and Cahuilla groups, with no one tribe dominating, but that Cahuilla dominated the area prior to the arrival of the Spanish. In the 1880’s, the choice of local Indians was to try and survive the attempts of white homesteaders to remove them from their land and their ancestral resources by any means necessary, which is after all the theme of Jacksons book.

Kroeber (1908) takes up this problem for the Cahuilla, and indicated that Mountain Cahuilla groups inhabited most of the San Jacintos. But because of the changes the Spanish Mission padres wrought on native southern Californian lifeways, peripheral Cahuilla villagers were replaced with a mix of cultures after the Spanish established ranch lands in the interior. This is the case at Morongo, Banning and Highland, where Serrano tribal members mixed with Cahuilla to form pockets of resistance to the Spanish and later the Mexican ranch owners. Certain places in the interior were depopulated through the whims of Mission leaders and the many tribal stragglers made their way to the original villages at Soboba (also known as *Jaguara*: see Englehardt 1921 or *Suvo’owu*: http://www.soboba-nsn.gov/index.php?id=history). Today, the elders at Soboba call themselves the Soboba Band of Luiseño Indians. This is quite probably a reflection of the fact that: 1) the padres at

Mission San Juan Capistrano recorded a rancheria in the Hemet/San Jacinto area, then 2) the padres at the Mission San Luis Rey de Francia sent Luiseño Indians to this area for the purposes of maintaining a large cattle ranch near the artesian springs at the base of the San Jacinto Canyon. No linguistic nor ethnographic information appears to support the interpretation that Luiseño tribal members were living at Soboba when the Spanish entered California.

The Cahuilla refer to themselves as *Iviatim* and the word Cahuilla is thought to have come from the tribal word Kawiya, meaning "master." They were divided into small groups or tribelets in the foothills, mountain regions, and partly in the desert lands east of the Sierra divide, into two broad groups called the Coyote and the Wildcat with about 50 villages during the pre-contact period. Today Cahuilla descendants live on the reservations of Agua Caliente, Augustine, Cabazon, Cahuilla, Los Coyotes, Morongo, Ramona, Santa Rosa, Soboba, and Torres-Martinez. The Cahuilla belong to the Shoshonean linguistic family and have had definitive historical relationships with the Hopi of Arizona, the Gabrieliño, and Diegueno of the southern Californian coast and the Luiseño of Riverside County as well as other desert tribes such as the Kamia, Chemehuevi, Paiute, and Serrano. The Cahuilla population prior to Spanish contact could have been as numerous as 6,000 persons residing in an area encompassing more than 2,400 square miles (Bean 1978; Bean and Saubel 1979; Strong 1972).

The pottery associated with the Cahuilla has been stylistically and ornamentally compared to that of an ancient Pueblo style, as well as to the Colorado River Indians, the Diegueno, Luiseño, and Mohave (Bean and Lawton 1975; Kroeber and Hooper 1978). It is constructed in coil form, and then shaped with a polishing stone and wooden paddle to be baked or fired in the sun. In many cases, their pottery was incised for decoration (Bean and Lawton 1975; Kroeber and Hooper 1978). Kroeber and Hooper (1978) suggest that the Cahuilla had four definitive pottery forms: an open bowl or dish, a cooking pot, a small-rimmed vessel and a wider opening rimmed vessel; and Bean and Lawton (1975) suggest that ladles, trays and pipes were also manufactured. Baskets were an important item to the Cahuilla clan and were typically made in a variety of shapes and sizes, but always produced from a coil of mesquite branches, willow, or palm leaves. Grasses were used in the foundation and the only tool used to manufacture these baskets was a needle. These needles were either fashioned from the leg bone of a deer or made from a heavy cactus needle set into a wooden handle (Bean 1978).

Cahuilla homes were constructed with forked posts, which supported wood ceiling beams. These structures were then completely covered in thatch, which was slightly mixed with sand or soil. In some cases, the floor was subterranean and each house was positioned so that a level of privacy was attained (Bean 1978; Kroeber and Hooper 1978). Wilke (1978) notes that the Cahuilla homes were generally hidden in mesquite groves, which effectively obscured them from view. Ceremony and ritual was of great importance to the Cahuilla (Bean 1978). Deep ceremonial ties existed between the Serrano and the Cahuilla, and it is thought that the Desert Cahuilla may have adopted certain ceremonial practices from the Serrano (Strong 1972). Frequently practiced ceremonies included multiple rituals for the mourning of the dead, the eagle dance, summer and winter solstice celebrations and separate boys and girls' initiation rites (Strong 1972). This cultural linkage between the Cahuilla and Serrano is furthered by inferences from Mission baptismal records and Serrano oral tradition.

2.3 - Historic Background of East Moreno Valley

In the early 1800's the Franciscans began to establish outposts east of the coastal Missions, so Spanish influence was better able to spread into the Inland Empire section of southern California. There was little struggle between the earliest settlers and the local Indians for land rights during this period, and much of the traditional Cahuilla territory was never included in an official Rancho land grant. The majority of the landscape was quite arid and could not sustain large stocks of cattle. However, the Spanish did their best to control Native populations in those areas suitable for cattle through subjugation and religious edict, despite continual raiding by more distant tribes, such as the Mojave. On or about 1819, the Mission San Luis Rey established a rancho with the name San Jacinto (Lech 2004). This covered about 130,000 acres and was the largest rancho in Riverside County. Mission padres establish a few outposts in this Rancho, among them one at Casa Loma Hill, and another at the Corral de Pilares. During the 1820's attempts were made to establish good trade routes between the Mission towns and various places along the Colorado and in Arizona, and several overland expeditions were made that passed through the valleys along the San Jacinto River.

Once Mexico ceded from Imperial Spain, the lands considered part of the Mission San Luis Rey were secularized by the Mexican Government. The properties were surveyed and subdivided with the purpose of awarding the land to patriots. José Antonio Estudillo was appointed administrator and major domo at Mission San Luis Rey in 1840. Three grants, comprising over one hundred and thirty three thousand acres of the former Mission San Luis Rey land in the Hemet-San Jacinto area were made to the Estudillo family after internal struggles for control. These were the Rancho San Jacinto Viejo (José Antonio Estudillo - 1842), the Rancho San Jacinto Sobrante to his daughter (María del Rosario Estudillo - 1846) and the Rancho San Jacinto Nuevo y Potrero to his son-in-law (Miguel Pedrorena - 1846). Once the United States seized control and formed the California Territory, these ranchos were for the most part kept intact until U.S. Army surveyors were able to establish their official boundaries. Once the locations of their land was known, they began to break apart through land foreclosures and sales.

An excellent review of the post-1850 history of the eastern section of the City of Moreno Valley and the Mystic Lake area can be found in Lech (2004) with adjunct material added to the historical record by Dice et al (2004). Lech (2004) notes that a trail lead from the Rancho San Jacinto headquarters northwest along the base of The Badlands to the springs in the Box Springs Mountains east of what is now Riverside, thence to roads near the Santa Ana River. Thus, the route, which is now Gilman Springs Road has been used for travel for over 160 years and bypassed the interior of the Badlands. The primary purpose of the interior ranchos was to raise cattle and sheep, but except for the Mystic

Lake *cienega*, little natural surface water was available south of San Timoteo Creek. The upper San Jacinto Valley has always proved extremely marginal, a factor that limited agricultural development well into the 1950s.

Since much of the land in the Moreno Valley area was not part of the *Rancho San Jacinto Nuevo y Potrero* or any other rancho, it could be purchased at government auction. A San Francisco land speculator, William Bourne, purchased land in the Alessandro area in September 1870 and began selling small parcels immediately thereafter. In 1887, local investors bought the remaining land from Bourne with the hope of forming the town of Alessandro around a stop on the California Southern Railroad near the Riverside National Cemetery. Little water for irrigation could be obtained in this area, but that did not stop the speculators from lying to prospective buyers about the potential for tapping non-existent aquifers. As shown below, a new way of selling these properties had to be invented.

The Bear Valley and Alessandro Development Company (BV&A) conceptualized the town of Moreno and the community of Alessandro in 1889. BV&A was able to obtain title to roughly 22,000 acres of land in that year, mostly derived from the old Bourne properties. Frank Elwood Brown, an engineer who had migrated to California in 1876 and a co-founder of the town of Redlands with Hiram Judson, formed the BV&A as a way of selling land to unknowing Easterners during the late 1800's California land speculation boom. Both began growing citrus in Redlands between 1878 and 1882 using meager local water supplies. Brown was also the builder of the first Bear Lake Dam, begun in 1883, forming the Bear Valley Water Company (BVWC) in the early 1880s. After successfully building the dam and reservoir, now known as Big Bear Lake, water began flowing from the dam through a series of flumes and canals to Redlands orchards in 1885. This project led locals to believe that the Moreno area could be successfully irrigated using water brought in from the San Bernardino Mountains to the north. This water would have to be brought to east Moreno Valley via a flume, ditch and tunnel, and a route through the Badlands had to be chosen. This route followed San Timoteo Creek and is in close proximity to Redlands Boulevard as it passes through the hills to the northwest of the Landfill. The 1901 *Elsinore, CA.* 30' topographic map shows that the only plotted road that crosses the Badlands runs along the old BVWC tunnel. All other roads except for a few near the Lamb Canyon Landfill do not pass through the Badlands during this time.

The irrigation potential for Big Bear Lake seemed enormous because the years 1875 to 1885 were the wettest winters on record. Brown assumed that the massive supplies in the reservoir reflected typical winter storage. With little knowledge of precipitation fluctuations in southern California, supplies appeared unlimited and grandiose schemes for harnessing the seeming overabundance of water would attract moneyed investors. Source water for the BV&A development was shunted through the pre-existing Redlands system into a reservoir once located east of Redlands Boulevard and north of Locust Street. The water was planned for delivery to areas north of Alessandro Blvd. through a series of canals and pipelines headed by a reservoir. Clearly, the purpose of Brown was to duplicate the success of the City of Redlands, which by 1890 was a thriving commercial citrus center located along an established railroad right-of-way.

By 1884, drought had set in and the tenuous water rights Brown claimed he held were denied in favor of farmers in the San Bernardino area. Water claimed by the BVIC was shut off, and except in a very few cases, the farms in the Moreno area failed. It is possible that all of the land in the Alessandro-Moreno tract was sold to eager farmers before 1894 but after that date drought claimed most of them. In addition, the Panic of 1893 began late in that year, which was the greatest depression the country had ever seen up to that time. It is likely that the Panic forced most of the original Moreno townspeople out before the BVIC irrigation water was cut off.

Although there were clear efforts to bridge the gap between San Timoteo Creek and Moreno, the lack of water supplies forced an extremely limited development of this region, at least south of San Timoteo Creek. Use of the project area would have been highly limited during the historic era because the Badlands were seen as a traveler’s obstacle, a place where cattle would get lost, with very scarce water resources. A few stagecoach roads crossed the Badlands southeast of the Project area during the late 1800’s but the region was typically avoided as routes to the north and south were much more accessible. Section 2.4 below shows that much of the Badlands in and near the project area was unclaimed until set aside by the BLM.

A homesteader known as Duff Weaver occupied the San Timoteo Canyon in the 1850’s and was friends with Cahuilla Chief Juan Antonio. In 1862, a smallpox epidemic struck southern California and killed numerous Indians, including Antonio in 1863 (Ingersoll 1902). Antonio was buried near the San Timoteo Schoolhouse at a Cahuilla place known as *Sahat’pa* (Smith et al 1960) which was located near the modern El Casco Lake.

A portion of the project area can be seen in an aerial photo dated to 1940 (see Appendix C) which shows that no roads crossed or led into the southern portion of the project area as of that date. SR60 is shown on the 1943 Perris, CA. 15’ quadrangle, and this two-lane roadway must have cut through the Badlands and assigned US60 after 1940. The two-lanes both directions SR60 Freeway was built in the late 1950’s, allowing the San Gorgonio Pass to be linked directly to Riverside for the first time in the Interstate Highway system. The County of Riverside created landfills in the Badlands during the late 1960’s and early 1970’s because the area was considered a wasteland with no good use (and had limited access), but was near large cities; Riverside and San Bernardino in particular.

2.4 - Bureau of Land Management General Land Office Records Search

Until reliable irrigation sources could be developed, homesteading in the Inland Empire was limited to those areas near creeks or permanent springs. Few structures were built in the Badlands during the earliest homesteading period because springs were few, little rainfall fell, and more suitable farmland was available in the valley near Hemet, San Jacinto and eastern Moreno Valley. MBA conducted an on-line search of the Bureau of Land Management (BLM) General Land Office (GLO) records on July 27, 2010. The results are quite limited and the details noted below. None of the names associated with lands located in the project area are noteworthy historic personages.

For Section 31 and 33 in T2S R2W, it was shown that all portions of these sections were granted to the SPRR on various dates in the late 1800's via railroad grant legislation (ie 14 Stat. 292). For Section 32 in T2S R2W, 608 acres of this Section was patented by the County of Riverside in 1964 through public land sale purposes (ie 44 Stat. 741). The southeast quarter of the southeast quarter (40 acres) was patented by one Edward B. Perrin in 1904 via legislation associated with 30 Stat. 993 (Exchange-National Forest)

For Section 5 in T3S R2W, all portions of this section were granted to the SPRR on various dates in the early 1900's via railroad grant legislation (ie 14 Stat. 292). For the northwestern 160 acres of Section 4, T3S R2W, the southeast quarter of the northwest quarter (41.8 acres) was patented by a Datus E. Myers and Thomas Valentine in 1913 via legislation associated with 5 Stat. 607 (scrip). The southwest quarter of the northwest quarter was patented by a John Blakeman in 1941 via legislation associated with 12 Stat. 392 (Homestead Act). The remaining portion of the northwestern quarter-section was patented by the County of Riverside through Exchange legislation (85 Stat. 688).

SECTION 3: RESEARCH PARAMETERS AND METHODS

The primary purpose of the cultural resource pedestrian survey is to locate and document previously recorded or new cultural resource sites or isolates that are more than 45 years old within the project area, and to determine whether such resources will be or could be impacted by development. County guidelines associated with Phase I surveys can be downloaded from the County TLMA website. The version of the County guidelines referred to during this research effort was dated January 2010.

The entirety of the project area is extremely steep and rugged. The area was examined using a reconnaissance technique, because all ground to be walked over must be safe enough to traverse. Accessible canyon bottoms was examined, vegetation and slopes permitting. Following County survey protocol, the topographic facts and reconnaissance techniques associated with the Project were discussed with, and approved by, County Archaeologist Leslie Mouriquand. Any detected sites must be recorded on Department of Parks and Recreation (DPR) 523 forms and must be evaluated for significance during the environmental compliance process. Following County of Riverside guidelines, recordation and significance evaluation work may be completed during a subsequent archaeological Phase II study, and/or upon authorization from the County archaeologist.

3.1 - National Historic Preservation Act (NHPA) and the National Register of Historic Places (NR)

The National Historic Preservation Act (NHPA) of 1966, as amended, established the National Register of Historic Places (NR), which contains an inventory of the nation's significant prehistoric, historic, and cultural properties. Section 106 of the NHPA requires federal agencies to take into account effects on historic properties caused by federal actions (aka *undertakings*, such as funding, permitting, etc.) and to provide the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on such undertakings through consultation with the State Historic Preservation Officer (SHPO) and interested Native American tribes and individuals. Under 36 Code of Federal Regulations 60, a historic property is recommended for possible inclusion on the NR if it is at least 50 years old, has integrity, and meets one of the following criteria:

A) It is associated with significant events in history, or broad patterns of events.

B) It is associated with significant people in the past.

C) It embodies the distinctive characteristics of an architectural type, period, or method of construction; or it is the work of a master or possesses high artistic value; or it represents a significant and distinguishable entity whose components may lack individual distinction.

D) It has yielded, or may yield, information important in history or prehistory.

Certain types of properties are usually excluded from consideration for listing in the NR, but they can be considered if they meet special requirements in addition to meeting the criteria listed above. Such properties include religious sites, relocated properties, graves and cemeteries, reconstructed properties, commemorative properties, and properties that have achieved significance within the past 50 years.

3.2 - California Environmental Quality Act and the California Register of Historical Resources (CR)

The CEQA Guidelines state that a resource need not be listed on any register to be found historically significant. The CEQA Guidelines direct lead agencies to evaluate archaeological sites to determine if they meet the criteria for listing in the California Register. If an archaeological site is a historical resource, in that it is listed or eligible for listing in the California Register, potential adverse impacts to it must be considered. If an archaeological site is considered not to be an historical resource but meets the definition of a “unique archeological resource” as defined in Public Resources Code Section 21083.2, then it would be treated in accordance with the provisions of that section.

As defined by Section 15064.5(a)(3)(A-D) of the CEQA Guidelines, a resource shall be considered historically significant if the resource meets the criteria for listing on the California Register of Historical Resources (CR). The CR and many local preservation ordinances have employed the criteria for eligibility to the NR as a model, since the NHPA provides the highest standard for evaluating the significance of historic resources. A resource that meets the NR criteria is clearly significant. In addition, a resource that does not meet the NR standards may still be considered historically significant at a state or local compliance level.

If the resource has integrity and any one of the criteria noted below is met at the State level of analysis, the resource would be considered significant and a direct impact to the cultural resource would be considered a significant impact on the environment. Typically, researchers in California use a 45-year age threshold following State Historic Preservation Officer (SHPO) recommendations. The time lag of five years between the State and federal criteria is explained by the fact that it takes about five years to plan for and redevelop any one property:

A) Is associated with events that have made a significant contribution to the broad patterns of California’s history and cultural heritage;

B) Is associated with the lives of persons important in our past;

C) Embodies the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possesses high artistic values; and

D) Has yielded, or may be likely to yield, information important in prehistory or history.

3.3 - Regional/Local Archaeological Regulations

The County of Riverside has created a series of guidelines and task lists for regional archaeologists to follow when completing CEQA-level cultural resources assessments. These are outline in the County's archaeological MOU. The County has identified four phases of archaeological assessments and resultant reports:

- Phase I: Initial Survey;
- Phase II: Test or Evaluation;
- Phase III: Mitigation or Data Recovery; and
- Phase IV: Monitoring.

According to the Riverside County Planning Department Standard Scopes of Work, the Phase I report should consist of an initial records, map and literature search, a Sacred Lands File record check with the Native American Heritage Commission, and a field inspection subject to certain protocol techniques. If cultural resources are detected during the field inspection, these must be recorded on Department of Parks and Recreation (DPR) 523 forms and must be evaluated for significance during the environmental compliance process. Following County of Riverside guidelines, recordation and significance evaluation work may be completed during a subsequent archaeological Phase II study, upon authorization from the County archaeologist.

A Phase II study is recommended by the County to gather additional information about the detected cultural resources for identification and evaluation purposes. If the results of a Phase II test or evaluation fail to find a resource significant or eligible for listing in the CR, then this Phase II study may constitute sufficient mitigation for a resource. Phase III studies are recommended if a resource would be destroyed in the future or if significant value can be obtained from the resource. These studies generally occur when a resource has been found significant through the Phase II test and evaluation process, and the resource is threatened by impending destruction. A Phase IV report is required to present any information recovered as a result of mitigation monitoring programs, and is intended to ensure compliance with project conditions and to complete the archaeological data available for a specific resource or project area.

When completing these CEQA-level studies, the County has instructed regional archaeologists to adhere to specific rubrics for creating Phased reports. The requirements for a Phase I or initial survey archaeological report are found on the County Planning website and are frequently updated. The current Phase I report outline mirrors the OHP-recommended Archaeological Resource Management Report (ARMR) format, and includes sections to discuss project area location, current conditions, background history and findings. There are also sections to present research design, methods, records search results, pedestrian survey results, discussion of resources detected and recommendations for additional work, where necessary.

The County additionally requires paperwork regarding notifications to the Planning Department of forthcoming archaeological reports and significance checklists for specific project areas. All phased archaeological reports created for Riverside County review must be certified with the wet signature of a current Riverside County certified archaeologist. For an archaeologist to maintain their registry status, the archaeologist must complete a certification course and maintain a current MOU between the archaeologist or consulting firm and the County.

3.4 - Research Design

Previous research can provide a general basic understanding of cultural resources that might be found within the project area. While little historical and archaeological work has been done on lands on or within a mile of the project margins, research on the history of peoples living on and near the Badlands, and the land ownership history and background of person obtaining land from the government through various public claims acts can provide a starting point for further research.

General topic areas common to southern California prehistory include 1) prehistoric chronology, 2) subsistence strategies, 3) settlement patterning, 4) exchange, and 5) tool technology. Historic topic areas include 1) land use, 2) personal backgrounds and 3) construction timetables. These general topics are contexts of research are difficult to address at the inventory level of analysis, but do provide a background for making statements about what is seen during an inventory. These topics allow for site type and content to be understood and evaluated within the framework of the local site area as well as in the broader context of the region.

For this reason, the goals of a Phase I survey study are to determine whether cultural resources are located within or near a defined project area, what type of resources are present or could be present, and to predict the chance for future discoveries of sites in the project area if construction-related impacts take place. Research assumptions were based upon the findings of the records search conducted at the EIC. Field research was undertaken following County parameters, with the archaeological team using a reconnaissance method as noted in Section 3.0 above. The research assumptions for the field survey consisted of the following:

1. The probability for detecting prehistoric archaeological sites appears to be low, based upon a minimal number of known prehistoric resources within 1 mile of the project area. Surface sites located in the Badlands region are typically found at the base of the hills near canyon mouths. The highest potential for prehistoric sites appears to be on canyon floors, where alluvial sedimentation is minimal. The entirety of the Project is located in difficult terrain, with no water supplies.
2. The probability for detecting historic-age resources appears to be low, because the majority of the Badlands Landfill property was once deeded to the Southern Pacific during the historic period thru the various railroad grant acts. Other lands in and near the project area were deeded to people through the Homestead Act, but this would require that establishment of

living quarters and use within the first five year of obtaining the deed. Much of the land in the Badlands was not found to be useful unless valuable minerals were detected, so the County of Riverside was deeded the property in the 1960's, reserving the mineral rights to the US Government. A study by Smith et al (1982) suggests that lands near the Badlands Landfill were at one time administered by the BLM because they had not been deeded during the homesteading period and reverted to the BLM. From this information we have gathered, it is highly unlikely that a structure or structural remains, domestic refuse and/ or water transmission or control systems will be detected within the project area.

3.5 - Research Goals

The goal of this study was to determine whether cultural resources are located within the project area, determine whether or not any existing cultural resources should be considered significant resources, and develop specific mitigation measures that will address potential impacts to existing or potential resources. Thus, this study consisted of six distinct efforts:

1. Request of NAHC Sacred Lands File record search and contact with appropriate tribal groups and individuals.
2. Review of previous cultural resource sites and studies in the region.
3. Examination of archived aerial photographs, topographic maps, and road maps.
4. Evaluation of cultural resource sensitivity.
5. Conduct a transect survey of the project area.
6. Development of recommendations associated with mitigation monitoring and/or impacts to existing cultural resources following CEQA Guidelines.

3.6 - Sites and Isolates

Prehistoric and historic cultural resource sites can vary in form and function from area to area. Prehistoric and historic cultural resources are defined as three or more items, such as lithics, stone tools, glass, cans, etc., that are not from a single source or material found within a 10 square meter area. Historic sites that could qualify as significant in California are typically more than 45 years old or have the potential to be more than 45 years old at the time of construction. These definitions assume that items found in an area with a diversity of materials can represent more than a single activity at a location. Discrete components of a site, also known as loci, may be identified to represent repeated activity, such as milling stations, hearths, or isolated structures.

Recordation of each site and isolate will follow the most recent site recordation manual developed by SHPO (dated March 1995). Photographs of the features or individual artifact made during the recordation phase are intended to show the basic qualities and location of the resource as a whole.

Further research may be warranted once the site has been carefully examined and an evaluation of potential effect made.

3.7 - Record Search

3.7.1 - Information Center Search

The primary purpose of a cultural resource record search is to determine what cultural resources more than 45 years old have been recorded in the project area, and whether such resources will be or could be impacted by development. A records search at the EIC, which is located at the University of California at Riverside, was conducted to determine the existence of previously documented cultural resources in the County. The records search included current inventories of the:

- National Register of Historic Places (NRHP)
- California Register of Historical Resources (CR)
- California Historical Landmarks (CHL)
- California Points of Historical Interest (CPHI)
- California State Historic Resources Inventory (HRI)
- Archival maps for the City and County

3.7.2 - Native American Heritage Commission Record Search

A request to the NAHC was sent in an effort to determine whether any sacred sites are located near the project area, as listed in their Sacred Lands File. Additional contact for the purpose of tribal comment was made with all appropriate tribal groups and individuals as named by the NAHC. MBA’s efforts were associated with fact-finding only, and were not affiliated with formal government-to-government consultations as outlined by Senate Bill (SB) 18. The results of these efforts are provided for in Appendix A.

Tribal Consultation Overview and Responsibilities

The following overview is provided to assist the County in meeting its responsibilities for compliance with Tribal Consultation legislation, which is required when a project results in adopting a Specific Plan, Specific Plan Amendment, or a General Plan Amendment. From our experience, if a consultation is required it will be handled by Leslie Mouriquand M.A., County Archaeologist.

As of March 1, 2005, California Government Codes 65092; 65351; 65352; 65352.3; 65352.4; 65352.5 and 65560, formerly known as Senate Bill (SB) 18, require city and county governments to consult with California Native American tribes before individual site-specific, project-level land use decisions are made. In particular, this process applies to General Plan Amendments and adoptions of Specific Plans. The intent of this legislation is to provide all tribes, whether federally recognized or not, an opportunity to consult with local governments for the purpose of preserving and protecting their sacred places.

SECTION 4: RESULTS

4.1 - Information Center Search

In 2006, MBA staff conducted a series of records searches at the EIC, which is located at the University of California, Riverside. MBA staff recently re-examined the topographic maps associated with this original search and found no changes to the data as of the year 2010. To identify any historic properties, MBA examined the current inventories of the NRHP, CR, CHL, and CPHI. In addition, we copied the HRI and certain archival maps for the County to use to determine the existence of previously documented local historical resources.

According to the EIC files, just six studies have been conducted within the one-mile search radius. In 1982, a "Class III" inventory of 613+ acres in and near the former De Anza Cycle Park was undertaken by Dr. Gerald Smith of the San Bernardino County Museum (Smith et al 1982). The Cycle Park was located due north of the Badlands Landfill, and no cultural resources nor Native American cultural values were reported by Smith's informants. Most of the Badlands Landfill site was reviewed by Drover (1991) who claimed that Smith had in fact surveyed the Badlands Landfill site and found little potential for prehistoric cultural resources. Several development-related projects have been undertaken at the toe of the badlands in Moreno Valley.

EIC files indicated that there are five cultural resource sites located within the one-mile radius surrounding the project area. None are known to be located inside the Project area. The previously recorded cultural resources are briefly described in the following table:

Table 1: Previously Recorded Cultural Resources

Site Name	Location	Type	~1 mile radius	~0.5 mile radius	~0.25 mile radius	On Site?
CA-RIV-2262H	Section 29	Van Derventer homesteading lands off San Timoteo Creek	X			No
CA-RIV-5862H	Section 6	Historic habitation		X		No
CA-RIV-6200	Section 6	Deeply buried prehistoric hearth	X	-	-	No
P33-7291	Section 6	Historic farmhouse	X	-	-	No
P33-7275	Section 6	1920's house along Theodore Street	X	-	-	No
Legend: X = Present within radius - = Not present within radius						

Review of the site records and reports shows that one prehistoric site has been located at the toe of the Badlands and that historic sites are near old trails and watercourses. The permanent stream that is San Timoteo Creek would have been occupied quite possibly full time by Cahuilla ancestors as numerous sites –located outside the one-mile search radius – are known along the Creek. Previous studies make mention of the fact that the terrain is quite rugged and systematic sampling of this region is quite difficult. On the basis of these data, we would predict that prehistoric sites will be confined to water sources such as springs and main washes, while historic-era resources would be located at the base of the Badlands foothills near roads and major trails.

4.2 - Native American Heritage Commission Record Search

On 13 May 2010, MBA sent a letter to the NAHC in an effort to determine whether any sacred sites are listed on their Sacred Lands File for this portion of the County of Riverside. Efforts were associated with informal consultation only, and are not affiliated with formal SB 18 consultations. The response from the NAHC was received on 7 June 2010 and they indicated that no sacred sites were known for the project area. To ensure that Native American concerns were adequately addressed, letters to each of the 13 listed tribal contacts were sent on 6 July 2010. As of the date of this report, two letters have been received: one from the Pala Band (dated 22 July) and another from the Cahuilla Band (dated 24 August). Neither group indicated that traditional resources were located in the project area.

4.3 - Cultural Survey Results

MBA archaeologists Michael H. Dice, Kenneth J. Lord and Arabesque Said-Abdulwahed surveyed the project area on July 21, 2010. As expected, the project area was difficult to examine because nearly all lands were completely inaccessible due to dangerous travel conditions. Most of the original dirt roads and two-tracks had been washed away since the acreage surrounding the Landfill was closed off from public access decades ago. Only those canyons that could be accessed from the existing landfill roads were accessed. None of the 218 acres associated with the proposed acquisition land could be observed directly because the slot canyons were dangerous, the slopes tremendous, and the ridges knife-edged.

During the survey, we identified several isolated dirt roads that appear to have been built after SR60 was constructed (about 1960): these are not considered significant historic resources. A borrow pit was identified on a hillside at the end of Canyon 6 but lacked any historic construction components save old cuts and scrapes. This borrow pit has been recorded onto a DPR523 Primary record form set. It is not significant. The De Anza motorcycle park lies due north of the project area. This was constructed less than 50 years ago, but there are signs that an old farmstead was once located in the draw upon which the De Anza Park now rests. The farm site will not be impacted by the Project because the lands therein lie outside the project area.

No prehistoric resources were observed during the survey. The inaccessible regions of the Landfill are even steeper than the areas we could actually review on foot. Because of the various factors discussed above, including extreme topography and the lack of water, it is even more unlikely that the inaccessible areas were used by prehistoric populations than elsewhere. Dirt roads into the project area appear to have been created to get at sand and gravels located in the wider canyons. Because there is no evidence that the project area was used by anyone until the 1950's, the potential for intact significant historic resources is similarily low.

SECTION 5: SUMMARY AND RECOMMENDATIONS

5.1 - Summary

In accordance with CEQA and the County of Riverside Archaeological MOU, MBA has assessed the effects of potential future landfill-related development within the project area. The results of the cultural resource record search and report review indicated that while the survey area has not been assessed since 1982, the landscape has not changed to the point where intensive survey is either required or needed to make an informed decision regarding the effects of future project development on cultural resources. A few historic resources were observed during the survey: these are unlikely to be impacted by development of the Project and in any event are not significant under CEQA or NEPA guidelines. DPR523 form sets associated with these historic resources have been generated and are found in Appendix E. These resources will not be directly affected by the project in the foreseeable future.

We conclude that it is unlikely the Landfill area was used in any lasting way by Native American populations and that significant prehistoric resource sites in the project area are highly unlikely. The potential for significant historic resources in the project area are similarly constrained because of a lack of permanent surface water resources and flat ground. The properties were never homesteaded, indeed, even though numerous Acts gave land away to homesteaders up to about 1960, persons chose to take other land instead. This is why the property reverted to the BLM in the 1960's, and was then exchanged to the County in that decade.

Section 106 of the National Historic Preservation Act (16 USC 470.f) requires that any Federal agency, which may be directly or indirectly involved in the permitting of the Project, to take into account the effect of the undertaking (ie the Corps permit) on any district, site, building, structure or object that is included in or potentially eligible for listing in the National Register. Following the procedures associated with the federal Section 106 process, MBA has not identified any historic properties in the project area (aka the Area of Potential Effect) that might be affected by planning or future development of the Badlands Landfill. In addition, MBA was contacted by the Pala Band (dated 22 July) and the Cahuilla Band (dated 24 August). Neither group indicated that traditional resources were located in the project area. Therefore, we conclude that the proposed project will have *No Effect* on any known significant cultural resource.

5.2 - Cultural Resource Recommendations

It is recognized that the RCWMD may develop the Badlands Landfill over a long period of time, perhaps several decades, and that any unknown cultural resources potentially located in the project area may be left undisturbed for many years. The first choice following County General Plan guidelines is to avoid impacting any cultural resource, even if that resource is not considered significant. Because there are no known significant cultural resources in the project area, and because the potential for such resources is considered unlikely, MBA does not recommend that any future ground-disturbing developments in the project area be monitored by a qualified archaeologist. Should landfill staff or contractors identify buried cultural resources during any groundbreaking activity, RCWMD staff should immediately contact the County of Riverside Archaeologist and advise him/her of the findings.

5.2.1 - Accidental Discovery of Human Remains

There is always the small possibility that ground-disturbing activities during construction may uncover previously unknown buried human remains. Should this occur, Federal laws and standards apply including the Native American Graves Protection and Repatriation Act (NAGPRA) and its regulations found in the Code of Federal Regulations 43 CFR 10.

In the event of an accidental discovery or recognition of any human remains, California State Health and Safety Code § 7050.5 dictates that no further disturbance shall occur until the County Coroner has made the necessary findings as to the origin and disposition of the remains, pursuant to CEQA regulations and Public Resources Code (PRC) § 5097.98.

5.2.2 - Accidental Discovery of Cultural Resources

It is always possible that ground-disturbing activities during construction will uncover previously unknown, buried cultural resources. In the event that buried cultural resources are discovered during construction, operations shall stop in the immediate vicinity of the find and a qualified archaeologist shall be consulted to determine whether the resource requires further study. The qualified archeologist shall make recommendations to the Lead Agency on the measures that shall be implemented to protect the discovered resources, including but not limited to excavation of the finds and evaluation of the finds in accordance with § 15064.5 of the CEQA Guidelines. Potentially significant cultural resources consist of, but are not limited to, stone, bone, fossils, wood, or shell artifacts or features, including hearths, structural remains, or historic dumpsites. Any previously undiscovered resources found during construction within the project area should be recorded on appropriate Department of Parks and Recreation (DPR) forms and evaluated for significance according to CEQA criteria.

If the resources are determined to be unique historic resources as defined under § 15064.5 of the CEQA Guidelines, mitigation measures shall be identified by the monitor and recommended to the Lead Agency. Appropriate mitigation measures for significant resources could include avoidance or capping, incorporation of the site in green space, parks, or open space, or data recovery excavations of the finds.

No further grading shall occur in the area of the discovery until the Lead Agency approves the measures to protect these resources. Any archaeological artifacts recovered because of mitigation shall be donated to a qualified scientific institution approved by the Lead Agency where they would be afforded long-term preservation to allow future scientific study.

In addition, reasonable efforts to avoid, minimize, or mitigate adverse effects to the property will be taken, and the State Historic Preservation Officer (SHPO) and Native American tribes with concerns about the property, as well as the Advisory Council on Historic Preservation (ACHP) will be notified within 48 hours, in compliance with 36 CFR 800.13(b)(3).

SECTION 6: CERTIFICATION

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this archaeological report, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Date: December 6, 2010 Signed:

Michael H. Dice, M.A., RPA
County Certified Archaeologist #101
Michael Brandman Associates
San Bernardino, CA

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Appendix A:
Cultural Resources Correspondence and EIC Records Search Confirmation

FAXED

Badlands [illegible]

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
915 Capitol Mall, RM 364
Sacramento, CA 95814
(916) 653-4082
(916) 657-5390 – Fax
nahc@pacbell.net

Information Below is Required for a Sacred Lands File Search

Project: The Badlands Landfill Survey Project

County: Riverside County

USGS Quadrangle Name: El Casco and Sunnymead

Township: 2South Range: 2West Section(portions): 31, 32, 33

Township: 3South Range: 2West Section(portions): 5, 4

Company/Firm/Agency:
Michael Brandman Associates

Contact Person: Michael H. Dice, M.A.

Street Address: 621 E Carnegie Drive Suite #100, San Bernardino, CA 92408

Cell 714.742.0468 (Preferred number.)

Office Phone: 909.884.2255

Fax: 909.884.2113

Email: mdice@brandman.com

Project area to be studied includes approximately 1083 acres and is associated with the potential expansion of an existing landfill. The property is virtually impossible to survey except by reconnaissance.

Source: TOPO! USGS El Casco (1979) & Sunnymead (1980) 7.5' DRGs.

Exhibit 2

Local Vicinity Map
Topographic Base

Michael Brandman Associates

NORTH

2,000 1,000 0 2,000
Feet

23100004 • 09/2010 | 2_Local_Topo.mxd

RIVERSIDE COUNTY WASTE MANAGEMENT DEPARTMENT • BADLANDS LANDFILL
PHASE I ARCHAEOLOGICAL SURVEY

STATE OF CALIFORNIA Arnold Schwarzenegger, Governor

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-6251
Fax (916) 657-5390
Web Site www.nahc.ca.gov
ds_nahc@pacbell.net

June 7, 2010

Mr. Michael Dice, M.A., RPA
Michael Brandman Associates
621 E. Carnegie Drive, Suite 100
San Bernardino, CA 92408

Sent by FAX to: 909-884-2113
No. of Pages: 4

Re: Request for a Sacred Lands File Search and Native American Contacts List **for the proposed " The Badlands Landfill Survey Project;"** located in the foothill area west of the San Gorgonio Pass/Cherry Valley area and east of Sunnymead; Riverside County, California

Dear Mr. Dice:

The Native American Heritage Commission (NAHC), the State of California 'Trustee Agency' for the protection and preservation of Native American cultural resources. The NAHC SLF search did not Indicate the presence of Native American cultural resources within one-half mile of the proposed project site (APE).

Also, this letter includes state and federal statutes relating to Native American historic properties of religious and cultural significance to American Indian tribes and interested Native American individuals as 'consulting parties' under both state and federal law.

The California Environmental Quality Act (CEQA - CA Public Resources Code §21000-21177, amended in 2009) requires that any project that causes a substantial adverse change in the significance of an historical resource, that includes archaeological resources, is a 'significant effect' requiring the preparation of an Environmental Impact Report (EIR) per the California Code of Regulations §15064.5(b)(c)(f) CEQA guidelines). Section 15382 of the CEQA Guidelines defines a significant impact on the environment as "a substantial, or potentially substantial, adverse change in any of physical conditions within an area affected by the proposed project, including ...objects of historic or aesthetic significance." In order to comply with this provision, the lead agency is required to assess whether the project will have an adverse impact on these resources within the 'area of potential effect (APE)', and if so, to mitigate that effect.

Early consultation with Native American tribes in your area is the best way to avoid unanticipated discoveries once a project is underway., Culturally-affiliated tribes and individuals may have knowledge of the religious and cultural significance of the historic properties in the project area (e.g. APE). We recommend that you contact persons on the attached list of Native American contacts. Furthermore we suggest that you contact the California Historic Resources Information System (CHRIS) at the Office of Historic Preservation Coordinator's office (at (916) 653-7278, for referral to the nearest Information Center of which there are 10.

Consultation with tribes and interested Native American consulting parties, on the NAHC list ,should be conducted in compliance with the requirements of federal NEPA (42 U.S.C. 4321-43351) and Section 106 and 4(f) of federal NHPA (16 U.S.C. 470 [f)]*et seq),* 36 CFR Part 800.3 (f) (2), the President's Council on Environmental Quality (CSQ; 42 U.S.C. 4371 *et seq.*) and NAGPRA (25 U.S.C. 3001-3013), as appropriate. . The 1992 *Secretary of the Interior's Standards for the Treatment of Historic Properties* were revised so that they could be applied to all historic resource types included in the National Register of Historic Places and including *cultural landscapes.*

Also, Public Resources Code Section 5097.98 and Health & Safety Code Section 7050.5 provide for provisions for accidentally discovered archeological resources during construction and mandate the processes to be followed in the event of an accidental discovery of any human remains in a project location other than a 'dedicated cemetery.

To be effective, consultation on specific projects must be the result of an <u>on-going relationship between Native American tribes and lead agencies</u>, project proponents and their contractors, in the opinion of the NAHC. Regarding tribal consultation, a relationship built around regular meetings and informal involvement with local tribes will lead to more qualitative consultation tribal input on specific projects.

The response to this search for Native American cultural resources is conducted in the NAHC Sacred Lands Inventory, established by the California Legislature (CA Public Resources Code §5097.94(a) and is exempt from the CA Public Records Act (c.f. California Government Code §6254.10) although Native Americans on the attached contact list may wish to reveal the nature of identified cultural resources/historic properties. Confidentiality of "historic properties of religious and cultural significance' may also be protected the under Section 304 of the NHPA or at the Secretary of the Interior' discretion if not eligible for listing on the National Register of Historic Places. The Secretary may also be advised by the federal Indian Religious Freedom Act (cf. 42 U.S.C, 1996) in issuing a decision on whether or not to disclose items of religious and/or cultural significance identified in or near the APE and possibly threatened by proposed project activity.

If you have any questions about this response to your request, please do not hesitate to contact me at (916) 653-6251.

Sincerely,

Dave Singleton
Program Analyst

Attachment: Native American Contacts

Native American Contacts
June 7, 2010
Riverside County

Pechanga Band of Mission Indians
Paul Macarro, Cultural Resource Center
P.O. Box 1477
Temecula , CA 92593
pmacarro@pechanga-nsn.
(951) 308-9295 Ext 8106
(951) 676-2768
(951) 506-9491 Fax
Luiseno

Ramona Band of Cahuilla Mission Indians
Joseph Hamilton, Chairman
P.O. Box 391670
Anza , CA 92539
admin@ramonatribe.com
(951) 763-4105
(951) 763-4325 Fax
Cahuilla

Santa Rosa Band of Mission Indians
John Marcus, Chairman
P.O. Box 609
Hemet , CA 92546
srtribaloffice@aol.com
(951) 658-5311
(951) 658-6733 Fax
Cahuilla

Morongo Band of Mission Indians
Michael Contreras, Cultural Heritage Prog.
12700 Pumarra Road
Banning , CA 92220
mcontreras@monongo-nsn.
(951) 755-5025
(951)201-1866 - cell
(951) 922-0105 Fax
Cahuilla
Serrano

Kupa Cultural Center (Pala Band)
Shasta Gaughen, Assistant Director
35008 Pala-Temecula Rd.PMB Box
Pala , CA 92059
cupa@palatribe.com
(760) 891-3590
(760) 742-4543 - FAX
Luiseno

Pechanga Band of Mission Indians
Mark Macarro, Chairperson
P.O. Box 1477
Temecula , CA 92593
tbrown@pechanga-nsn.gov
(951) 676-2768
(951) 695-1778 Fax
Luiseno

Willie J. Pink
48310 Pechanga Road
Temecula , CA 92592
wjpink@hotmail.com
(909) 936-1216
Prefers e-mail contact
Luiseno

Serrano Nation of Indians
Goldie Walker
6588 Valaria Drive
Highland , CA 92346
(909) 862-9883
Serrano

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code. Also, federal National Environmental Policy Act (NEPA), National Historic Preservation Act, Section 106 and fed eral NAGPRA. And 36 CFR Part 800.3.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed The Badlands Landfill Survey Project; located between Sunnymead and the San Gorgonio/Cherry Valley area of Riverside County, California for which a Sacred Lands file search and Native American Contacts list were requested.

Native American Contacts
June 7, 2010
Riverside County

Agua Caliente Band of Cahuilla Indians THPO
Patricia Tuck, Tribal Historic Perservation Officer
5401 Dinah Shore Drive Cahuilla
Palm Springs, CA 92264
ptuck@aguacaliente-nsn.gov

(760) 699-6907
(760) 699-6924- Fax

Cahuilla Band of Indians
Luther Salgado, Sr., , Chairperson
PO Box 391760 Cahuilla
Anza , CA 92539
tribalcouncil@cahuilla.net
915-763-5549

Anna Hoover, Cultural Analyst
Pechanga Cultural Resources Department
P.O. Box 2183 Luiseño
Temecula , CA 92593
(951-770-8104
(951) 694-0446 - FAX
ahoover@pechanga-nsn.gov

Ernest H. Siva
Morongo Band of Mission Indians Tribal Elder
9570 Mias Canyon Road Serrano
Banning , CA 92220 Cahuilla
siva@dishmail.com
(951) 849-4676

Joseph Ontiveros, Cultural Resource Department
SOBOBA BAND OF LUISENO INDIANS
P.O. BOX 487 Luiseno
San Jacinto , CA 92581
(951) 654-5544, ext 4137
(951) 663-5279
jontiveros@soboba-msn.gov

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Michael Brandman Associates

Fresno
559.497.0310

Irvine
714.508.4100

Palm Springs
760.322.8847

Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 6, 2010

Cultural Analyst Anna Hoover
Pechanga Cultural Resources Department
PO Box 2183
Temecula, CA 92593

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Cultural Analyst Hoover:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

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We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext 1208 or 7147420468 (cell) if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Sunnymead and Beaumont, CA* topo maps

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July 6, 2010

Mr. Ernest H. Siva
Morongo Band of Mission Indians Tribal Elder
9570 Mias Canyon Rd
Banning, CA 92220

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Mr. Siva:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is **not associated with the SB18 process**, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

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San Ramon
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July 6, 2010

Ms. Goldie Walker
Serrano Band of Indian
6588 Valeria Drive
Highland, CA 92346

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Ms. Walker:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

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July 6, 2010

Chairman John Marcus
Santa Rosa Band of Mission Indians
P.O. Box 609
Hemet, CA 92546

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Chairman Marcus:

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July 6, 2010

Chairman Joseph Hamilton
Ramona Band of Cahuilla
P.O. Box 391670
Anza, CA 92539

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Chairman Hamilton:

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July 6, 2010

Mr. Joseph Ontiveros
Soboba Band of Luiseno Indians
PO Box 487
San Jacinto, CA 92581

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Mr. Ontiveros:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is **not associated with the SB18 process**, but is a document that shall be included in our cultural resource survey report.

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Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

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July 6, 2010

Chairperson Luther Salgado
Cahuilla Band of Indians
PO Box 391760
Anza, CA 92539

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Chairperson Salgado:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

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July 6, 2010

Chairperson Mark Macarro
Pechanga Band of Mission Indians
P.O. Box 1477
Temecula, CA 92593

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Chairperson Macarro:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

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Michael Brandman Associates

Fresno
559.497.0310

Irvine
714.508.4100

Palm Springs
760.322.8847

Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 6, 2010

Mr. Michael Contreras
Morongo Band of Mission Indians
12700 Pumarr Road
Bannin, CA 92220

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Mr. Contreras:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

Section 106 of the National Historic Preservation Act of 1966 (NHPA) and CEQA Guidelines state that we must consider the effects a project may have on historic properties. The definition of “historic properties” can include properties of traditional religious and cultural significance to Native American groups. To determine whether the proposed project may impact any historic properties, including traditional cultural properties, MBA has reviewed background information and consulted with entities such as the NAHC. The Native American Heritage Commission does not indicate that any sacred sites are located in or near this project area, but have listed you as a tribal contact.

We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext 1208 or 7147420468 (cell) if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

Enc: USGS *Sunnymead and Beaumont, CA* topo maps

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July 6, 2010

Ms. Patricia Tuck
Agua Caliente Band of Cahuilla Indians THPO
5401 Dinah Shore Drive
Palm Springs, CA 92264

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Ms. Tuck:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is **not associated with the SB18 process**, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

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We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext 1208 or 7147420468 (cell) if you have any questions or information, or you may address and mail a response to my attention at the address below.

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San Bernardino, CA 92408

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San Ramon
925.830.2733

July 6, 2010

Mr. Paul Macarro
Pechanga Band of Mission Indians
P.O. Box 1477
Temecula, CA 92593

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Mr. Macarro:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

Section 106 of the National Historic Preservation Act of 1966 (NHPA) and CEQA Guidelines state that we must consider the effects a project may have on historic properties. The definition of “historic properties” can include properties of traditional religious and cultural significance to Native American groups. To determine whether the proposed project may impact any historic properties, including traditional cultural properties, MBA has reviewed background information and consulted with entities such as the NAHC. The Native American Heritage Commission does not indicate that any sacred sites are located in or near this project area, but have listed you as a tribal contact.

We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext 1208 or 7147420468 (cell) if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408
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760.322.8847

Sacramento
916.447.1100

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909.884.2255

San Ramon
925.830.2733

July 6, 2010

Assistant Director Shasta Gaughen
Cupa Cultural Center (Pala Band)
35008 Pala-Temecula Rd. PMB Box 445
Pala, CA 92056

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Assistant Director Gaughen:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is not associated with the SB18 process, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

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We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext 1208 or 7147420468 (cell) if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408

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Sacramento
916.447.1100

San Bernardino
909.884.2255

San Ramon
925.830.2733

July 6, 2010

Mr. Willie J. Pink
48310 Pechanga Road
Temecula, CA 92592

Subject: **Native American Information Request Letter associated with one Cultural Resource Survey: The Badlands Landfill Survey Project located in the County of Riverside, California. (USGS Sunnymead and Beaumont, CA. quads)**

Dear Mr. Pink:

Michael Brandman Associates will soon be undertaking an archaeological survey for a project on approximately 1,115 acres in the central Badlands section of the County of Riverside. The proposed project is associated with planning for the future expansion of the Badlands Landfill. This information request letter is **not associated with the SB18 process**, but is a document that shall be included in our cultural resource survey report.

As seen in the attached topographic map, the landfill expansion project area is located in portions of Sections 31, 32 and 33 of Township 2 South/Range 2 West, and portions of Section 4 and 5 of Township 3 South/Range 2 West. Not all of this area can be surveyed because it is too rugged.

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We wish to ask if you have any information or concerns about this project area, and/or if the proposed project may have an impact on cultural resources that are important to you. Please feel free to contact me at 909.884.2255 ext 1208 or 7147420468 (cell) if you have any questions or information, or you may address and mail a response to my attention at the address below.

Sincerely,

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Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, CA 92408
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ENVIRONMENTAL SERVICES ▪ PLANNING ▪ NATURAL RESOURCES MANAGEMENT

www.brandman.com

PALA BAND OF MISSION INDIANS
Tribal Historic Preservation Office
35008 Pala Temecula Rd. PMB 445
Pala, CA 92059

Ph: (760) 891-3591
Fax: (760) 742-4543

RECEIVED 7/24/10

July 22, 2010

Michael H. Dice, M.A.
Michael Brandman Associates
621 E Carnegie Drive, Suite 100
San Bernardino, Ca 92408

Re: The Badlands Landfill Survey Project located in the County of Riverside, CA

Dear Mr. Dice:

The Pala Band of Mission Indians Tribal Historic Preservation Office has received your notification of the project referenced above. This letter constitutes our response on behalf of Robert Smith, Tribal Chairman.

We have consulted our maps and determined that the project as described is not within the boundaries of the recognized Pala Indian Reservation. The project is also beyond the boundaries of the territory that the tribe considers its Traditional Use Area (TUA). Therefore, we have no objection to the continuation of project activities as currently planned and we defer to the wishes of Tribes in closer proximity to the project area.

We appreciate involvement with your initiative and look forward to working with you on future efforts. If you have questions or need additional information, please do not hesitate to contact me by telephone at 760-891-3591 or by e-mail at sgaughen@palatribe.com.

Sincerely,

Shasta

Shasta C. Gaughen, MA
Tribal Historic Preservation Officer
Pala Band of Mission Indians

ATTENTION: THE PALA TRIBAL HISTORIC PRESERVATION OFFICE IS RESPONSIBLE FOR ALL REQUESTS FOR CONSULTATION. PLEASE ADDRESS CORRESPONDENCE TO **SHASTA C. GAUGHEN** AT THE ABOVE ADDRESS. IT IS NOT NECESSARY TO ALSO SEND NOTICES TO PALA TRIBAL CHAIRMAN ROBERT SMITH. PLEASE ALSO NOTE THAT JOE NIXON NO LONGER WORKS FOR THE PALA THPO.

Cahuilla Tribal Environmental Protection Office
P.O. Box 391714 (52701 CA-Highway 371)
Anza, California 92539
(951) 763-2631 Fax (951) 763-2632)

August 24, 2010

Michael H. Dice, M.A., Senior Archaeologist
Michael Brandman Associates
621 E. Carnegie Drive, Suite 100
San Bernardino, CA 92408

RE: The Badland Landfill Survey Project in the County of Riverside, California

Dear Mr. Dice:

Thank you for contacting the Cahuilla Band of Indians concerning the above referenced project. We currently have no knowledge of any cultural resources within the project plan.

Although the project area is outside the Cahuilla Indian Reservation territory, it is not outside the Traditional Use Area for the Cahuilla Band of Indians and we request, as a courtesy, that we be kept in the information loop with regard to this area as the project progresses and we would appreciate being maintained on the receiving list for project updates, reports of investigations and/or any documentation that might be generated regarding previously reported or newly discovered cultural resource sites within the area designated.

Finally, working in and around traditional use areas intensifies the possibility of encountering cultural resources during the construction/excavation phase. For this, we recommend that Approved Cultural Monitors be present on site during all survey and all ground disturbing activities, should they become necessary. The Cahuilla tribe does have trained and certified Native American Monitors who are qualified to monitor construction and archaeological activities, and you can contact the Cahuilla Tribal Environmental Protection Office at the above numbers for proposed monitoring.

Sincerely,
Yvonne L. Markle
Yvonne L. Markle
Cahuilla Environmental Office Manager
Cahuilla Band of Indians
environmentalofficer@cahuilla.net

"We do not inherit the earth from our ancestors, we are borrowing it from our children"

Badlands RS update.

EIC--INY/MNO/RIV--ST--

County: IN MN [✓ RI] Area: The Badlands Client: ; Project:

USGS 7.5' El Casco & Sunnymead Section(s) 5, 4, 31, 32 T. 2S,3S R. 2W

HISTORIC MAPS: 15' 30'

Letter; Original map (keep copy); Copies of historic map(s); Report printout; Copies of records/reports

(1) NR; (2) ADOE; (3) HPD; Comments Built

REPORTS				CONFIDENTIAL MAPS							NON-CONFIDENTIAL MAPS				
ON		1/4-1 MI	O-VIEWS	ON				1/4 - 1/2 1 MI			ON			1/4 - 1 MI	
RPT #	# PGS	RPT #	RPT #	TRI	P #	PGS	NRS	TRI	P#	PGS	P#	PGS	NRS	P#	PGS
1384 ✓		1665			18625	MBA record		179		7				15649	MBA
1383 ✓		7126						2262		11				15648	
7962	35	2171						5862	7910	8				7291	✓
		2172						6200	8709	5				7275	2
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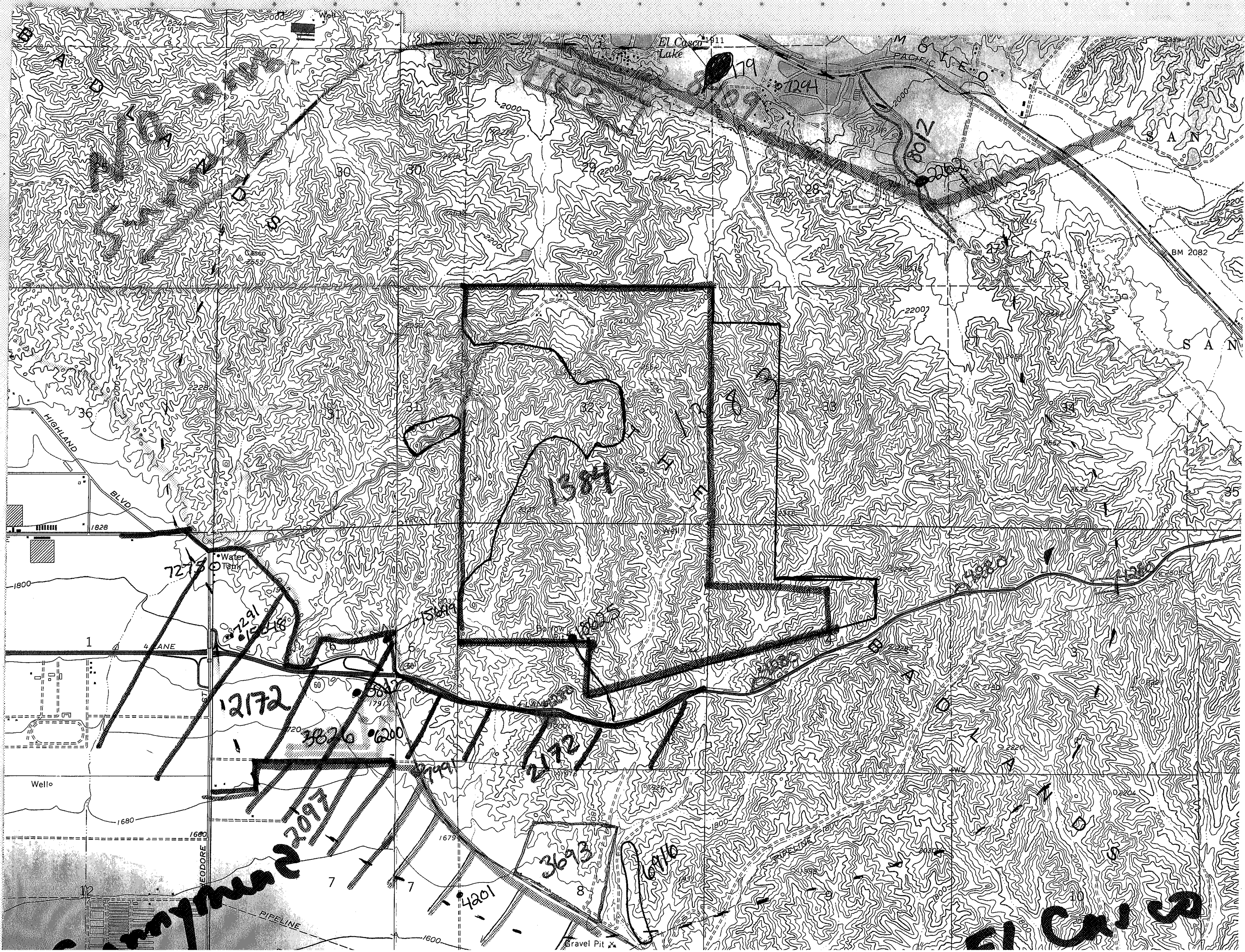
Total # copies: 76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PIPELINE
PIPELINE
THEODORE
Gravel Pit
Casco
El Casco

Appendix B:
Personnel Qualifications

Michael Brandman Associates

CORPORATE RESUME

Michael H. Dice, MA, RPA

Senior Cultural Resource Specialist/Project Manager

Overview

- 30+ years experience in Cultural Resource Management
- Master's degree, Anthropology – Arizona State University, Tempe. 1993
- Bachelor's degree, Anthropology – Washington State University, Pullman. 1986
- Registered Professional Archaeologist (RPA 2000)
- Certified Archaeologist in Riverside County (#101), County of Orange and the County of San Diego.

Michael H. Dice, MA, RPA, Senior Cultural Resource Specialist and Project Manager, has more than 30 years experience performing record searches, archaeological surveys, archaeological site testing projects, and data collection projects on private and public lands in the Southwestern United States. He has authored or co-authored more than 200 Cultural Resources Inventory Reports required for CEQA and/or NEPA level documents. His management experience within CRM involves producing proposals, hiring and managing field and office cultural resource personnel, writing draft and final reports to various Clients and Lead Agencies, and managing costs effectively. Michael has extensive experience with California Native American Tribes, having provided direct consultation and coordination with the Agua Caliente Band, Gabrielino tribal officials, Juaneño tribal officials, the Morongo Band, the Serrano Band, and the Temecula Band of Luiseno Indians (Pechanga).

Michael's statement of experience is divided into three categories: Prehistoric and Historic Archaeological projects, Historic-era Assessment projects and Environmental Compliance project management. Key projects are listed.

Experience, Prehistoric and Historic Archaeology

Cultural Resource Assessment of The Las Montanas Marketplace Project, City of Indio, CA. M-To Management, Inc., Los Alamitos, CA. (2010-2011)

Mr. Dice performed an archaeological survey of 95 acres in the northern section of the City of Indio in support of an EIR for a new private developmental project. The project area was believed, through museum research, to contain three prehistoric archaeological sites. MBA cultural resource staff provided the proponent with an exploratory testing study that will effectively clear the project of specific mitigation measures for the sites in question. Because one of the sites was determined significant within an adjacent project area, that sites had to be cleared from the project. Work was undertaken before the City accepted the Initial Study. Consultations with local Tribal Authorities took place.

Cultural Resource Assessment of The Salton Sea Solar Project, Riverside County, CA. Reese-Chambers Systems Consultants Inc., Somis, CA. (2009-2010)

Mr. Dice performed an archaeological survey and protohistoric ceramic scatter assessment on approximately 480 acres just north of the Salton Sea in the County of Riverside. The purpose of the study was to evaluate seemingly vacant property as part of an analysis for potential impacts during construction of a new solar panel complex. Two sites were identified and will have to be Phase III collected prior to construction. Consultations with local Tribal Authorities took place.

Phase 1 Cultural Resource Assessment of the Badlands Landfill and Lamb Canyon Landfill Expansion Projects, Riverside County, California. Riverside County Waste Management Department (2010)

Mr. Dice performed an archaeological survey on a total of 1600 acres adjacent to the existing Badlands Landfill and the Lamb Canyon Landfill in the County of Riverside. The purpose of the study was to evaluate adjacent property as part of an analysis for potential impacts during expansion of the Landfills.

Several new resources were detected and recorded during the study. While RCWMD will not construct for several decades, the sites will be avoided when land development takes place in the site areas. Consultations with local Tribal Authorities took place.

Cultural Resource Assessment of the Van Norman Dam and Chatsworth Dam Complexes. Los Angeles Department of Water and Power (2008-9)

Mr. Dice performed an archaeological survey and historic landscape assessment of the Van Norman Dam complex plus the Chatsworth Dam in western Los Angeles County for the Los Angeles Department of Water and Power. For the first time, the history of the complex was detailed and Program-level recommendations for historic evaluations of these significant engineering complexes were made. LADWP plans to remove the upper Van Norman Dam and replace it with a newly designed covered Dam in order to reduce water supply pollutants. Soils on the floor of the Chatsworth Dam will be used for fill. The project was written under CEQA Guidelines because LADWP will not be using federal monies. Future work will involve Section 106 because certain permits will be required when the project reaches a Project-level analysis.

Cultural Resource Assessment, Phase II Historical evaluation and Phase IV Monitoring for the Sketchers Industrial Park Project, City of Moreno Valley, California. Highland-Fairview Operating Partners (2004-2011)

Mr. Dice undertook a Phase 1 survey of the Sketchers property in addition to other properties controlled by the Client, headed a team of cultural professionals performing historic building evaluations, then headed up a field crew of monitors during the earth-moving phase of complex construction in 2010. Wholly seen through by Mr. Dice, several historic era buildings were examined. Consultations with local Tribal Authorities took place.

Phase 2 Testing Evaluation of Historic Site CA-SBR-11567H, the Empire-Fontana Project (ACOE #200301127), City of Fontana, California (2005)

Mr. Dice undertook an evaluation of a historic archaeological site for the City of Fontana in order to gain permits for developmental impact from the Army Corps of Engineers. Several abandoned historic foundations, trash dumps, remnant buildings and a possible prehistoric isolated within the historic property were examined and quantified. The report was submitted and accepted by Mr. Steve Dibble of the Army Corps LA District.

Phase 2 Testing and Phase 3 Excavation of the Loring Ranch Project, Rubidoux-Jurupa Area, County of Riverside, California. Mastercraft Homes, Inc. (2004)

Mr. Dice undertook an evaluation of two historic archaeological sites on vacant land located west of the Santa Ana River and southeast of the Flabob Airport. Cultural Resource Staff determined that two mid-1800's trash deposits were located on the property and tested the sites for significance. Because the sites were felt to reflect a period in history when Chinese immigrants were forced into limited economic means, the sites were determined to represents "truck farms" developed between 1870 and 1900.

Experience, Historic Building and Landscape Assessments

Section 106 Cultural Resource Assessment and Technical Evaluation of the McCoy and Garibaldi Laterals, Merced Irrigation District. Fremming, Parson & Pecchenino, Consulting Civil Engineers, Merced, CA. (2010)

Mr. Dice performed an archaeological survey and historic landscape assessment of two Laterals within the Merced Irrigation District in support of the District's plans to use federal funding (Bureau of Reclamation) to repair segments of the Laterals. Mr. Dice determined that the MID should be considered a potential Historic District for listing on the National Register. Modifications to the Laterals as a result of the undertaking will have No Adverse Effect to the potential Historic District that is the MID. Consultations with local Tribal Authorities took place.

Three Historic Assessments of the Southside Park, the Del Paso Regional Park and the Chorley Park. City of Sacramento, California (2010)

Under contract with the City of Sacramento Parks and Recreation Department, Mr. Dice produced three technical studies in order to fulfill Section 106 requirements. The Department requested these studies because the Department requires Recreation Trails and Land and Water Conservation funding programs. Each park exhibited a landscape more than 50 years old, and certain older internal structures, that allowed each Park to be considered potentially eligible for the National Register at the local level of analysis. We determined that the Southside Park and the Del Paso Park are potentially eligible for the NR but that the specific projects would have no impact on their eligibility qualities. The Chorley Park was determined not significant. Consultations with local Tribal Authorities took place.

Historic Building Evaluation of the San Gorgonio Inn, City of Banning, CA. (2010)

Mr. Dice evaluated a historic-era structure originally built in 1884 and rebuilt in 1930 for significance at the State (CEQA) level of analysis. The City proposed to demolish the structure and the report supported an EIR written by Ernest Perea of Romo Planning Group Inc., Covina. Mr. Dice performed a historic background assessment and developed a thematic context with which the structure could be evaluated against. The results of this research showed that the building did not qualify for listed on the National or State Register, but that the location of the Inn was considered locally significant. This was not a popular decision, especially with Steve Lech, but the research showed that the results were justified. After reading the report, the City chose to attempt to preserve Googie-styled signage off-site.

Historic Building Evaluation of the F&M Artesia Branch Bank, City of Long Beach, CA. (2009)

Mr. Dice evaluated a structure built in 1961 for significance at the State (CEQA) and City of Long Beach Historic Property level of analysis. The City had proposed to demolish the structure complex and the technical report supports an IS/MND written in City Format for the proponent, Jeffrey Tartaglino of Palm Desert Development. Mr. Dice performed a historic background assessment and developed a thematic context with which the structure could be evaluated against. Because the structure was found significant at the local level of analysis, the City required a photographic assay of the building: this was incorporated into the finished document.

Historic Building Evaluation of the Premiere Lanes Bowling Alley, City of Santa Fe Springs, CA. (2009)

Mr. Dice evaluated a structure built in 1960-61 for significance at the State (CEQA) level of analysis. The City had proposed to demolish the structure complex and our technical report supported an EIR written by Sandra Bauer of Bauer Consulting Inc., Irvine. Mr. Dice performed a historic background assessment and developed a thematic context with which the structure could be evaluated against. The City will allow the removal of the building through demolition but save Googie-styled signage associated with the structure.

Historic Building Survey, Washington Boulevard and Consolidated Redevelopment Projects, City of Santa Fe Springs, CA.

Mr. Dice conducted a historic building survey for two redevelopment project areas located in the City of Santa Fe Springs, County of Los Angeles. The Washington Boulevard Redevelopment project area is located in the City of Santa Fe Springs' side of Washington Boulevard, and is bisected by Sorensen Avenue. The purpose of the study was to identify those properties more than 45 years old that may be demolished during planned Redevelopment in the next 25 years. The Consolidated Redevelopment Project Area is located near Gateway Plaza at the intersection of Telegraph Road and Painter Avenue west of Carmenita Road. A program-level historic context was developed and existing properties preliminarily assessed against that historic context. The results showed that more 140 individual properties more than 45 years old were located in and near the Redevelopment project area. The evaluation of the historic context and existing properties will allow the City, for the first time, to recommend that the significance of old buildings be considered when undertaking redevelopment in the City limits.

Historic Resource Assessment and Phase II Recommendation, The Alfa Leisure Property, City of Chino, CA.

This study was a CEQA and NEPA-compliant assessment of the old Chino Sugar Mill, including an historic building survey and photographic assay. The Mill building housed one of the first commercial ventures in the City, opening in the 1880's. The results of the study showed that the structure was a locally significant structure but could not be saved within a reasonable monetary expenditure as the structure was completely unstable from an earthquake standpoint. Mr. Dice recommended that a photographic assay and additional historic analysis be undertaken before the structure would be allowed to be demolished.

Experience, Environmental Compliance Management

Compliance work for the Bakersfield State Vehicular Recreation Area (SVRA), County of Kern, California. City of Bakersfield and County of Kern, California. (2005-2006)

Mr. Dice led a cultural resource survey of a 10,000+ acre proposed park project on private ranch land in the County of Kern north of the City of Bakersfield. Work was done in support of an EIR/EA written to convince the State of California to purchase the property for use as an off-road vehicle park. Mr. Dice wrote the budget for the survey, hired and managed a field crew of 12+ persons, developed protocols for survey, managed the development of final DPR523 form sets for the document, then developed the cultural resource section of the Draft EIR in support of the project. Mr. Dice directed consultations with local Tribal Authorities.

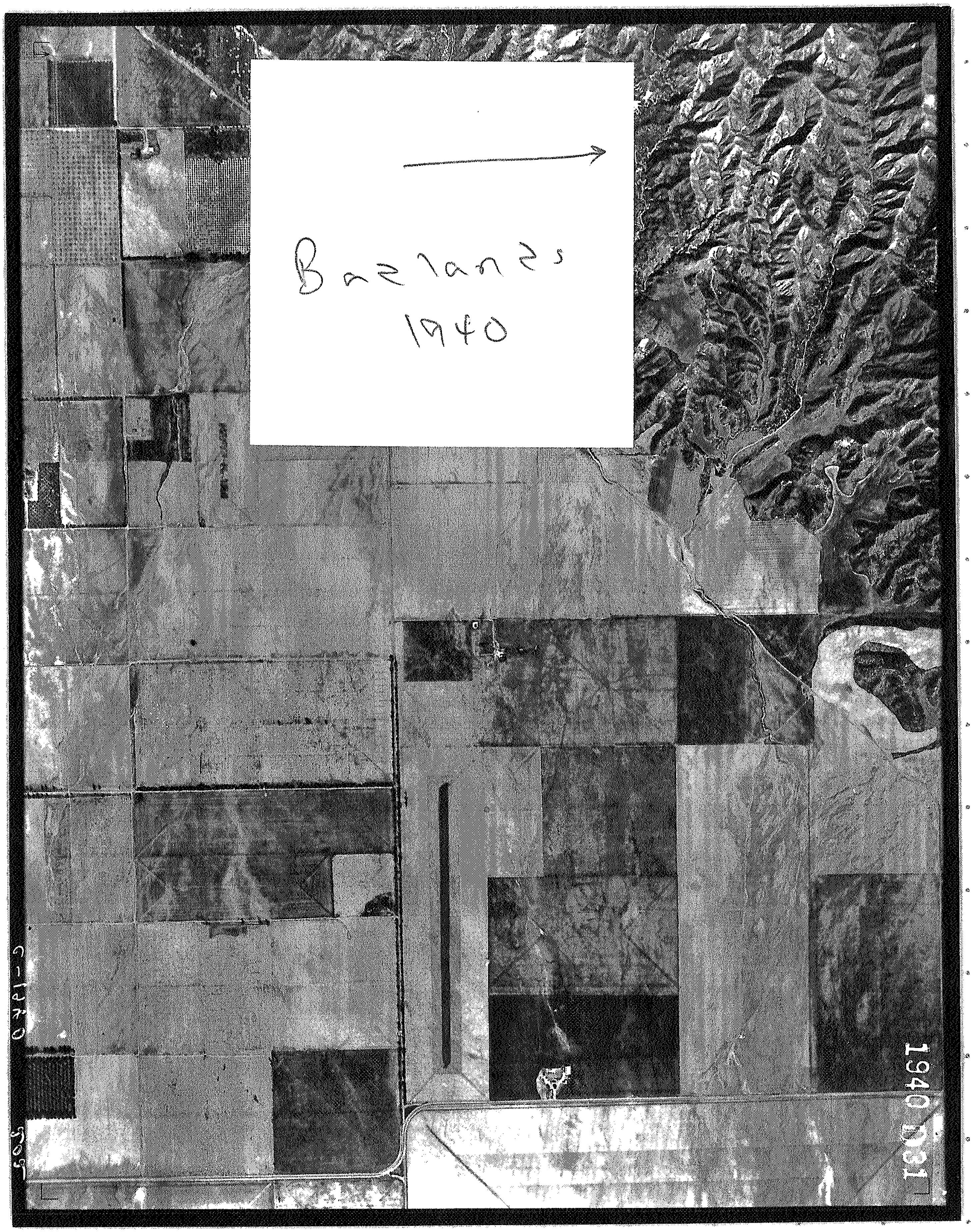
Compliance work for the East Orange and Santiago Hills II Developmental Plan and Phase 3 Excavation of CA-ORA-556, City of Orange, California. The Irvine Company, Newport Beach, CA. (2003-6)

Mr. Dice led a cultural resource survey of a 1,500-acre project area in the East Orange Annexation and Sphere of Influence zone in the Santiago Hills. He led a team that evaluated a series of historic and prehistoric sites for the project, recommending that one site be Phase 3 excavated. The excavation was led by Mr. Dice, with a field crew of 6-8 people. The site was found potentially not significant. A Phase 3 excavation report was written. In addition, Mr. Dice wrote a cultural resource section of an EIR in support of the project. Mr. Dice directed consultations with local Tribal Authorities.

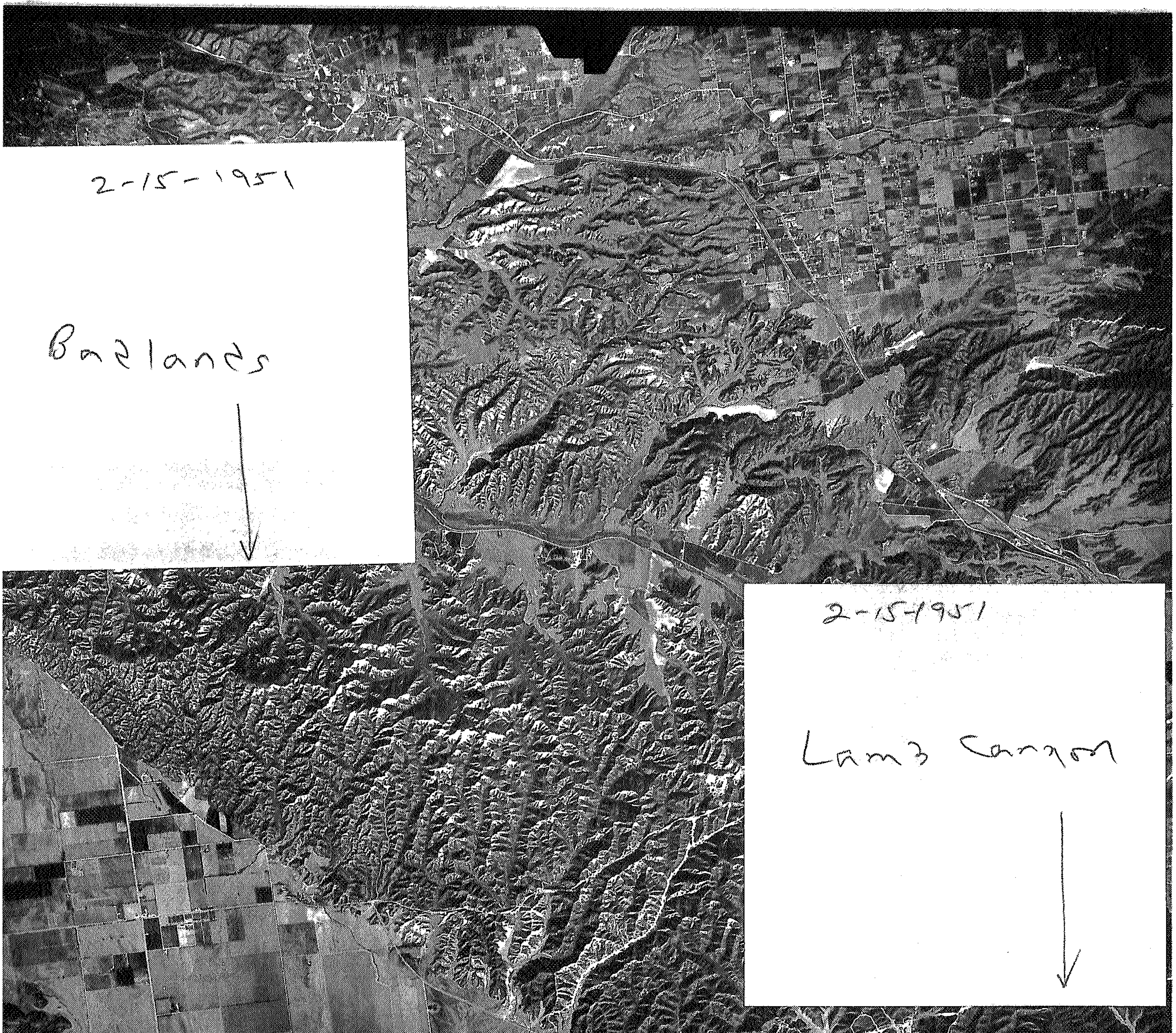
Professional Affiliations

- Member, California Historical Society
- Member, National Trust for Historic Preservation
- Member, Registry of Professional Archaeologists

Appendix C:
Historic Aerial Photographs



Badlands
1940

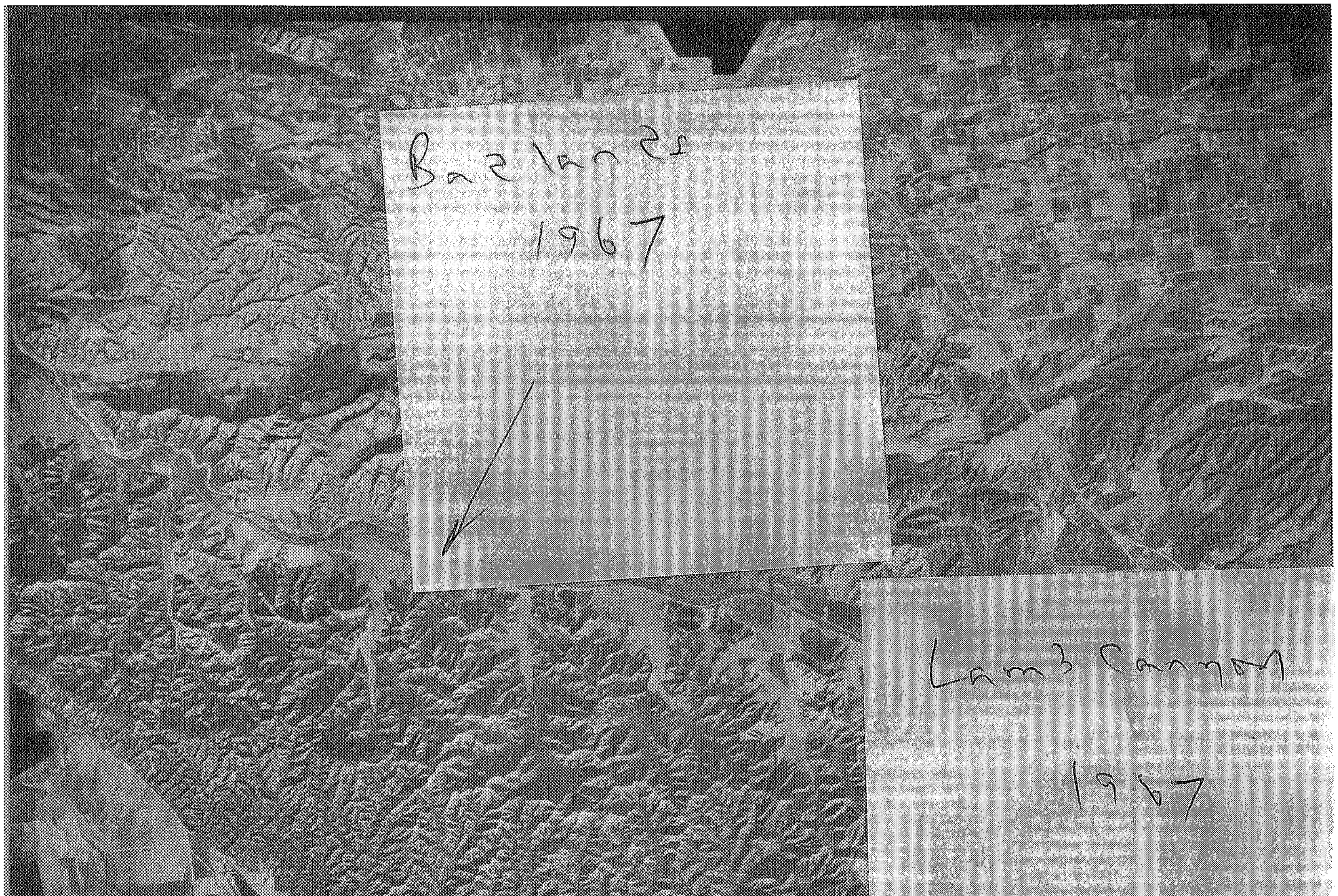


2-15-1951

Badlands

2-15-1951

Lamb Canyon



Badlands
1967

Lamb Canyon
1967

—1967—

Appendix D:
Photographs Taken During The Survey

Typical canyon view of the Badlands Landfill project area. View west from southwestern section of the property. Hilly terrain is very steep and the canyons are v-shaped with narrow trailways.

Typical view of canyon floor looking north toward the edge of the Landfill. Erosion is slowed by modern riprap and concrete channels.

View of terrain near the old De Anza motorcycle park showing wider canyon bottoms. The water table has dropped over the years such that many places exhibit deep cuts and rills, with alluvium lost downstream during storms. Most dirt roads in the project area are not maintained and are therefore impossible to drive upon, even with four-wheel drive vehicles.

Land within the old De Anza Motorcycle Park. This was once a grazed area with possible ranch buildings. All buildings have been removed.

Appendix E:
DPR 523 Form Sets

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

NRHP Status Code:
Other Listings
Review Code **Reviewer** **Date**

Primary #:
HRI #
Trinomial

Page 1 of 3 ***Resource Name or #: BL-1**

P1. Other Identifier:

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County: Riverside**

***b. USGS 7.5' Quad: El Casco, CA. Date: 1976 T 3 S ;R 2 W; SE ¼ of the SE ¼ of Section 5, S.B.B.M.**

c. Address: None **City: None** **Zip: None**

d. UTM: Zone 11 the borrow pit is centered at 489517mE/3755564mN and the road between SR60 and the pit begins to the south at 489791mE/3754975mN (pit location recorded using Garvin handheld and reconfirmed using GoogleEarth UTM setting) NAD 1983/1984

e. Other Locational Data: APN#422030014, 422030015, 422030011, 422030010. **Elevation:** 1960-1880 feet asl

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The site consists of a clearly delineated borrow pit located about 680 meters northwest of SR60 plus an access road that led from the freeway to the pit. The access road allowed fill to be taken from the pit site to that section of the freeway that used engineered fill to cross a deep yet unnamed drainage. Fill may have been taken from two places. The first is a clear scar exhibiting San Timoteo Formation loamy gravels. The first location is on a gradually sloping hillside overlooking an unnamed canyon, and the scar is about 300 by 60 feet wide (see photo page 3). We estimate that about 40,000 cubic yards of material was removed. The material was transported down a dirt road roughly 12 feet wide that had been carved into the canyon floor by bulldozers. The road was rough-hewn and not stabilized during construction, and has been washed out and is deeply scarred in places due to canyon flooding, making the trip today quite impossible. A second possible borrow pit is located west of the first on a narrow ridge south of a cliff and west of the first pit (see photo page 3). Another road extends westward from this possible pit area to another freeway overcrossing, but it is not certain whether or not that westerward road was actually built for borrow pit use. Historic aerials suggest the borrow pit was utilized in the 1950's.

***P3b. Resource Attributes:** (List attributes and codes) AH9

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #) View of borrow pit area toward the north.

***P6. Date Constructed/Age and Sources:** ☒ Historic ☐ Prehistoric ☐Both

***P7. Owner and Address:**
Riverside County Waste Management Department
14310 Frederick Street
Moreno Valley, CA. 92553

***P8. Recorded by:** (Name, affiliation, and address)
Michael H. Dice, M.A.
Michael Brandman Associates
621 Carnegie Drive, Suite #100
San Bernardino, CA. 92408

***P9. Date Recorded:** July 21, 2010

***P10. Survey Type:** (Describe) CEQA-level Cultural Resource Reconnaissance Survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Dice, M.H. and K.J. Lord. 2010. *Phase 1 Cultural Resource Assessment of The Badlands Landfill Expansion Project, Riverside County, California*. For the Riverside County Waste Management Department. On-file, Michael Brandman Associates. Dated August 5, 2010.

***Attachments:** ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record ☐ Other (List):

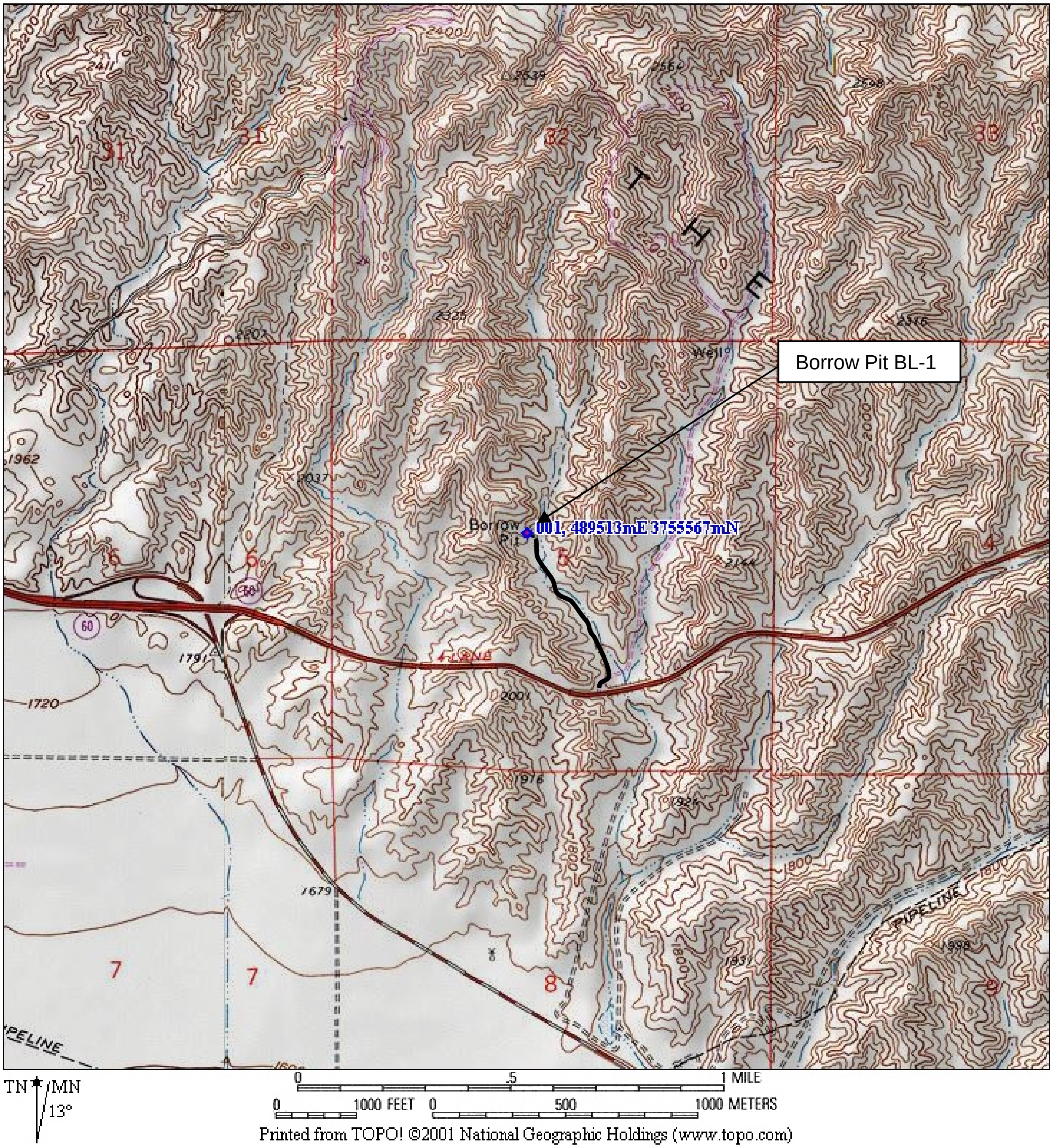
State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
LOCATION MAP

Primary #
HRI#
Trinomial:

Page 2 of 3

***Resource Name or #: BL-1**

MBA Project #2310.0004.0 USGS El Casco, CA. 7.5' topographic map



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NOTE: Borrow pit is located on the topo map and was relocated in the field. One road leading to the borrow pit from SR60 is clearly associated with the development of the pit after examining historic aerial photographs. This road is considered part of the site.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PHOTOGRAPHIC RECORD

Primary#:
HRI#:
Trinomial:

Page 3 of 3

***Resource Name or #: BL-1**

Image of borrow pit and road on GoogleEarth was taken in November 2009. The red arrows show the road between the pit and the freeway. The borrow pit pictured on page 1 of this dpr form set is shown, as is a secondary possible borrow pit on the ridge to the west.

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

PRIMARY RECORD

Primary #:
HRI #
Trinomial

NRHP Status Code:
Other Listings
Review Code **Reviewer** **Date**

Page 1 of 3 ***Resource Name or #: BL-2**

P1. Other Identifier: DeAnza Motorcycle Park

***P2. Location:** ☐ **Not for Publication** ☒ **Unrestricted** ***a. County: Riverside**

***b. USGS 7.5' Quad: El Casco, CA.** **Date: 1976** **T 2 S ;R 2 W;** **NE ¼ of the NW ¼ of Section 32, S.B.B.M.**

c. Address: None **City: None** **Zip: None**

d. UTM: Zone 11 center: 0489465mE/3757720mN NAD 1983/1984

e. Other Locational Data: none. **Elevation:** 2250-2400 feet asl

***P3a. Description:** (Describe resource and its major elements. Include design, materials, condition, alterations, size, setting, and boundaries) The De Anza motorcycle park property property was reviewed by staff using historic aerial photographs found on www.historicaerials.com and a site visit. The El Casco topo map shows the property held adits or borrow pits in the mid 1970's. In 1959, the property was being regularly disked or mowed as pasture and it is possible that a source of water, piped in or stored in tanks, was in use to water domestic animals. Earlier maps suggest the property may have held outbuildings associated with a farm or homestead near El Casco Lake. The large storage tanks and metal debris found on the property may have been used in the 1950's, then adapted for use by the motocycle enthusiasts. By 1967, the use of the property for pasture stopped at the property line (see page 3 of this DPR.) and use appeared minimal. By 1978, the flats in the drainage were cleared for the motorcycle riders park and much of the hillsides had been bladed by bulldozers. The cuts were probably made in the very early 1970's based on the condition of vegetation on the property today. In 1980, the photos show that the motorcycle park had been abandoned.

***P3b. Resource Attributes:** (List attributes and codes) AH9

***P4. Resources Present:** ☐ Building ☐ Structure ☐ Object ☒ Site ☐ District ☐ Element of District ☐ Other (Isolates, etc.)

P5b. Description of Photo: (View, date, accession #).

***P6. Date Constructed/Age and Sources:**
☒ Historic ☐ Prehistoric ☐Both

***P7. Owner and Address:**
Riverside County Waste Management Department
14310 Frederick Street
Moreno Valley, CA. 92553

***P8. Recorded by:** (Name, affiliation, and address)
Michael H. Dice, M.A.
Michael Brandman Associates
621 Carnegie Drive, Suite #100
San Bernardino, CA. 92408

***P9. Date Recorded:** July 21, 2010

***P10. Survey Type:** (Describe) CEQA-level Cultural Resource Reconnaissance Survey

***P11. Report Citation:** (Cite survey report and other sources, or enter "none.") Dice, M.H. and K.J. Lord. 2010. *Phase 1 Cultural Resource Assessment of The Badlands Landfill Expansion Project, Riverside County, California*. For the Riverside County Waste Management Department. On-file, Michael Brandman Associates. Dated August 5, 2010.

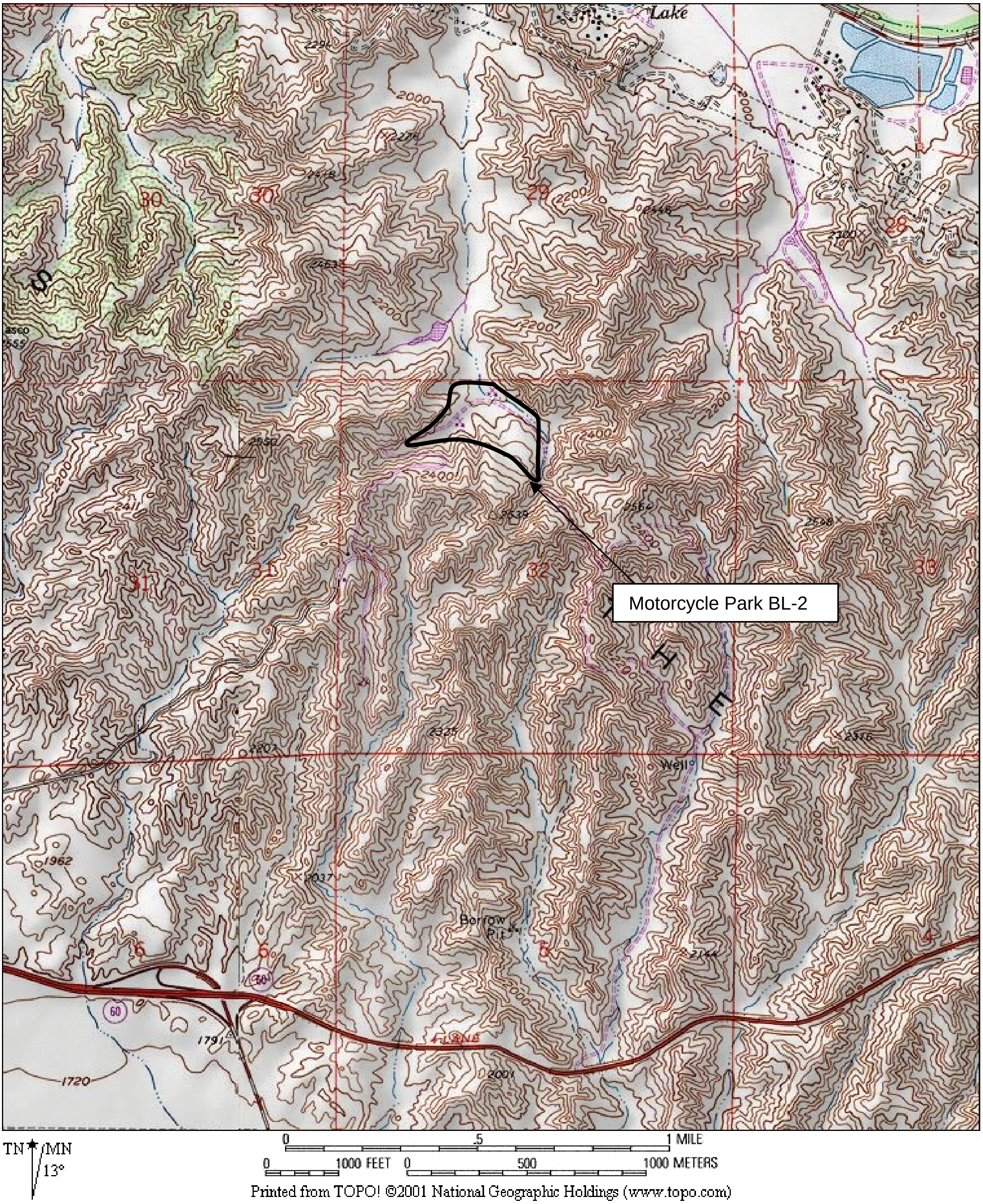
***Attachments:** ☐ NONE ☒ Location Map ☐ Sketch Map ☐ Continuation Sheet ☐ Building, Structure, and Object Record ☐ Archaeological Record ☐ District Record ☐ Linear Feature Record ☐ Milling Station Record ☐ Rock Art Record ☐ Artifact Record ☒ Photograph Record ☐ Other (List):

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION

LOCATION MAP

Primary #
HRI#
Trinomial:

Page 2 of 3 ***Resource Name or #: BL-2**



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NOTE: The motorcycle park is located on the Landfill property south of the Section 32 line. If impacted by Landfill development, the Park remnant should be evaluated and any earlier, 1950's components, relocated and examined.

DPR 523 (1/95) *Required information

State of California — The Resources Agency
DEPARTMENT OF PARKS AND RECREATION
PHOTOGRAPHIC RECORD

Primary#:
HRI#:
Trinomial:

***Resource Name or #: BL-2**

Image of former motorcycle park on GoogleEarth was taken in 2009.