GEOTECHNICAL AND PAVEMENT STUDY
PROPOSED RUNWAY 18-36 AND
TAXIWAY A/CONNECTORS RECONSTRUCTION
APPLE VALLEY AIRPORT (APV)
APPLE VALLEY, SAN BERNARDINO COUNTY, CALIFORNIA

KLF PROJECT #20154622.001A

April 10, 2015

April 10, 2015
Project No. 20154622.001A

C&S Engineers, Inc.
2020 Camino Del Rio North, Suite 1000
San Diego, California 92108

Attention: Arnie White, P.E., P.L.S.
Managing Engineer

Subject: Geotechnical and Pavement Study
Proposed Runway 18-36 and Taxiway A/Connectors Reconstruction
Apple Valley Airport (APV)
Apple Valley, San Bernardino County, California

Dear Mr. White:

Kleinfelder is pleased to present this report summarizing our geotechnical and pavement study for the proposed Runway 18-36, Taxiway A, and Connectors Reconstruction project at the Apple Valley Airport (APV) in Apple Valley, San Bernardino County, California. The purpose of our geotechnical study was to evaluate existing subsurface conditions at the site and provide geotechnical and pavement conclusions and recommendations for design and construction of the project. The conclusions and recommendations presented in this report are subject to the limitations presented in Section 6.

We appreciate the opportunity to be of service to you on this project. If you have any questions, comments or require additional information, please do not hesitate to contact the undersigned.

Respectfully submitted,

KLEINFELDER, INC.

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Principal Geotechnical Engineer

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A Report Prepared for:

C&S Engineers, Inc.
2020 Camino Del Rio North, Suite 1000
San Diego, California 92108

Geotechnical and Pavement Study
Proposed Runway 18-36 And
Taxiway A/Connectors Reconstruction
Apple Valley Airport (APV)
Apple Valley, San Bernardino County, California

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April10, 2015
Kleinfelder Project No: 20154622.001A

TABLE OF CONTENTS

TABLE OF CONTENTS

Section **Page**

1 INTRODUCTION

Kleinfelder was retained by C&S Engineers, Inc. to provide geotechnical and pavement engineering services for the proposed Runway 18-36, Taxiway A, and connectors reconstruction project at the Apple Valley Airport (APV) in Apple Valley, California. The location of the project site is presented as Figure 1, Site Vicinity Map. The scope of our services for this project was presented in our proposal entitled, "Proposal and Cost Estimate for Geotechnical Study/Pavement Design (Optional), Proposed Runway 18-36 Reconstruction Project, Apple Valley Airport, Apple Valley, San Bernardino County, California", dated January 28, 2015.

Kleinfelder previously performed geotechnical investigation for the AST fuel facility and apron reconstruction at the site. Results of our services and our recommendations were presented in the report entitled “Report of Preliminary Geotechnical Investigation, Proposed AST Fuel Facility/ Apron Reconstruction, Apple Valley Airport, Apple Valley, San Bernardino County, California,” dated October 26, 2011.

1.1 PROJECT DESCRIPTION

We understand that the project will consist of reconstruction of existing Runway 18-36, portion of Taxiway A, and Taxiway A-7. In addition, three taxiways (A-3, A-4, and B-2) will be relocated and two taxiways (A-5 and A-6) will be removed. All existing runway and taxiways consist of asphalt-concrete pavement. The new asphalt-concrete pavement section will be designed based on the Federal Aviation Administration (FAA) Aircraft Standard. Further, it is our understanding that the projected design aircraft is a Bombardier Challenger 600 with a maximum gross weight of 48,200 pounds. Other details pertaining to this project were not available at this time.

1.2 PURPOSE AND SCOPE

The purpose of our study was to evaluate general subsurface soil and pavement conditions along the project alignment and provide geotechnical and pavement conclusions and recommendations for design and construction of the proposed project. Our investigation and geotechnical design activities were conducted in general accordance with FAA Advisory Circular 150/5320-6E. A description of the scope of services performed for this project is presented below.

Task 1 - Literature Review

We have reviewed readily available geologic maps, geotechnical reports of work previously performed at and near the airport, and as-built plans. Gathered information was used to assist in our field exploration program and to evaluate geotechnical conditions at the site.

Task 2 –Pavement Condition Assessment and Pavement Design

A visual condition assessment was conducted to evaluate the condition of the existing pavement of Runway 18-36 and a portion of Taxiway A within the project limits. Based on the results of our field condition assessment and laboratory data, we developed recommendations for asphalt concrete pavement section(s) based on FAA design procedure and provided aircraft traffic and loads. A summary of our pavement condition assessment and detailed asphalt concrete pavement design recommendations are provided in Section 2.3 and 3.2 of the report, respectively.

Task 3 – Field Exploration

Subsurface conditions at the site were explored by drilling twenty seven exploratory borings to depths of approximately 10 feet below the existing ground surface (bgs). These boring were drilled using truck-mounted hollow-stem-auger drilling equipment. The approximate locations of the borings are presented on Figure 2, Site Plan.

Prior to commencement of the fieldwork, various geophysical techniques were used at the boring locations to identify potential conflicts with subsurface structures. Boring locations were also cleared for buried utilities through Underground Service Alert (USA).

The exploratory borings were advanced between March 3 and May 4, 2015 with truck-mounted drilling equipment equipped with hollow-stem augers provided by Cal-Pac Drilling of Calimesa, California. A Kleinfelder engineer supervised the field operations and logged the explorations in general accordance with Unified Soil Classification System (ASTM D 2487). Existing asphalt-concrete pavement and aggregate base thickness were measured and recorded, if encountered. Selected bulk and drive samples were retrieved and transported to our laboratory for further evaluation. The number of blows necessary to drive a Standard Penetration Test (SPT) sampler or a California-type sampler was recorded. Appendix A presents a description of the field exploration program, exploration logs, and a legend of terms and symbols used on the logs. Soil descriptions used on the logs result from field observations and data, as well as from

laboratory test data. Stratification lines on the logs represent the approximate boundary between soil types, and the actual transition may vary and can be gradual.

Task 4 - Laboratory Testing

Laboratory testing was performed on collected representative subgrade bulk and drive samples to substantiate field classifications and to provide engineering parameters for pavement design. Testing consisted of in-situ moisture/density, grain-size distribution, plasticity index, maximum density/optimum moisture content relationship for light load pavements based on the design aircraft, and California Bearing Ratio (CBR). The laboratory test results are presented in Appendix B and on the boring logs in Appendix A.

Task 4 - Report Preparation

Based on the results of our field investigation and laboratory testing, we have provided findings, conclusions, and recommendations concerning the following.

- Existing pavement section, including thickness of asphalt concrete and base at the boring locations.
- Discussion of general subsurface conditions as encountered in our field exploration;
- Results of laboratory tests (Appendix B) including CBR values of subgrade soil to be used for pavement design;
- Guidelines for earthwork construction including subgrade compaction requirements in accordance with FAA Advisory Circular 150/5320-6E, fill placement and compaction.
- Visual pavement condition assessment of the existing pavement.
- Asphalt concrete pavement section(s) based on FAA design procedure and provided aircraft traffic.

The report contains site map, boring location plan, logs of borings, laboratory test results, and site photographs.

2 SITE CONDITIONS

2.1 SITE DESCRIPTION

The Apple Valley Airport is located at 21600 Corwin Road in Apple Valley, California, as shown on Figure 1. The site is a relatively flat and currently occupied by a main terminal, fueling facility, two runways, two taxiways, and taxiway connectors. The area of the proposed pavement rehabilitation project consists of Runway 18-36, a southern portion of Taxiway A, and several Taxiway A and B connectors.

2.2 EXISTING PAVEMENT SECTIONS

In general, Runway 18-36 has approximately 4 inches of asphalt concrete pavement over 6 to 8 inches of base. Borings B-7 and B-15 were explored at previously patched asphalt, and the asphalt section is approximately 5 inches. In the southern portion of Taxiway A, the pavement consists of 3 inches of asphalt over 6 inches of base. At Boring B-26, the pavement section comprises of 3 inches of newer asphalt concrete over 4 inches of asphalt and underlain by approximately 6 inches of base. Table 1 presents a summary of the pavement section thickness (approximate) encountered during field exploration at the site.

Table 1

Structural Pavement Section Thicknesses

Boring	Location	Asphalt Concrete Pavement Thickness[1] (inches)	Base (inches)
B-1	Proposed Taxiway B-2	None	None
B-2	Proposed Taxiway B-2	None	None
B-3	Proposed Taxiway A-4	None	None
B-4	Proposed Taxiway A-4	None	None
B-5	Proposed Taxiway A-3	None	None
B-6	Proposed Taxiway A-3	None	None
B-7	Runway 18-36	5*	6
B-7-Alt	Taxiway A-7	3.5	6
B-8	Runway 18-36	4	6
B-9	Runway 18-36	3.5	6
B-10	Runway 18-36	4	6
B-11	Runway 18-36	4	8
B-12	Runway 18-36	4	7
B-13	Runway 18-36	4	7
B-14	Runway 18-36	4	8
B-15	Runway 18-36	5*	6
B-16	Runway 18-36	4	6
B-17	Runway 18-36	4	6
B-18	Runway 18-36	4	8
B-19	Runway 18-36	4	6
B-20	Runway 18-36	4	8
B-21	Runway 18-36	4	6
B-22	Runway 18-36	4	8
B-23	Runway 18-36	4	6
B-24	Taxiway A	3	5
B-25	Taxiway A	3	6
B-26	Taxiway A	3” overlay over 4”	6

*Patched asphalt

2.3 PAVEMENT CONDITION ASSESSMENT

The existing pavement conditions were observed at the location of each exploratory boring. Limited visual observations of the existing pavement were made on February 19, 2015. In generally, the pavement at Runway 18-36 and Taxiway A7 are in poor condition with medium-to high-severity longitudinal and traverse cracks throughout. The Foreign Object Debris (FOD) potential is also moderate to high due to potholes and severe spalling along existing cracks. Given the age of the pavement and the degree of cracking observed, the pavement appears to have exceeded its design structural life. At the portion of Taxiway A within the project limits, low to medium severity longitudinal and traverse cracks were observed. Photographs of the existing pavement conditions are shown on Figures 3 to 7, Site Photographs. A detailed pavement condition survey was not included in our scope of services.

2.4 SUBSURFACE SOIL CONDITIONS

2.4.1 General

Near-surface soil deposits encountered during our explorations consisted primarily of loose to very dense silty sand, clayey sand, and sand with silt. The measured dry density in the upper 5-feet of subgrade soils varied from 108 to 135 pounds per cubic foot (pcf) with an average of 125 pcf. The water contents of the soil in the upper 5 feet varied between 2 and 7 percent with an average of 5.5 percent. The in-situ moisture contents of the existing near-surface subgrade soils were generally found to be below optimum moisture contents along the project alignment.

Using the laboratory maximum dry density values obtained based on the ASTM Test Method ASTM D698, the calculated relative compaction of the existing near-surface subgrade materials (upper 5 feet) ranges from about 84 to 105 percent. Generally, the in-situ dry density of the existing near-surface subgrade soils were generally found to be greater than 97 percent relative compaction of the maximum dry density based on ASTM D698. Please note that due to the nature of the on-site soils and potential disturbance of driven samples, the actual in-situ dry densities (and corresponding relative compactions) may be greater.

A detailed description of our field investigation and logs of borings are included in Appendix A of this report. All laboratory tests performed for this study and their results are included in Appendix B of this report.

2.4.2 Expansion Characteristics

Expansive soils are characterized by their ability to undergo significant volume change (shrink or swell) due to variations in moisture content. Changes in soil moisture content can result from rainfall, landscape irrigation, utility leakage, perched groundwater, drought, or other factors and may cause unacceptable settlement or heave of pavements supported over these materials. Depending on the extent and location below finished subgrade, these soils could have a detrimental effect on the proposed construction.

Based on the nature of soil deposits (granular soils) underlying the site, we believe that the expansion potential of the on-site soils is low to very low. The expansion potential of the final subgrade soils following all earthwork operations should be evaluated to confirm or modify the findings presented herein.

2.5 GROUNDWATER CONDITIONS

Based on the visual observations of the soils retrieved from the borings, groundwater was not encountered at the time of our field exploration. According to the State of California, groundwater levels at the project site are located at depths greater than 250 feet below existing grades. Fluctuations of the groundwater level should be anticipated during periods of heavy precipitation and/or irrigation.

3 CONCLUSIONS AND RECOMMENDATIONS

3.1 GENERAL

Based on the results of our field exploration, laboratory testing and engineering analyses conducted during this study, it is our professional opinion that the proposed project is geotechnically feasible, provided the recommendations presented in this report are incorporated into the project design and construction.

The following opinions, conclusions, and recommendations are based on the properties of the materials encountered in the borings, the results of the laboratory-testing program, and our engineering analyses performed. Our recommendations regarding the geotechnical and pavement aspects of the design and construction of the project are presented in the following sections.

3.2 PAVEMENT DESIGN CONSIDERATIONS

3.2.1 General

The proposed project will include reconstruction of flexible pavement for Runway 18-36 and a portion of Taxiway A as well as construction of new flexible pavement for the proposed Connectors. Two flexible pavement section design alternatives are presented in the following sections. The flexible pavement sections were designed in accordance with FAA pavement design procedures, AC 150/5320-6E, using FAA Rigid and Flexible Iterative Elastic Layer Design (FAARFIELD), version 1.305. The design inputs and summaries used for the pavement design are presented in Appendix C.

3.2.2 New Flexible Pavement

The existing pavement may be removed and replaced with a new flexible pavement section. The new full depth flexible pavement section is described in Table 2. Prior to placement of P-209 Crushed Aggregate Base, pavement subgrade should be prepared in accordance with Section 4.2.1.

Table 2 Full Depth Flexible Pavement Design Recommendation		
Layer Type	Modulus (psi)	Layer Thickness (inch)
P-401/P-403 HMA Surface	200,000	6
P-209 Cr Ag	29,540	12(1)
Total Thickness		18

3.2.3 Alternative Flexible Pavement

As an alternative to full depth removal and reconstruction, the existing asphalt and the upper 4 inches of base may be pulverized in place and recompacted as the subbase for new overlaying flexible pavement. The existing flexible pavement to be pulverized and recompacted is designed as a layer of undefined material with modulus of 30,000 pounds per square inch (psi). The alternative flexible pavement design recommendation is described Table 3:

Table 3 Alternative Pavement Design Recommendation		
Layer Type	Modulus (psi)	Layer Thickness (inch)
P-401/P-403 HMA Surface	200,000	5
P-209 Cr Ag	56,100	6
Undefined (Pulverized and recompacted asphalt and base)	30,000	Pulverized thickness (4" AC and 4" base)
Additional Thickness		11

The alternative flexible pavement will result in a finish pavement grade raise of approximately 11 inches provided that the existing asphalt and base layers can be pulverized and recompacted in place. No additional overexcavation or earthwork is needed for the alternative design. Prior to placement of P-209 Crushed Aggregate Base, pulverized and recompacted subbase should be prepared in accordance with Section 4.2.2.

3.2.4 Design Life

Proposed flexible pavement alternatives are evaluated for a 20-year design life in accordance with FAA AC 150/5320-6E.

3.2.5 Subgrade Characteristics

The near-surface subgrade soils encountered during our field exploration were generally comprised of silty sand, clayey sand, and sand with silt. These soils are classified as SM, SC, and SP-SM, respectively using the Unified Soil Classification System. Based on results of our testing, all subgrade soils should be considered as non-cohesive with respect to the FAA criteria for evaluating compaction control. Laboratory CBR tests were conducted on selected soil samples with results summarized in Table 4 below. Based on the CBR test results and our experience with local soils in the project area, a design CBR of 4 is appropriate for the subgrade soils, sampled from a depth of 1 to 4 feet below the existing pavement.

Table 4 Pavement Supporting Capacity

Boring	Depth (ft.)	Soil Type	CBR 95% Relative Compaction	CBR 100% Relative Compaction
B-1	0-5	SC	4 (2)	11 (1)
B-6	0-5	SM	8 (2)	22 (1)
B-22	1-5	SM	6 (2)	15 (1)

CBR values are based on laboratory curves for 0.1-inch penetration and maximum dry density per ASTM D698

(1) CBR values are based on interpolation of laboratory test curves.

(2) CBR values are based on extrapolation of laboratory test curves.

3.2.6 Aircraft Fleet Mix and Traffic Forecasts

Aircraft traffic data provided to us by C&S Engineers for the project is presented on Table 5. An annual growth of 3 percent is assumed. The data was used for the asphalt pavement design.

Table 5
Runway 18-36 Aircraft Traffic

Aircraft	Annual Departures	% Annual Growth	20 year Design Annual Departures
Baron-E-55	10,300	3	267,800
Bonanza-F-33A	10,300	3	267,800
Citation-525	10,300	3	267,800
Sngl Whl- 12.5	27,130	3	705,380
BeechJet-400A	5,300	3	137,800
Citation-X	1,000	3	26,000
Challenger-CL-604	70	3	1,820

4 CONSTRUCTION RECOMMENDATIONS

4.1 GENERAL

The following recommendations should be used for construction of the project. The construction should be performed in accordance with FAA Advisory Circular 150/5370-10G. Specific construction recommendations are presented for each of the flexible pavement sections below.

4.2 SITE PREPARATION

Prior to general site grading, existing vegetation, organic topsoil, flexible asphalt pavement, debris, and oversized materials greater than 3 inches in maximum dimension should be removed, stripped, and disposed of off-site. Existing utility pipelines or conduits that extend beyond the limits of the proposed construction and are to be abandoned in place, should be plugged with non-shrinking cement grout to prevent migration of soil and/or water.

Following excavation to pavement subgrade elevation, we recommend that the exposed subgrade be proof-rolled with heavy construction equipment (e.g. loader or smooth-drum roller) to disclose areas of soft and yielding material. Where soft and yielding material is observed, it should be overexcavated and replaced as engineered fill. After proof-rolling and/or prior to placement of fill, the subgrade should be scarified to a depth of 6 to 8 inches, moisture conditioned, and recompacted to at least 95 percent relative compaction of the maximum dry density based on ASTM D698. The moisture content of the fill should be maintained at within 2 percent of optimum moisture content during compaction. The proof-rolling should extend beyond the proposed pavement configuration a horizontal distance of at least 2 feet.

The exposed subgrade should be observed by a representative of Kleinfelder to evaluate the presence of satisfactory materials at design elevations. If unsatisfactory material, such as soft or disturbed soil, debris, or otherwise unsuitable soil, is present at the base of the excavation, it should be overexcavated and replaced with engineered fill to the depth determined by the Kleinfelder representative.

4.2.1 New Flexible Pavement

In general, for any new pavement (proposed Connectors) and the full depth reconstruction of flexible pavement, the subgrade soil should be overexcavated to a depth of at least 18 inches below the bottom of the new aggregate base layer to provide a uniform subgrade for the

proposed pavement. The subgrade should be moisture conditioning to within two percent of the optimum moisture content and re-compacted to meet compaction criteria as specified in Section 4.3 of this report. The pavement and aggregate base should be prepared and compacted as specified in Section 4.4 of this report. All reference to optimum moisture content and relative compaction should be in accordance with ASTM D698.

The existing asphalt pavement after removal can be reused as crushed miscellaneous base materials for new vehicular access roads provided the gradation and quality requirements specified in the Section 200-2 of the current edition of the Standard Specifications for Public Works Construction (Greenbook) are met. The crushed miscellaneous base may not be reused as Crushed Aggregate Base for any airfield pavements.

4.2.2 Flexible Pavement Alternative

For the existing Runway 18-36 and the southern portion of Taxiway A, the existing pavement and base may be pulverized in place and recompacted as subbase for overlying new flexible pavement sections. The pulverized material should be rolled with a vibratory smooth drum roller, or equivalent. The subbase should be recompacted to at least 100 percent relative compaction of the maximum dry density based on ASTM D698 to a moisture content within 2 percent of the optimum moisture content. Following recompaction, the exposed subbase should be observed by a representative of Kleinfelder to evaluate the presence of satisfactory materials prior to new base placement. If unsatisfactory material, such as soft or disturbed soil, debris, or otherwise unsuitable material, is present at the subbase, it should be overexcavated and replaced with engineered fill to the depth determined by the Kleinfelder representative.

4.3 SUBGRADE COMPACTION REQUIRMENTS

As discussed in Section 2.4 of this report, the near-surface subgrade soils encountered during our field exploration were generally comprised of medium dense to dense silty sand, clayey sand, and sand with silt. Based on results of our testing, all subgrade soils should be considered as non-cohesive with respect to the FAA criteria for evaluating compaction control. Based on laboratory testing results, the in-situ dry density of the soils in the upper 3 feet below existing grade were generally found to be greater than 97 percent relative compaction of the maximum dry density based on ASTM D698. The existing in-situ density of the subgrade soils at depths between 3 to 5 feet below existing grade within the proposed project alignment meets the FAA subgrade in-place density requirements. In order to provide a uniform subgrade for the

proposed pavement, the compaction requirements are presented in Table 5 below based on the design aircraft of gross weight of 48,200 pounds and dual gear configuration. The moisture content should be maintained at within 2 percent of the optimum moisture content during compaction.

Table 6 Subgrade Compaction Requirements	
Percent Compaction	**Depth of Compaction (inches)**
100	12
95	12-26

4.4 PAVEMENT SECTION COMPACTION REQUIRMENTS

The flexible pavement sections should be prepared and compacted in accordance with FAA Advisory Circular 150/5370-10G. The pavement design sections provided above are contingent on the following recommendations being implemented during construction.

- The subgrade for new pavements and subbase for alternative design flexible pavements should be prepared as recommended in Section 4.2.1 and Section 4.2.2, respectively.
- Subgrade soils should be in a stable, non-pumping condition at the time the P-209 Crushed Aggregate Base materials are placed and compacted.
- Crushed Aggregate Base materials should be compacted to at least 100 percent relative compaction (ASTM D698).
- Adequate drainage (both surface and subsurface) should be provided such that the subgrade soils and aggregate base materials are not allowed to become wet.
- Crushed Aggregate Base should meet current FAA specifications for P-209 Crushed Aggregate Base.
- Hot Mix Asphalt (HMA) pavement materials and placement methods should meet current FAA specifications for flexible surface course.

Pavement sections provided above are based on the soil conditions encountered during our field investigation, our assumptions regarding final site grades, and limited laboratory testing.

4.5 ENGINEERED FILL

We recommend that soil compaction control be performed in accordance with the latest edition of ASTM D698. We anticipate that most of the on-site soils may be reusable as engineered fill, once oversized materials greater than 3 inches in diameter have been removed and after any

organic debris are cleared and disposed off-site. Fill should be placed in lifts no greater than 8 inches thick, loose measurement, and should be compacted in accordance with Subgrade Compaction Requirements presented in Section 4.3 of this report.

Import materials, if required, should be non-plastic and be uniformly graded with no greater than 30 percent of the particles passing the No. 200 sieve and no particles greater than 3 inches in dimension. We recommend that the contractor will be responsible to assure that all import soil be free of environmentally regulated substances. All earthwork operations should be observed and tested by qualified geotechnical personnel.

4.6 EXCAVATION CHARACTERISTICS

The borings at the site were advanced using a truck-mounted drilling equipment with hollow-stem augers. Drilling was completed with little to moderate effort through the upper soils. Conventional heavy-duty earth moving equipment should be capable of performing the excavations required for this project.

4.7 SITE DRAINAGE

It is important that drainage away from the pavement be provided to prevent ponding and/or saturation of the soils in the vicinity of improvements. We recommend that the site be graded to carry surface water away from the improvements and that positive measures be implemented to carry away runoff. Poor perimeter or surface drainage could cause reduced subgrade support. It is recommended that site drainage be designed by the project civil engineer.

5 ADDITIONAL SERVICES

5.1 PLANS AND SPECIFICATIONS REVIEW

We recommend that Kleinfelder perform a general review of the project plans and specifications before they are finalized to verify that our geotechnical and pavement recommendations have been properly interpreted and implemented during design. If we are not accorded the privilege of performing this review, we can assume no responsibility for misinterpretation of our recommendations.

5.2 CONSTRUCTION OBSERVATION AND TESTING

The construction process is an integral design component with respect to the geotechnical aspects of a project. Because geotechnical engineering is an inexact science due to the variability of natural processes, and because we sample only a limited portion of the soils affecting the performance of the proposed structure, unanticipated or changed conditions can be encountered during grading. Proper geotechnical observation and testing during construction are imperative to allow the geotechnical engineer the opportunity to verify assumptions made during the design process. Therefore, we recommend that Kleinfelder be retained during the construction of the proposed pavement rehabilitation to observe compliance with the design concepts and geotechnical recommendations, and to allow design changes in the event that subsurface conditions or methods of construction differ from those assumed while completing this study.

Our services are typically needed at the following stages of grading.

- After demolition;
- During grading;
- After the overexcavation, but prior to scarification;
- During utility trench backfill; and
- During base placement and paving.

6 LIMITATIONS

This geotechnical study has been prepared for the exclusive use of C&S Engineers and their agents for specific application to the proposed Runway 18-36, Taxiway A/Connectors Reconstruction project the Apple Valley Airport located in Apple Valley, California. The findings, conclusions and recommendations presented in this report were prepared in accordance with generally accepted geotechnical engineering practice. No other warranty, express or implied, is made.

The scope of services was limited to a background data review and the field exploration described in Section 1.2. It should be recognized that definition and evaluation of subsurface conditions are difficult. Judgments leading to conclusions and recommendations are generally made with incomplete knowledge of the subsurface conditions present due to the limitations of data from field studies. The conclusions of this assessment are based on our field exploration and laboratory testing programs, and engineering analyses.

Kleinfelder offers various levels of investigative and engineering services to suit the varying needs of different clients. Although risk can never be eliminated, more detailed and extensive studies yield more information, which may help understand and manage the level of risk. Since detailed study and analysis involves greater expense, our clients participate in determining levels of service, which provide information for their purposes at acceptable levels of risk. The client and key members of the design team should discuss the issues covered in this report with Kleinfelder, so that the issues are understood and applied in a manner consistent with the owner's budget, tolerance of risk and expectations for future performance and maintenance.

Recommendations contained in this report are based on our field observations and subsurface explorations, limited laboratory tests, and our present knowledge of the proposed construction. It is possible that soil or groundwater conditions could vary between or beyond the points explored. If soil or groundwater conditions are encountered during construction that differ from those described herein, the client is responsible for ensuring that Kleinfelder is notified immediately so that we may reevaluate the recommendations of this report. If the scope of the proposed construction, including the aircraft fleet mix or locations of the improvements, changes from that described in this report, the conclusions and recommendations contained in this report are not considered valid until the changes are reviewed, and the conclusions of this report are modified or approved in writing, by Kleinfelder.

The scope of services for this subsurface exploration and geotechnical report did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous substances in the soil, surface water, or groundwater at this site.

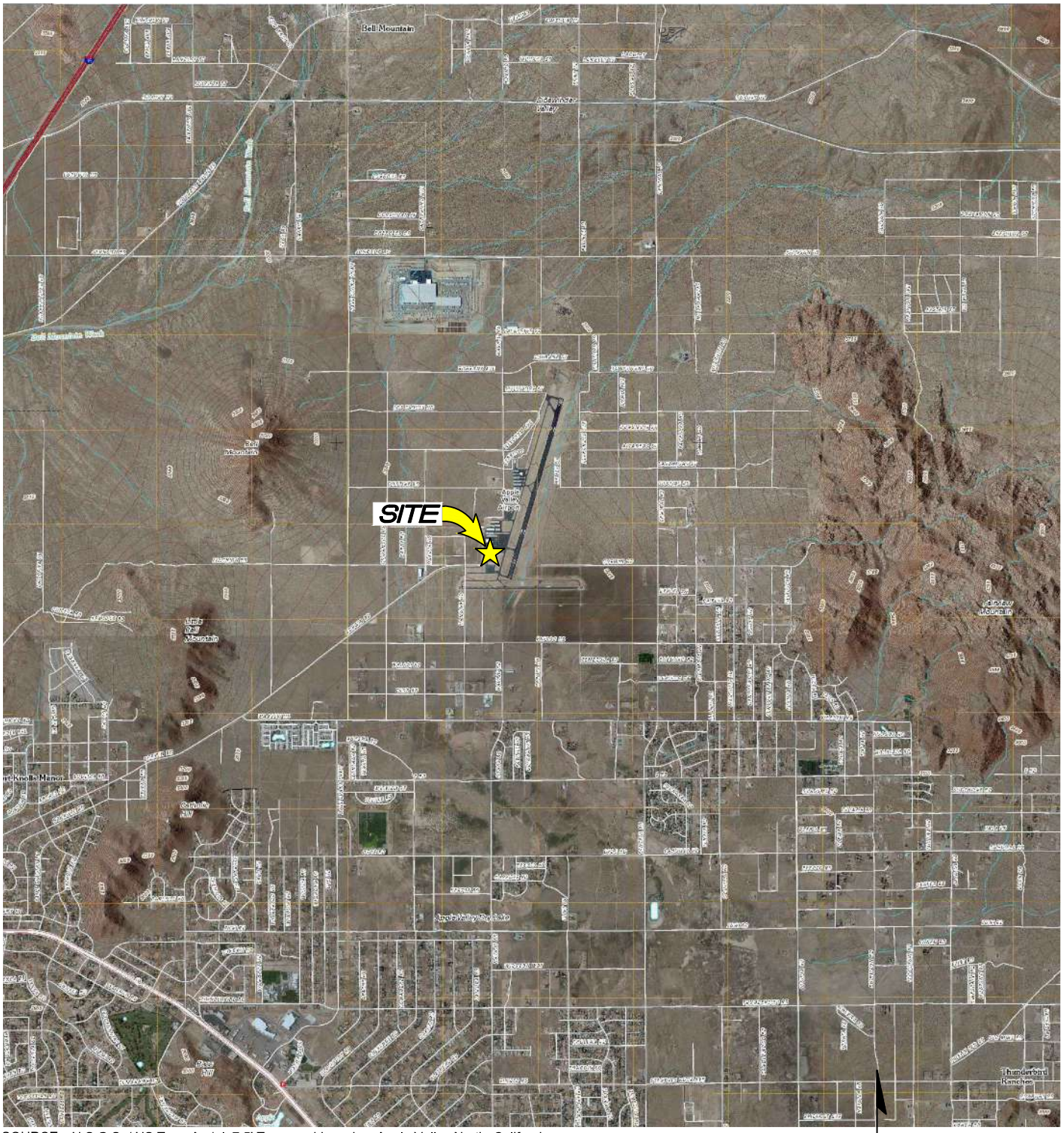
Kleinfelder cannot be responsible for interpretation by others of this report or the conditions encountered in the field. Kleinfelder must be retained so that all geotechnical aspects of construction will be monitored on a full-time basis by a representative from Kleinfelder, including site preparation, and placement of engineered fill and pavement. These services provide Kleinfelder the opportunity to observe the actual soil and groundwater conditions encountered during construction and to evaluate the applicability of the recommendations presented in this report to the site conditions. If Kleinfelder is not retained to provide these services, we will cease to be the engineer of record for this project and will assume no responsibility for any potential claim during or after construction on this project. If changed site conditions affect the recommendations presented herein, Kleinfelder must also be retained to perform a supplemental evaluation and to issue a revision to our original report.

This report, and any future addenda or reports regarding this site, may be made available to bidders to supply them with only the data contained in the report regarding subsurface conditions and laboratory test results at the point and time noted. Bidders may not rely on interpretations, opinion, recommendations, or conclusions contained in the report. Because of the limited nature of any subsurface study, the contractor may encounter conditions during construction which differ from those presented in this report. In such event, the contractor should promptly notify the owner so that Kleinfelder's geotechnical engineer can be contacted to confirm those conditions. We recommend the contractor describe the nature and extent of the differing conditions in writing and that the construction contract include provisions for dealing with differing conditions. Contingency funds should be reserved for potential problems during earthwork and pavement construction.

This report may be used only by the client and only for the purposes stated, within a reasonable time from its issuance, but in no event later than one year from the date of the report. Land use, site conditions (both on site and off site) or other factors may change over time, and additional work may be required with the passage of time. Any party, other than the client who wishes to use this report shall notify Kleinfelder of such intended use. Based on the intended use of this report and the nature of the new project, Kleinfelder may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements by the client or anyone else will release Kleinfelder from any liability resulting from the use of this report by any

unauthorized party and the client agrees to defend, indemnify, and hold harmless Kleinfelder from any claims or liability associated with such unauthorized use or non-compliance.

FIGURES



SOURCE: U.S.G.S. / US Topo Aerial, 7.5' Topographic series, Apple Valley North, California Quadrangle 2012.

N

2,000 1,000 0 2,000

APPROXIMATE SCALE (feet)

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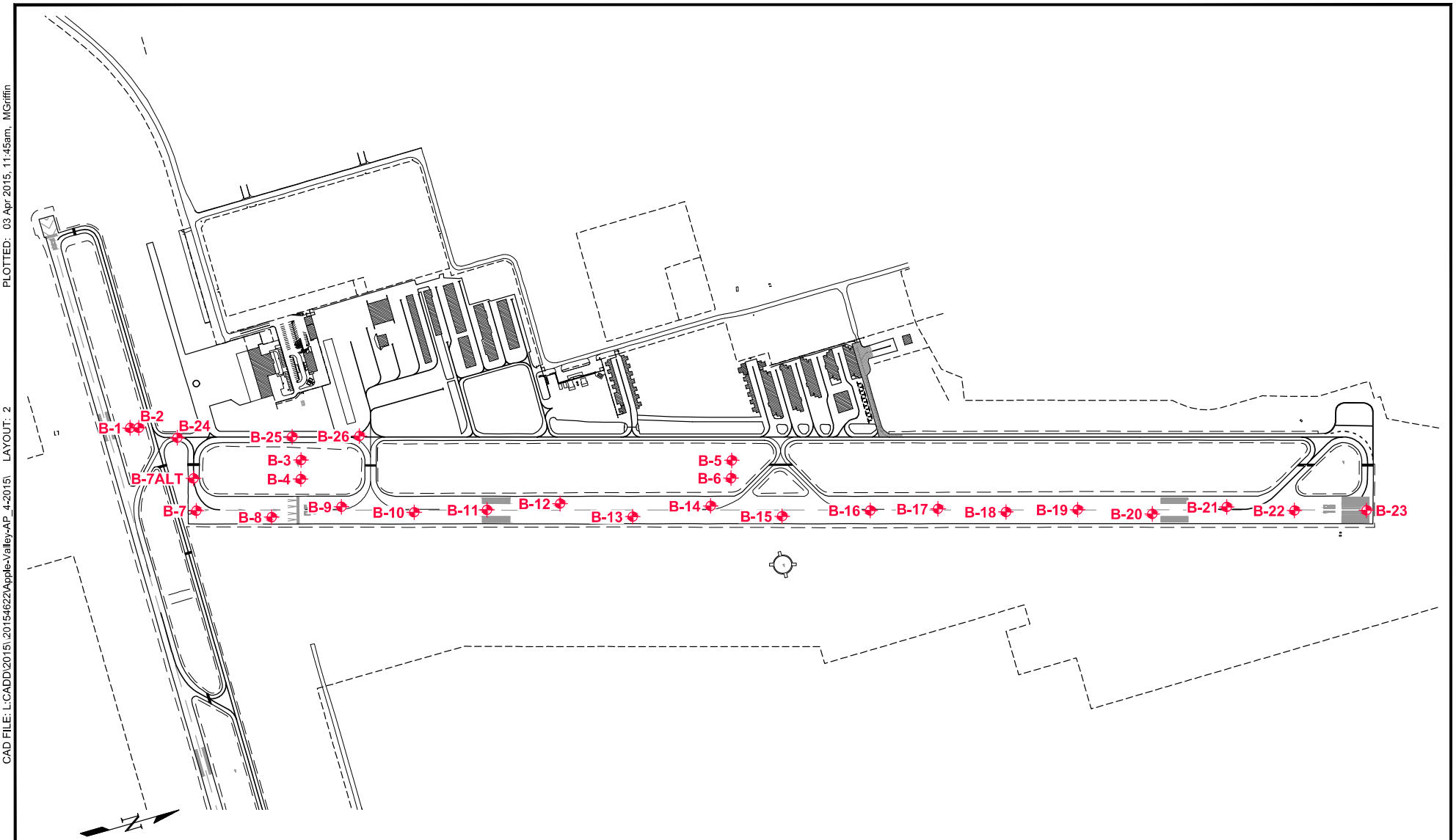
DRAWN BY:	MRG
CHECKED BY:	SK
FILE NAME:	20154622-fig1_SVM.dwg

SITE VICINITY MAP

APPLE VALLEY AIRPORT
RUNWAY 18-36 AND TAXIWAY A RECONSTRUCTION
APPLE VALLEY, CALIFORNIA

FIGURE
1

PLOTTED: 03 Apr 2015, 11:44am, MGriffin
CAD FILE: C:\CADD\2015\20154622\Apple-Valley-AP_4-2015\ LAYOUT: 1
LONG BEACH, CA



500 250 0 500

APPROXIMATE SCALE (feet)

EXPLANATION

B-26 APPROXIMATE BORING LOCATION

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PROJECT NO.	20154622
DRAWN:	3/2015
DRAWN BY:	MRG
CHECKED BY:	SK
FILE NAME:	20154622-fig2_SP-BLE.dwg

SITE PLAN

APPLE VALLEY AIRPORT
RUNWAY 18-36 AND TAXIWAY A RECONSTRUCTION
APPLE VALLEY, CALIFORNIA

FIGURE
2

CAD FILE: L:\CADD\2015\20154622\Apple-Valley-AP_4-2015\ LAYOUT: 2 PLOTTED: 03 Apr 2015, 11:45am, MGriffin

ATTACHED IMAGES:
ATTACHED XREFS:
LONG BEACH, CA

Medium surface raveling observed on Runway 18-36

Low to medium sever longitudinal and transverse cracking on Runway 18-36

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	SITE PHOTOGRAPHS Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE 3

Spalling observed along the cracking on Runway 18-36

Low to medium sever longitudinal and transverse cracking on Runway 18-36

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	SITE PHOTOGRAPHS Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE 4

FOD potential with high severity longitudinal cracking

Pothole observed on Runway 18-36

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	SITE PHOTOGRAPHS Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE 5

Pothole observed on Runway 18-36 with high severity longitudinal cracking

Large patching on Runway 18-36

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	SITE PHOTOGRAPHS Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE 6

Low to medium sever longitudinal and transverse cracking on Runway 18-36

Low to medium sever longitudinal and transverse cracking on the southern portion of Taxiway A

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	SITE PHOTOGRAPHS Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE 7

APPENDIX A

FIELD EXPLORATIONS

APPENDIX A
FIELD EXPLORATION

GENERAL

Our field exploration program consisted of a site reconnaissance, drilling twenty seven borings, at the project site between March 3 and March 4, 2015. Prior to commencement of the fieldwork, various geophysical techniques were used at the boring locations in order to identify potential conflicts with subsurface structures. The boring locations were also cleared for buried utilities through Underground Service Alert (USA).

All borings were drilled to depth of approximately 10 feet below ground surface (bgs). The borings were drilled by California Pacific (CalPac) Drilling of Calimesa, California with a (Mobile B53) truck-mounted, hollow stem auger (HSA) drill rig. The approximate locations of the borings are presented on Figure 2, Site Plan.

The logs for the Borings are presented as Figure A-3 through A-29. An explanation to the log is presented as Figure A-1 and A-2. The Log of Boring describes the earth materials encountered, samples obtained and show field and laboratory tests performed. The log also shows the location, boring number, drilling date and the name of the drilling subcontractor. The borings were logged by a Kleinfelder engineer using the Unified Soil Classification System. The boundaries between soil types shown on the log are approximate because the transition between different soil layers may be gradual. Bulk and drive samples of selected earth materials were obtained from the borings.

A California-type sampler was used to obtain drive samples of the soil encountered. This sampler consists of a 3-inch O.D., 2.4-inch I.D. split barrel shaft that is pushed or driven a total of 18 inches into the soil at the bottom of the boring. The soil was retained in six 1-inch brass rings for laboratory testing. An additional 2 inches of soil from each drive remained in the cutting shoe and was usually discarded after visually classifying the soil. The sampler was driven using a 140-pound hammer falling 30 inches. The total number of blows required to drive the sampler the final 12 inches is termed blow count and is recorded on the Log of Boring.

Samples were also obtained using a Standard Penetration Sampler (SPT). This sampler consists of a 2-inch O.D., 1⅜-inch I.D. split barrel shaft that is advanced into the soils at the bottom of the drill hole a total of 18 inches. The sampler was driven using a 140-pound hammer falling 30 inches. The total number of hammer blows required to drive the sampler the final 12

inches is termed the blow count (N) and is recorded on the Log of Boring. The procedures we employed in the field are generally consistent with those described in ASTM Standard Test Method D1586.

Bulk samples of the surface soils were retrieved directly from the auger cuttings.

SAMPLE/SAMPLER TYPE GRAPHICS

BULK SAMPLE

CALIFORNIA SAMPLER
(3 in. (76.2 mm.) outer diameter)

STANDARD PENETRATION SPLIT SPOON SAMPLER
(2 in. (50.8 mm.) outer diameter and 1-3/8 in. (34.9 mm.) inner diameter)

GROUND WATER GRAPHICS

WATER LEVEL (level where first observed)

WATER LEVEL (level after exploration completion)

WATER LEVEL (additional levels after exploration)

OBSERVED SEEPAGE

NOTES

- The report and graphics key are an integral part of these logs. All data and interpretations in this log are subject to the explanations and limitations stated in the report.
- Lines separating strata on the logs represent approximate boundaries only. Actual transitions may be gradual or differ from those shown.
- No warranty is provided as to the continuity of soil or rock conditions between individual sample locations.
- Logs represent general soil or rock conditions observed at the point of exploration on the date indicated.
- In general, Unified Soil Classification System designations presented on the logs were based on visual classification in the field and were modified where appropriate based on gradation and index property testing.
- Fine grained soils that plot within the hatched area on the Plasticity Chart, and coarse grained soils with between 5% and 12% passing the No. 200 sieve require dual USCS symbols, ie., GW-GM, GP-GM, GW-GC, GP-GC, GC-GM, SW-SM, SP-SM, SW-SC, SP-SC, SC-SM.
- If sampler is not able to be driven at least 6 inches then 50/X indicates number of blows required to drive the identified sampler X inches with a 140 pound hammer falling 30 inches.

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

COARSE GRAINED SOILS (More than half of material is larger than the #200 sieve)	**GRAVELS** (More than half of coarse fraction is larger than the #4 sieve)	CLEAN GRAVEL WITH <5% FINES	Cu ≥4 and 1≤Cc≤3		**GW**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
			Cu <4 and/ or 1>Cc >3		**GP**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE OR NO FINES
		GRAVELS WITH 5% TO 12% FINES	Cu ≥4 and 1≤Cc≤3		**GW-GM**	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GW-GC	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
			Cu <4 and/ or 1>Cc >3		**GP-GM**	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE FINES
					GP-GC	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES WITH LITTLE CLAY FINES
		GRAVELS WITH > 12% FINES			**GM**	SILTY GRAVELS, GRAVEL-SILT-SAND MIXTURES
					GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
					GC-GM	CLAYEY GRAVELS, GRAVEL-SAND-CLAY-SILT MIXTURES
	SANDS (More than half of coarse fraction is smaller than the #4 sieve)	CLEAN SANDS WITH <5% FINES	Cu ≥6 and 1≤Cc≤3		**SW**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
			Cu <6 and/ or 1>Cc >3		**SP**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE OR NO FINES
		SANDS WITH 5% TO 12% FINES	Cu ≥6 and 1≤Cc≤3		**SW-SM**	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SW-SC	WELL-GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
			Cu <6 and/ or 1>Cc >3		**SP-SM**	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE FINES
					SP-SC	POORLY GRADED SANDS, SAND-GRAVEL MIXTURES WITH LITTLE CLAY FINES
		SANDS WITH > 12% FINES			**SM**	SILTY SANDS, SAND-GRAVEL-SILT MIXTURES
					SC	CLAYEY SANDS, SAND-GRAVEL-CLAY MIXTURES
					SC-SM	CLAYEY SANDS, SAND-SILT-CLAY MIXTURES

FINE GRAINED SOILS (More than half of material is smaller than the #200 sieve)	SILTS AND CLAYS (Liquid Limit less than 50)	**ML**	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS, SILTS WITH SLIGHT PLASTICITY
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		CL-ML	INORGANIC CLAYS-SILTS OF LOW PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
		OL	ORGANIC SILTS & ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (Liquid Limit greater than 50)	**MH**	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILT
		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
		OH	ORGANIC CLAYS & ORGANIC SILTS OF MEDIUM-TO-HIGH PLASTICITY

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REVISED:	3/25/2015

GRAPHICS KEY

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

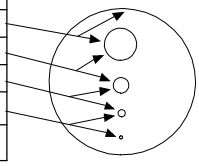
PLATE

A-1

KLEINFELDER - 2 Ada, Suite 250 | Irvine, CA 92618 | PH: 949.727.4466 | FAX: 949.727.9242 | www.kleinfelder.com

GRAIN SIZE

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		>12 in. (304.8 mm.)	>12 in. (304.8 mm.)	Larger than basketball-sized
Cobbles		3 - 12 in. (76.2 - 304.8 mm.)	3 - 12 in. (76.2 - 304.8 mm.)	Fist-sized to basketball-sized
Gravel	coarse	3/4 -3 in. (19 - 76.2 mm.)	3/4 -3 in. (19 - 76.2 mm.)	Thumb-sized to fist-sized
	fine	#4 - 3/4 in. (#4 - 19 mm.)	0.19 - 0.75 in. (4.8 - 19 mm.)	Pea-sized to thumb-sized
Sand	coarse	#10 - #4	0.079 - 0.19 in. (2 - 4.9 mm.)	Rock salt-sized to pea-sized
	medium	#40 - #10	0.017 - 0.079 in. (0.43 - 2 mm.)	Sugar-sized to rock salt-sized
	fine	#200 - #10	0.0029 - 0.017 in. (0.07 - 0.43 mm.)	Flour-sized to sugar-sized
Fines		Passing #200	<0.0029 in. (<0.07 mm.)	Flour-sized and smaller

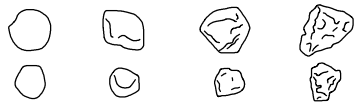


Munsell Color

NAME	ABBR
Red	R
Yellow Red	YR
Yellow	Y
Green Yellow	GY
Green	G
Blue Green	BG
Blue	B
Purple Blue	PB
Purple	P
Red Purple	RP
Black	N

ANGULARITY

DESCRIPTION	CRITERIA
Angular	Particles have sharp edges and relatively plane sides with unpolished surfaces
Subangular	Particles are similar to angular description but have rounded edges
Subrounded	Particles have nearly plane sides but have well-rounded corners and edges
Rounded	Particles have smoothly curved sides and no edges



Particles Present

Amount	Percentage
trace	<5
few	5-10
little	15-25
some	30-45
and	50
mostly	50-100

PLASTICITY

DESCRIPTION	LL	FIELD TEST
Non-plastic	NP	A 1/8-in. (3 mm.) thread cannot be rolled at any water content.
Low (L)	< 30	The thread can barely be rolled and the lump or thread cannot be formed when drier than the plastic limit.
Medium (M)	30 - 50	The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be rerolled after reaching the plastic limit. The lump or thread crumbles when drier than the plastic limit
High (H)	> 50	It takes considerable time rolling and kneading to reach the plastic limit. The thread can be rerolled several times after reaching the plastic limit. The lump or thread can be formed without crumbling when drier than the plastic limit

MOISTURE CONTENT

DESCRIPTION	FIELD TEST
Dry	Absence of moisture, dusty, dry to the touch
Moist	Damp but no visible water
Wet	Visible free water, usually soil is below water table

REACTION WITH HYDROCHLORIC ACID

DESCRIPTION	FIELD TEST
None	No visible reaction
Weak	Some reaction, with bubbles forming slowly
Strong	Violent reaction, with bubbles forming immediately

APPARENT / RELATIVE DENSITY - COARSE-GRAINED SOIL

APPARENT DENSITY	SPT-N_{60} (# blows/ft)	MODIFIED CA SAMPLER (# blows/ft)	CALIFORNIA SAMPLER (# blows/ft)	RELATIVE DENSITY (%)
Very Loose	<4	<4	<5	0 - 15
Loose	4 - 10	5 - 12	5 - 15	15 - 35
Medium Dense	10 - 30	12 - 35	15 - 40	35 - 65
Dense	30 - 50	35 - 60	40 - 70	65 - 85
Very Dense	>50	>60	>70	85 - 100

NOTE: AFTER TERZAGHI AND PECK, 1948

CONSISTENCY - FINE-GRAINED SOIL

CONSISTENCY	UNCONFINED COMPRESSIVE STRENGTH (q_u)(psf)	CRITERIA
Very Soft	< 1000	Thumb will penetrate soil more than 1 in. (25 mm.)
Soft	1000 - 2000	Thumb will penetrate soil about 1 in. (25 mm.)
Firm	2000 - 4000	Thumb will indent soil about 1/4-in. (6 mm.)
Hard	4000 - 8000	Thumb will not indent soil but readily indented with thumbnail
Very Hard	> 8000	Thumbnail will not indent soil

STRUCTURE

DESCRIPTION	CRITERIA
Stratified	Alternating layers of varying material or color with layers at least 1/4-in. thick, note thickness
Laminated	Alternating layers of varying material or color with the layer less than 1/4-in. thick, note thickness
Fissured	Breaks along definite planes of fracture with little resistance to fracturing
Slickensided	Fracture planes appear polished or glossy, sometimes striated
Blocky	Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lensed	Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay; note thickness
Homogeneous	Same color and appearance throughout

CEMENTATION

DESCRIPTION	FIELD TEST
Weakly	Crumbles or breaks with handling or slight finger pressure
Moderately	Crumbles or breaks with considerable finger pressure
Strongly	Will not crumble or break with finger pressure

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SOIL DESCRIPTION KEY

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE

A-2

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-1**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,030,760.147 (ft)
Easting: 6,805,427.215 (ft)
Surveyed Ground Surface Elevation (ft.): 2,957.71
Surface Condition: Dirt

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Clayey SAND (SC): fine to medium-grained, low plasticity, brown, moist, fine gravel							99	30			**ASTM D698 Method A=** Max. Dry Unit Wt.: 128.0 pcf Opt. Water Content: 10.0% **CBR Test**
2955			dry to moist, very dense, moderately cemented, caliche, increase in fines		BC=32 32 27	10"		4.6						
	5													
2950					BC=30 50/6"	12"								
	10													
2945														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
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DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-1

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-3
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling		**BORING LOG B-2**
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

Northing: 2,030,806.21 (ft)
Easting: 6,805,439.42 (ft)
Surveyed Ground Surface Elevation (ft.): 2,959.15
Surface Condition: Dirt

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Silty SAND (SM): fine to coarse-grained, non-plastic, brown, moist, mostly fine sand, trace fine gravel, rootlets											
			dry to moist, very dense, strongly cemented, caliche		BC=30 50/3"	10"		5.0	124.6					
2955	5		**Clayey SAND (SC)**: fine to medium-grained, low plasticity, brown, dry, very dense											
					BC=23 27 32	12"								
2950	10													
2945														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
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DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-2

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-4
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-3**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION | LABORATORY RESULTS

Northing: 2,031,615.84 (ft)
Easting: 6,805,849.577 (ft)
Surveyed Ground Surface Elevation (ft.): 2,970.35
Surface Condition: Dirt

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
2970			**Silty SAND (SM)**: fine to coarse-grained, sub-angular, yellowish brown, fine gravel, sub-angular											
					BC=12 24 31	12"								
			Clayey SAND (SC): fine to coarse-grained, low plasticity, brown to reddish brown, mottled with pale yellow, moist, medium dense to dense, moderately cemented, fine gravel, caliche, some mica, calcite veins					6.5	127.3			26	10	
2965	5													
			dry to moist, very dense, strongly cemented		BC=19 39 39	12"								
2960	10													

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
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CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-3

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-5
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling		**BORING LOG B-4**
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,031,586.004 (ft)
Easting: 6,805,949.096 (ft)
Surveyed Ground Surface Elevation (ft.): 2,970.94
Surface Condition: Dirt

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
2970			**Silty SAND (SM)**: fine to coarse-grained, non-plastic, yellowish brown, moist, mostly fine sand, few fine gravel											
			medium dense, moderately cemented, calcite veins, increase in fine gravel		BC=3 7 14	12"		4.4						
2965	5		mottled with pale yellow, very dense, moderately to strongly cemented, increase in caliche, some mica		BC=50/6"	6"								
2960	10													

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-4

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-6

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-5**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Cloudy	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,033,890.848 (ft)
Easting: 6,806,487.664 (ft)
Surveyed Ground Surface Elevation (ft.): 3,002.79
Surface Condition: Dirt

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Silty SAND (SM): fine to medium-grained, non-plastic, yellowish brown, moist, mostly fine sand, trace fine gravel, sub-rounded to sub-angular											
3000			loose to medium dense, trace rootlets		BC=5 5 6	12"		2.8						
	5													
2995			**Clayey SAND (SC)**: fine to medium-grained, low plasticity, yellowish brown, mottled with pale yellow, moist, dense to very dense, strongly cemented, caliche		BC=21 50/5"	12"	SC	5.9			25	25	9	
	10													
2990														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-5

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-7

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Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-6**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Cloudy	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,033,860.822 (ft)
Easting: 6,806,579.799 (ft)
Surveyed Ground Surface Elevation (ft.): 3,004.96
Surface Condition: Dirt

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			Silty SAND (SM): fine to coarse-grained, yellowish brown, moist, some gravel, rounded to angular							96	26			**ASTM D698 Method A=** Max. Dry Unit Wt.: 128.4 pcf Opt. Water Content: 8.0% **CBR Test**
			gravel encountered, up to 3 inches, rounded											
			medium dense		BC=20 23 18	12"								
			some mica					2.2	121.0					
3000	5													
			Clayey SAND (SC): fine to medium-grained, low plasticity, yellowish brown, mottled with pale yellow, dry to moist, very dense, strongly cemented, trace fine gravel, few caliche											
					BC=15 26 26	12"								
2995	10													

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-6

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-8

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling		**BORING LOG B-7**
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,030,987.969 (ft)
Easting: 6,805,962.913 (ft)
Surveyed Ground Surface Elevation (ft.): 2,966.71
Surface Condition: AC Pavement (Patch)

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			5-inch Asphalt (Patch)											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, non-plastic, brown, moist, fine gravel											
2965			loose to medium dense, some mica		BC=9 9 8	12"		7.3	120.7					
	5		**Clayey SAND (SC)**: fine to coarse-grained, low plasticity, brown, moist, medium dense, calcite veins											
2960					BC=9 23 50	12"								
			Silty SAND (SM): fine to coarse-grained, non-plastic, reddish brown, moist, very dense, fine gravel											
	10													
2955														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-7

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-9
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-7-Alt**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,031,020.992 (ft)
Easting: 6,805,788.045 (ft)
Surveyed Ground Surface Elevation (ft.): 2,965.57
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
2965			3.5-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, non-plastic, brown, moist, trace gravel											
					BC=3 3 4	12"		6.0	127.9					
			brown with reddish brown, loose											
	5													
2960														
			mottled with pale yellow		BC=6 4 3	18"								
	10													
2955														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
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REVISED:	3/25/2015

BORING LOG B-7-Alt

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-10
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-8**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,031,376.657 (ft)
Easting: 6,806,108.181 (ft)
Surveyed Ground Surface Elevation (ft.): 2,971.54
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)
			4-inch Asphalt			
			6-inch Aggregate Base			
2970			**Silty SAND (SM)**: fine to coarse-grained, non-plastic, brown, moist, fine gravel, sub-angular, few mica			
			medium dense		BC=7 9 9	12"
	5					
2965			mottled with reddish brown, dense, mostly fine sand, few caliche		BC=16 25 42	12"
	10					
2960						

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
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BORING LOG B-8

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-11
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-9**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,031,760.378 (ft)
Easting: 6,806,156.173 (ft)
Surveyed Ground Surface Elevation (ft.): 2,976.85
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			3.5-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-angular, non-plastic, brown, moist, fine to coarse gravel, sub-angular											
2975			gravel encountered, up to 2.5", sub-angular											
			medium dense, some mica		BC=7 7 16	12"								
	5													
2970			moderately cemented, caliche		BC=12 16 17	12"								
			Clayey SAND (SC): fine to medium-grained, low plasticity, brown to reddish brown, moist, medium dense, moderately cemented, caliche, calcite veins											
	10													
2965														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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BORING LOG B-9

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-12
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling		**BORING LOG B-10**
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,032,136.578 (ft)
Easting: 6,806,292.785 (ft)
Surveyed Ground Surface Elevation (ft.): 2,982.64
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, non-plastic, brown, moist, fine gravel, sub-rounded to sub-angular											
2980			dense, moderately cemented, some mica		BC=20 30 30	12"		6.0	134.5					
	5													
2975			medium dense, clay nodules, caliche		BC=4 6 19	12"								
	10													
2970														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
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DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-10

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-13
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-11**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,032,525.097 (ft)
Easting: 6,806,387.586 (ft)
Surveyed Ground Surface Elevation (ft.): 2,988.77
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			8-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, non-plastic, brown, moist, few fine to coarse gravel											
			medium dense		BC=9 12 13	12"								
2985	5													
			Clayey SAND (SC): fine to coarse-grained, low plasticity, reddish brown, mottled with pale yellow, moist, medium dense, caliche											
					BC=7 17 23	12"								
2980	10													
2975														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-11

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-14
PAGE: 1 of 1

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Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-12**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

Northing: 2,032,919.85 (ft)
Easting: 6,806,462.021 (ft)
Surveyed Ground Surface Elevation (ft.): 2,994.35
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			7-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-angular, non-plastic, brown, moist, few fine to coarse gravel, sub-angular											
			dense, moderately cemented, few mica		BC=13 28 31	12"		5.7	132.7					
2990	5													
			low plasticity, mottled with pale yellow, few clay, caliche medium dense		BC=3 6 11	12"								
2985	10													
2980														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-12

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-15
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-13**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Partly Cloudy	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,033,284.397 (ft)
Easting: 6,806,638.889 (ft)
Surveyed Ground Surface Elevation (ft.): 3,000.21
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
3000			4-inch Asphalt											
			7-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-rounded, non-plastic, brown, moist, fine to coarse gravel, sub-angular to sub-rounded, up to 2"							91	22			
			brown with reddish brown, medium dense, some mica		BC=7 10 7	12"								
2995	5													
			mottled with white, medium dense to dense, mostly medium sand, calcite veins		BC=13 19 28	12"								
2990	10													

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-13

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-16
PAGE: 1 of 1

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Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-14**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Partly Cloudy	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,033,712.126 (ft)
Easting: 6,806,697.167 (ft)
Surveyed Ground Surface Elevation (ft.): 3,006.86
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			8-inch Aggregate Base											
3005			**Silty SAND (SM)**: fine to coarse-grained, sub-angular, brown, moist, few fine gravel, sub-angular to sub-rounded											
			dense, moderately cemented		BC=19 30 36	12"		5.3	132.5					
	5													
3000			**Clayey SAND (SC)**: fine to coarse-grained, sub-angular, low plasticity, reddish brown, dry to moist, loose, weakly cemented, few fine gravel, sub-angular to angular		BC=4 4 5	12"								
	10													
2995														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-14

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-17
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-15**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Partly Cloudy	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,034,074.197 (ft)
Easting: 6,806,857.01 (ft)
Surveyed Ground Surface Elevation (ft.): 3,012.56
Surface Condition: AC Pavement (Patch)

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)
			5-inch Asphalt (Patch)			
			6-inch Aggregate Base			
			Silty SAND (SM): fine to coarse-grained, sub-rounded to sub-angular, non-plastic, brown, moist, trace fine gravel, some mica			
3010						
			mottled with yellow, dense		BC=8 15 20	12"
	5					
3005						
			medium dense, calcite vein		BC=7 8 16	12"
	10					
3000						

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-15

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-18
PAGE: 1 of 1

BORING LOG B-16

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling		
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,034,547.95 (ft)
Easting: 6,806,956.291 (ft)
Surveyed Ground Surface Elevation (ft.): 3,020.22
Surface Condition: AC Pavement

LABORATORY RESULTS

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
3020			4-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-rounded to sub-angular, non-plastic, brown, moist, trace fine gravel											
			brown with reddish/yellowish brown, medium dense		BC=15 23 23	12"		6.2	129.8		25			
3015	5													
			calcite veins, trace caliche nodules		BC=6 14 15	12"								
3010	10													

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-16

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-19
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-17**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION | LABORATORY RESULTS

Northing: 2,034,908.705 (ft)
Easting: 6,807,048.104 (ft)
Surveyed Ground Surface Elevation (ft.): 3,025.86
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			6-inch Aggregate Base											
3025			**Silty SAND (SM)**: fine to coarse-grained, sub-angular, non-plastic, brown, moist, trace fine gravel, sub-angular											
			mottled with yellow, medium dense		BC=11 16 18	12"				97	23			
	5													
3020			mostly medium to coarse-grained sand, with caliche nodules											
					BC=8 13 20	12"		5.3			20			
	10													
3015														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-17

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-20
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-18**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,035,262.787 (ft)
Easting: 6,807,164.792 (ft)
Surveyed Ground Surface Elevation (ft.): 3,031.36
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			8-inch Aggregate Base											
3030			**Silty SAND (SM)**: fine to coarse-grained, sub-angular, non-plastic, brown, moist											
			increase in silt											
			fine to medium-grained, dense, moderately cemented, some mica, some caliche, trace fine gravel		BC=28 42 36	12"	SM	5.2	132.4		29	NP	NP	NP = non-plastic
	5													
3025			fine to coarse-grained, medium dense											
					BC=7 10 14	12"								
	10													
3020														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-18

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-21
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-19**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,035,645.051 (ft)
Easting: 6,807,258.796 (ft)
Surveyed Ground Surface Elevation (ft.): 3,037.38
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-angular, non-plastic, brown, moist, trace fine to coarse gravel, sub-rounded to sub-angular				SM			90	13			
3035														
			mottled with yellow, medium dense		BC=9 9 9	12"								
	5													
3030			**Clayey SAND (SC)**: fine to coarse-grained, sub-angular, low plasticity, moist, medium dense to dense, moderately cemented, caliche, few mica, trace fine gravel, sub-angular											
					BC=13 22 27	12"								
	10													
3025														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-19

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-22
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-20**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,036,032.294 (ft)
Easting: 6,807,390.947 (ft)
Surveyed Ground Surface Elevation (ft.): 3,043.16
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			8-inch Aggregate Base											
			Poorly-graded SAND with Silt (SP-SM): fine to coarse-grained, sub-angular, non-plastic, brown, moist, some fine gravel, sub-angular to sub-rounded											
3040			loose		BC=6 6 5	12"		3.3	107.8		9.1	NP	NP	NP = non-plastic
	5		**Clayey SAND (SC)**: fine to coarse-grained, sub-angular, low plasticity, brown, moist, medium dense, few fine gravel, sub-angular to sub-rounded, some mica											
3035					BC=6 8 13	12"								
	10													
3030														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-20

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-23
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-21**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,036,435.776 (ft)
Easting: 6,807,464.608 (ft)
Approximate Ground Surface Elevation (ft.): 3,049.16
Surface Condition: AC Pavement

Approximate Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-angular, low plasticity, brown, moist, loose, few fine to coarse gravel											
3045					BC=2 3 2	12"								
	5		medium dense to dense, moderately cemented, mostly medium sand											
3040					BC=10 19 29	12"	SM	4.6		99	15			
	10													
3035														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation are approximate and were estimated by Kleinfelder.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-21

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-24
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-22**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,036,788.827 (ft)
Easting: 6,807,583.333 (ft)
Surveyed Ground Surface Elevation (ft.): 3,055.15
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
3055			4-inch Asphalt											
			8-inch Aggregate Base											
			Silty SAND (SM): fine to coarse-grained, sub-angular, non-plastic, brown, moist, few fine to coarse gravel, sub-angular to angular							96	18			**ASTM D698 Method A=** Max. Dry Unit Wt.: 127.9 pcf Opt. Water Content: 10.1% **CBR Test**
			loose, clay nodules, increase in fines		BC=5 5 6	12"		6.8	119.0					
3050	5		**Clayey SAND (SC)**: fine to coarse-grained, sub-angular, low plasticity, orangish brown, mottled with olive, moist, medium dense, few fine gravel, some mica											
					BC=10 8 13	12"								
3045	10													

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-22

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-25
PAGE: 1 of 1

Date Begin - End:	3/03/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-23**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,037,169.796 (ft)
Easting: 6,807,688.513 (ft)
Surveyed Ground Surface Elevation (ft.): 3,061.07
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			4-inch Asphalt											
			6-inch Aggregate Base											
3060			**Silty SAND (SM)**: fine to coarse-grained, sub-angular, non-plastic, brown, moist, some fine to coarse gravel, sub-angular to angular											
			brown to orangish brown, medium dense		BC=9 12 15	12"		4.2	116.9					
	5													
3055														
			weakly cemented, caliche, some clay nodules		BC=10 11 14	12"								
	10													
3050														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 03, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-23

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-26
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-24**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,030,995.755 (ft)
Easting: 6,805,548.897 (ft)
Surveyed Ground Surface Elevation (ft.): 2,964.42
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)
			3-inch Asphalt			
			5-inch Aggregate Base			
			Silty SAND (SM): fine to medium-grained, non-plastic, brown, moist, fine gravel			
			loose, some mica		BC=3 3 3	12"
2960	5					
			reddish brown, mottled with pale yellow, dense, increase grain size, caliche		BC=13 23 47	12"
2955	10					
2950						

LABORATORY RESULTS

USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-24

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-27
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-25**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,031,603.055 (ft)
Easting: 6,805,713.522 (ft)
Surveyed Ground Surface Elevation (ft.): 2,972.54
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			3-inch Asphalt											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to medium-grained, non-plastic, brown, moist, few fine to coarse gravel, sub-angular											
2970			loose, increase in fines, some mica		BC=6 5 3	12"		7.4	116.5					
	5													
2965			medium dense, weakly to moderately cemented, caliche		BC=16 14 10	12"								
	10													
2960														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-25

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-28
PAGE: 1 of 1

Date Begin - End:	3/04/2015	**Drilling Company:**	Cal Pac Drilling	**BORING LOG B-26**	
Logged By:	S. Kuo	**Drill Crew:**	James & Josh		
Hor.-Vert. Datum:	NAD 83 - NAVD88	**Drilling Equipment:**	B-53	**Hammer Type - Drop:**	140 lb. Auto - 30 in.
Plunge:	-90 degrees	**Drilling Method:**	Hollow Stem Auger	**Hammer Efficiency:**	86%
Weather:	Sunny	**Exploration Diameter:**	8 in. O.D.	**Hammer Cal. Date:**	Unknown

FIELD EXPLORATION

Northing: 2,031,959.457 (ft)
Easting: 6,805,808.806 (ft)
Surveyed Ground Surface Elevation (ft.): 2,977.52
Surface Condition: AC Pavement

Surveyed Elevation (feet)	Depth (feet)	Graphical Log	Lithologic Description	Sample Type	Blow Counts(BC)= Uncorr. Blows/6 in.	Recovery (NR=No Recovery)	USCS Symbol	Water Content (%)	Dry Unit Wt. (pcf)	Passing #4 (%)	Passing #200 (%)	Liquid Limit	Plasticity Index (NP=NonPlastic)	Additional Tests/ Remarks
			3-inch overlay over 4-inch previous Asphalt (7" total)											
			6-inch Aggregate Base											
			Silty SAND (SM): fine to medium-grained, non-plastic, brown, moist, fine gravel, some mica							94	30			
2975			medium dense		BC=7 6 7	12"								
	5													
2970			increase in grain size, less fines		BC=10 15 17	12"								
			Clayey SAND (SC): fine to medium-grained, brown to reddish brown, moist, medium dense, caliche, calcite veins											
	10													
2965														

The boring was terminated at approximately 10 ft. below ground surface. The exploration was backfilled with auger cuttings and patched with Quikset at surface on March 04, 2015.

GROUNDWATER LEVEL INFORMATION:
Groundwater was not encountered during drilling or after completion.
The exploration location and elevation were surveyed by CGI Surveying.

KLEINFELDER
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PROJECT NO.:	20154622
DRAWN BY:	MP
CHECKED BY:	SK
DATE:	3/5/2015
REVISED:	3/25/2015

BORING LOG B-26

Proposed Runway 18-36 Reconstruction
Apple Valley Airport
21600 Crowin Road, Apple Valley, CA

PLATE
A-29
PAGE: 1 of 1

APPENDIX B
Laboratory Testing

APPENDIX B
LABORATORY TESTING

GENERAL

Laboratory tests were performed on selected samples as an aid in classifying the soils and to evaluate physical properties of the soils that may affect pavement design and construction procedures. The tests were performed in general conformance with the current ASTM standards. A description of the laboratory-testing program is presented below.

MOISTURE AND UNIT WEIGHT

Moisture content and dry unit weight tests were performed on selected samples recovered from the boring. Moisture contents were determined in general accordance with ASTM Test Method D 2216; dry unit weight was calculated using the entire weight of the samples collected. Results of these tests are presented on the boring logs in Appendix A.

SIEVE ANALYSES

Sieve analyses were performed on selected samples of the materials encountered at the site to evaluate the grain size distribution characteristics of the soils and to aid in their classification. Tests were performed in general accordance with ASTM Test Method D 422. The results of these tests are presented on the boring logs in Appendix A.

WASH SIEVE

The percent passing the No. 200 sieve of selected soil samples was performed by wash sieving in accordance with ASTM Standard Test Method D1140. The results of the tests are presented on the boring logs in Appendix A.

ATTERBERG LIMITS

Atterberg limits were performed on selected soil samples to assist in soil classification. Testing was performed in general accordance with ASTM D4318. Results are presented on the boring logs in Appendix A.

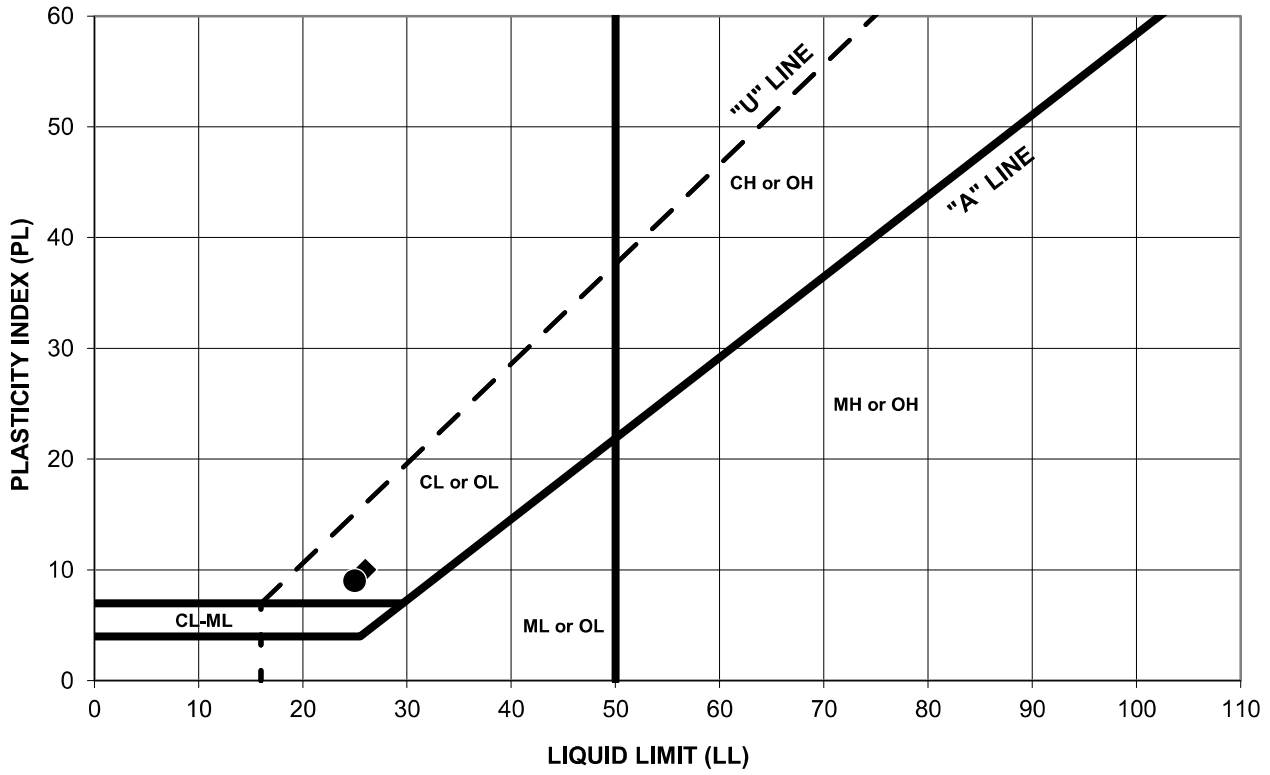
CALIFORNIA BEARING RATIO TEST

California Bearing Ratio (CBR) Testing were performed on a bulk soil sample obtained within the proposed rehabilitation area to evaluate pavement support characteristics of the near-

surface onsite soils. CBR tests were performed in accordance with ASTM Test Method D1883. The test results are attached in this Appendix.

MAXIMUM DENSITY TESTS

Maximum density tests were performed on selected subgrade samples of the on-site soils to determine compaction characteristics. Tests were performed in accordance with ASTM Test Method D698. The test results are attached in this Appendix.



SYMBOL	SAMPLE IDENTIFICATION			ATTERBERG LIMITS			SOIL CLASSIFICATION
	BORING NO.	SAMPLE NO.	DEPTH (ft)	LL	PL	PI	
◆	B-3	1	3	26	16	10	Clayey Sand (SC)
●	B-5	2	8	25	16	9	Clayey Sand (SC)
▲	B-18	1	3	-	-	-	Silty Sand (SM)
×	B-20	1	3	-	-	-	Silty Sand (SM)

Testing performed in general accordance with ASTM D4318

KLEINFELDER
Bright People. Right Solutions.

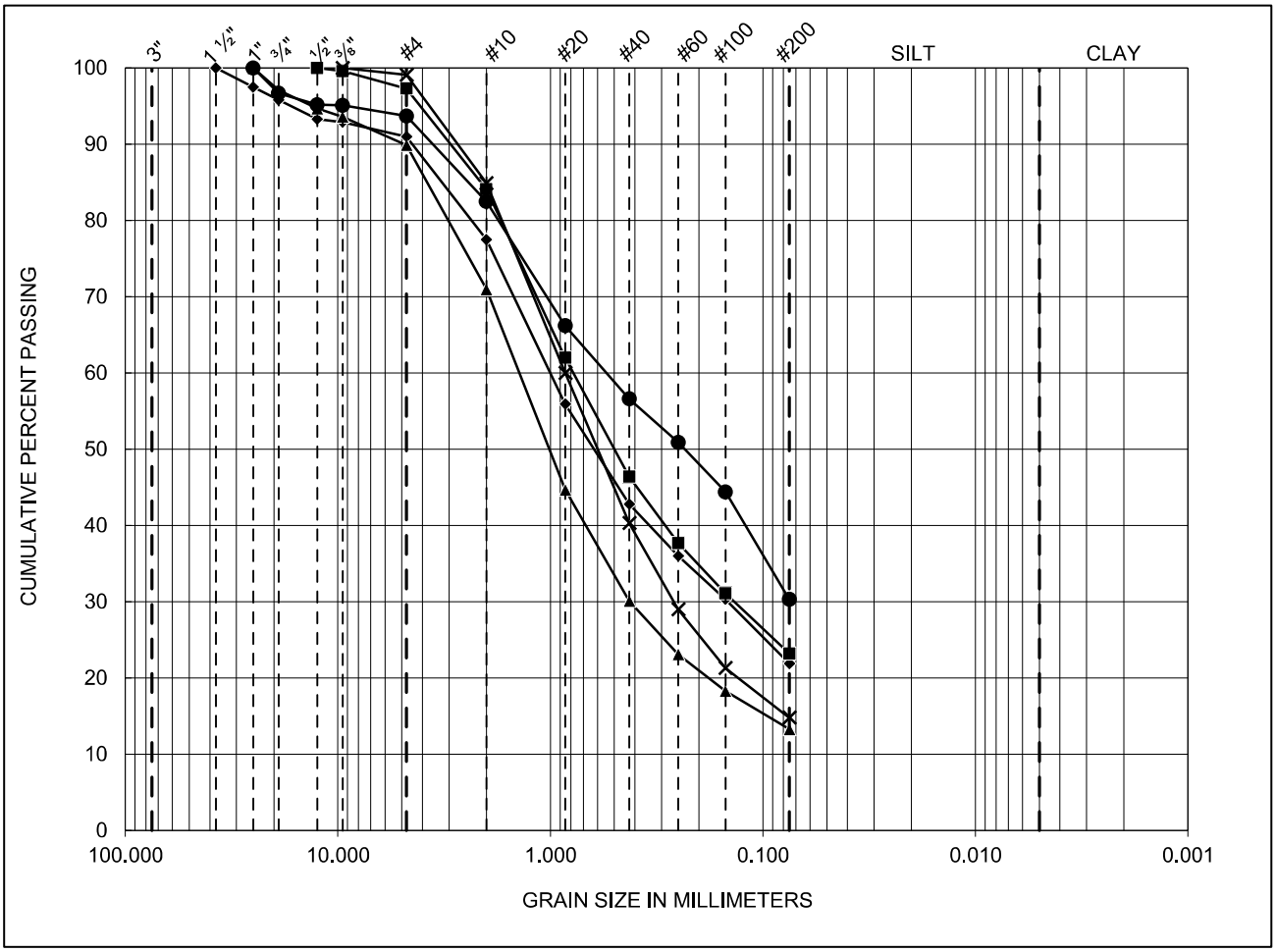
PROJECT NO.:20154622
TESTED BY: R. Roque
DATE: 3/11/2015
CHECKED BY: J. Diaz
DATE: 3/11/2015

PLASTICITY TESTING

Proposed Runway 18-36
Reconstruction
Apple Valley Airport

PLATE

B-1



COBBLE	GRAVEL	SAND	SILT	CLAY

SYMBOL	SAMPLE IDENTIFICATION			PERCENTAGES			ATTERBERG LIMITS			SOIL CLASSIFICATION
	BORING NO.	SAMPLE NO.	DEPTH (ft.)	GRAVEL	SAND	FINES	LL	PL	PI	
◆	B-13	1	0-5	9.0	69.1	21.9	N/A	N/A	N/A	Silty Sand (SM)
■	B-17	1	3	2.7	74.1	23.2	N/A	N/A	N/A	Silty Sand (SM)
▲	B-19	1	1-5'	10.1	76.6	13.3	N/A	N/A	N/A	Silty Sand (SM)
×	B-21	2	8	0.9	84.3	14.8	N/A	N/A	N/A	Silty Sand (SM)
●	B-26	1	1-5'	6.3	63.4	30.3	N/A	N/A	N/A	Silty Sand (SM)

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO.:20154622
TESTED BY: E.Degener
DATE: 3/9/2015
CHECKED BY: J. Diaz
DATE: 3/9/2015

GRAIN SIZE DISTRIBUTION

Proposed Runway 18-36
Reconstruction
Apple Valley Airport

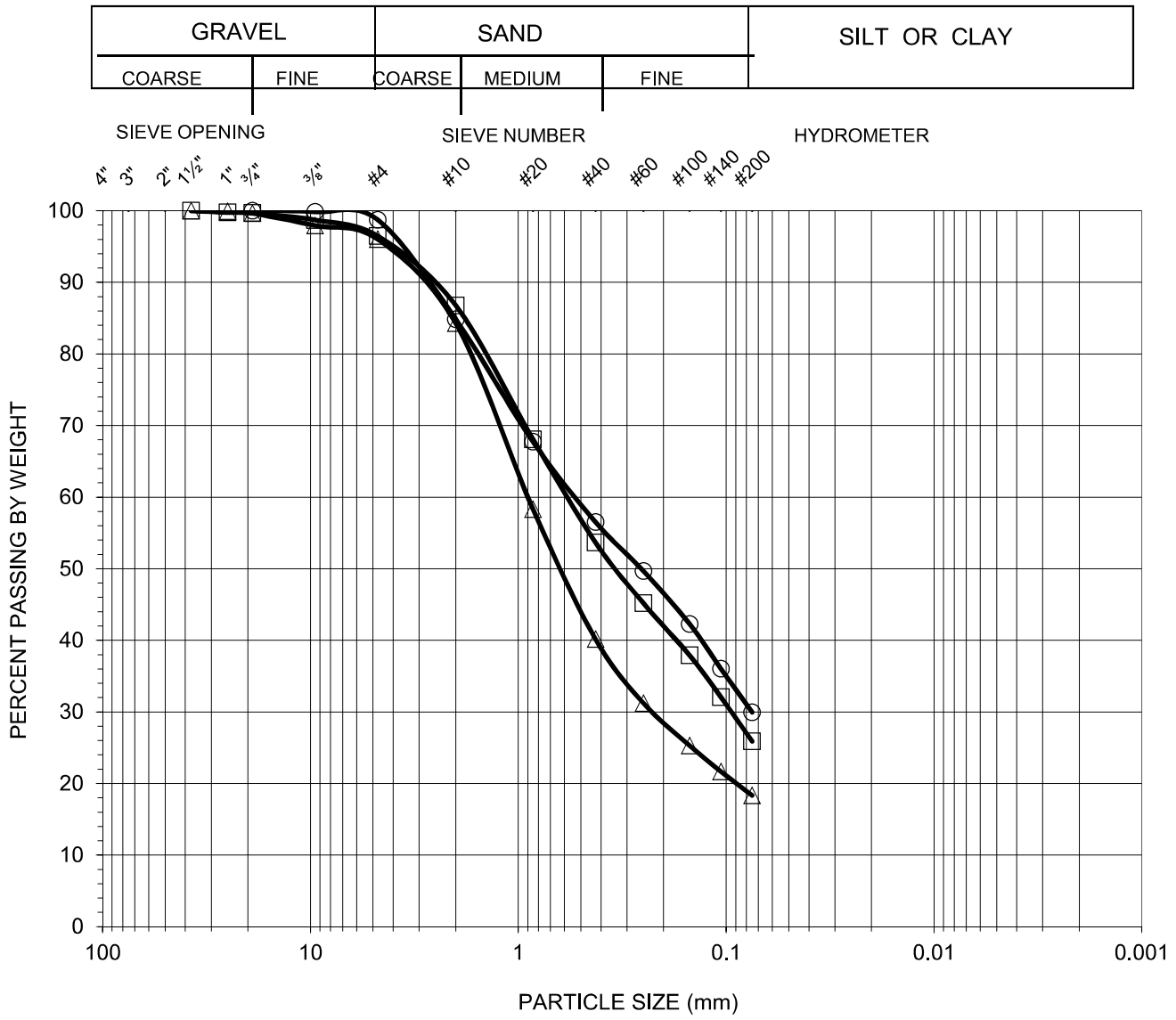
PLATE

B-2

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	Kleinfelder	Tested by:	NG	Date:	03/18/15
Project Name:	Apple Valley Airport Runway 18/36 Recon	Computed by:	JP	Date:	03/23/15
Project Number:	20154622	Checked by:	AP	Date:	03/23/15

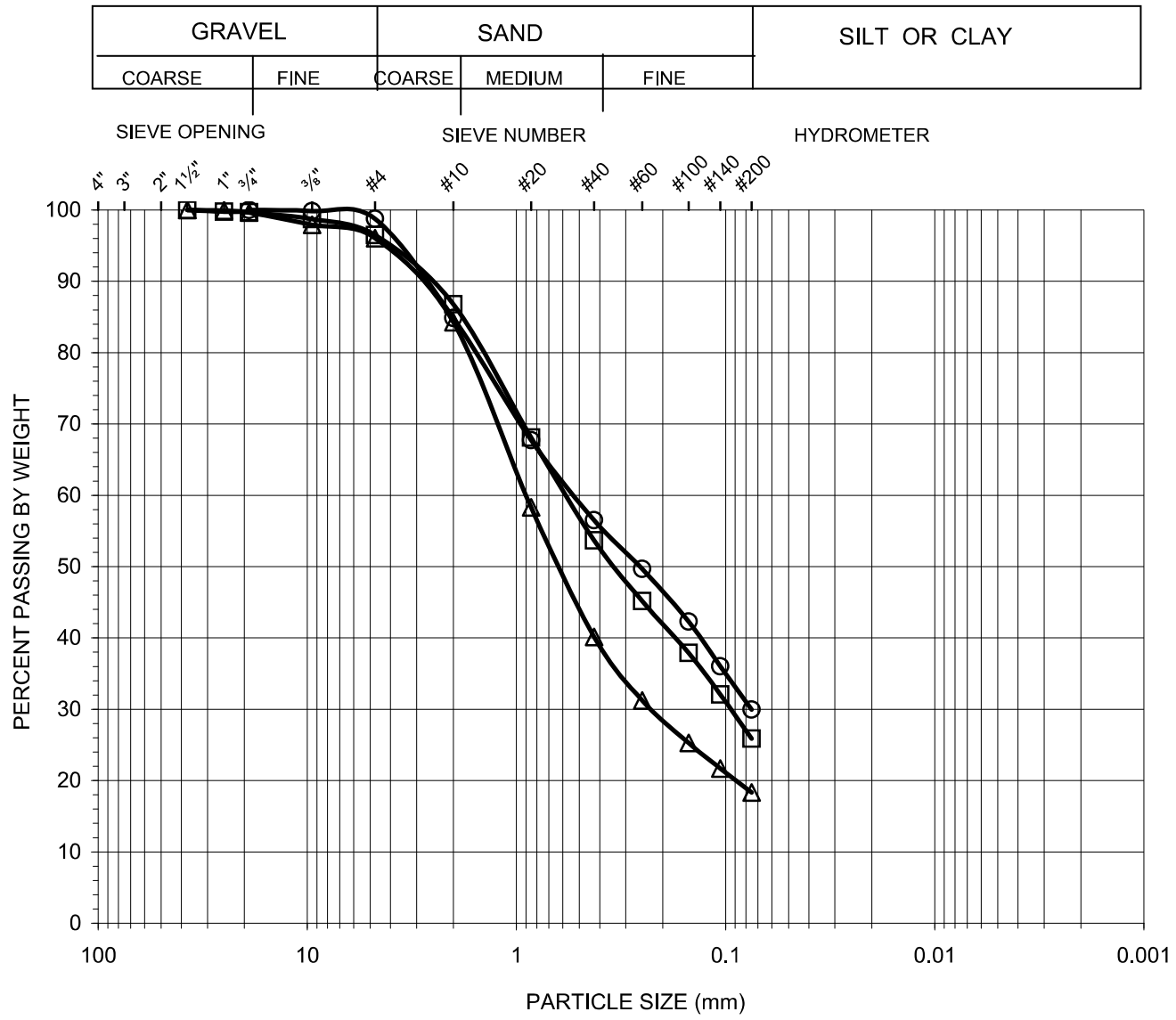


Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	B-1	1	0-5	1	69	30	N/A	SM
□	B-6	1	0-5	4	70	26	N/A	SM
△	B-22	1	1-5	4	78	18	N/A	SM

AP Engineering & Testing, Inc.

GRAIN SIZE DISTRIBUTION CURVE
ASTM D 6913

Client Name:	Kleinfelder	Tested by:	NG	Date:	03/18/15
Project Name:	Apple Valley Airport Runway 18/36 Recon	Computed by:	JP	Date:	03/23/15
Project Number:	20154622	Checked by:	AP	Date:	03/23/15



Symbol	Boring No.	Sample No.	Sample Depth (feet)	Percent			Atterberg Limits LL:PL:PI	Soil Type U.S.C.S
				Gravel	Sand	Silt & Clay		
○	B-1	1	0-5	1	69	30	N/A	SC*
□	B-6	1	0-5	4	70	26	N/A	SM
△	B-22	1	1-5	4	78	18	N/A	SM

Note: * The plasticity is based on visual classification.

AP Engineering & Testing, Inc.

COMPACTION TEST

Client: Kleinfelder
AP Number: 15-0313
Project Name: Apple Valley Airport Runway 18/36 Recon
Tested By: JT
Date: 03/16/15
Project No. : 20154622
Calculated By: JP
Date: 03/17/15
Boring No.: B-1
Checked By: AP
Date: 03/24/15
Sample No.: 1
Depth(ft.): 0-5
Visual Sample Description: Clayey Sand

Compaction Method
[ ] ASTM D1557
[X] ASTM D698

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Preparation Method
[ ] Moist
[X] Dry

Wt. Comp. Soil + Mold (gm.)	3836	3973	3963	3908		
Wt. of Mold (gm.)	1866	1866	1866	1866		
Net Wt. of Soil (gm.)	1970	2107	2097	2042		
Container No.						
Wt. of Container (gm.)	142.91	144.39	150.37	153.35		
Wet Wt. of Soil + Cont. (gm.)	508.25	409.06	699.17	729.75		
Dry Wt. of Soil + Cont. (gm.)	485.32	386.94	641.70	661.03		
Moisture Content (%)	6.70	9.12	11.70	13.53		
Wet Density (pcf)	130.29	139.35	138.69	135.05		
Dry Density (pcf)	122.11	127.71	124.17	118.95		

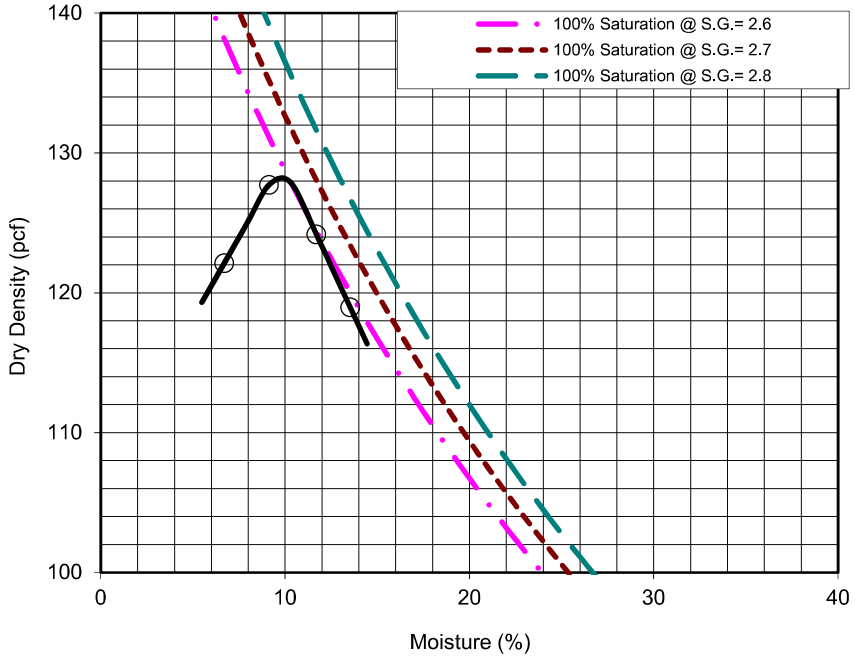
Maximum Dry Density (pcf): 128.0
Maximum Dry Density w/ Rock Correction (pcf): N/A
Optimum Moisture Content (%): 10.0
Optimum Moisture Content w/ Rock Correction (%): N/A

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* 1.3%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 3 (Three)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 3 (Three)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 3 (Three)
Blows per layer : 56 (fifty-six)



AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-1	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Clayey Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	1
Blows Per Layer	10
Wt of Wet Soil & Mold (gm)	12233
Weight of Mold (gm)	7199.5
Weight of Wet Soil (gm)	5034
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	347.45
Dry Wt. Soil + Container (gm)	335.15
Wt. Container (gm)	220.59
Moisture Content (%)	10.74
Wet Density (pcf)	135.7
Dry Density (pcf)	122.5

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	10
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	128.0
Molded Relative Comp (%)	95.7
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	1
		Dial Rdgs	Swell (in)
03/19/15	14:55	0.2256	
03/20/15	15:40	0.2230	
03/23/15	20:05	0.2225	-0.0031
Percent Swell/Collapse (+/-)			-0.06

AFTER SOAKING

Mold Number	1	
Wt. of Wet Soil + Mold (gm)	12243	
Weight of Mold (gm)	7200	
Weight of Wet Soil (gm)	5043	
Mold Volume (cu.ft)	0.0817	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	489.21	541.22
Dry Wt. Soil + Container (gm)	453.74	500.04
Wt. Container (gm)	151.53	149.59
Mosture Content (%)	11.7	11.8
Average Moisture Content (%)	11.7	
Wet Density (pcf)	136.0	
After Test Dry Density (pcf)	121.7	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration (inch)	Mold No.: 1 LOAD (lb)	Stress (psi)
0.000	0	0.00
0.025	21	6.90
0.050	43	14.40
0.075	68	22.70
0.100	93	31.00
0.125	118	39.20
0.150	147	48.90
0.175	171	57.10
0.200	200	66.69
0.225	230	76.70
0.250	261	87.04
0.275	292	97.37
0.300	323	107.71
0.325	354	118.05
0.350	385	128.39
0.375	414	138.06
0.400	443	147.73
0.425	472	157.40
0.450	502	167.40
0.475	531	177.07
0.500	562	187.41

TEST RESULTS

CBR @ .1": 3

CBR @ .2": 4

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL

ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-1	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Clayey Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	2
Blows Per Layer	25
Wt of Wet Soil & Mold & Spacer (gm)	12348
Weight of Mold & Spacer (gm)	7198.5
Weight of Wet Soil (gm)	5150
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	347.45
Dry Wt. Soil + Container (gm)	335.15
Wt. Container (gm)	220.59
Moisture Content (%)	10.74
Wet Density (pcf)	138.8
Dry Density (pcf)	125.3

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	25
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	128.0
Molded Relative Comp (%)	97.9
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	2
		Dial Rdgs	Swell (in)
03/19/15	14:55	0.2001	
03/20/15	15:40	0.1978	
03/23/15	20:05	0.1975	-0.0026
Percent Swell/Collapse (+/-)			-0.05

AFTER SOAKING

Mold Number	2	
Wt. of Wet Soil + Mold + Base Plate (gm)	12415	
Weight of Mold+ Base Plate (gm)	7199	
Weight of Wet Soil (gm)	5216	
Mold Volume (cu.ft)	0.0818	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	557.46	587.17
Dry Wt. Soil + Container (gm)	515.14	542.04
Wt. Container (gm)	149.56	151.98
Mosture Content (%)	11.6	11.6
Average Moisture Content (%)	11.6	
Wet Density (pcf)	140.7	
After Test Dry Density (pcf)	126.1	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration (inch)	Mold No.: LOAD (lb)	2 Stress (psi)
0.000	0	0.00
0.025	27	8.90
0.050	64	21.30
0.078	105	35.10
0.100	138	46.10
0.125	166	55.30
0.150	198	66.00
0.175	226	75.30
0.200	255	84.90
0.225	283	94.50
0.250	310	103.40
0.275	341	113.70
0.300	372	124.05
0.325	407	135.56
0.350	443	147.56
0.375	471	156.90
0.400	503	167.90
0.425	532	177.50
0.450	555	185.10
0.475	578	192.70
0.500	596	198.90

TEST RESULTS

CBR @ .1":	**5**
CBR @ .2":	**6**

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-1	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Clayey Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	3
Blows Per Layer	56
Wt of Wet Soil & Mold (gm)	12480.5
Weight of Mold (gm)	7220.5
Weight of Wet Soil (gm)	5260
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	347.45
Dry Wt. Soil + Container (gm)	335.15
Wt. Container (gm)	220.59
Moisture Content (%)	10.74
Wet Density (pcf)	141.8
Dry Density (pcf)	128.0

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	56
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	128.0
Molded Relative Comp (%)	100.0
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	3
		Dial Rdgs	Swell (in)
03/19/15	14:55	0.3243	
03/20/15	15:40	0.3236	
03/23/15	20:05	0.3235	-0.0008
Percent Swell/Collapse (+/-)			-0.02

AFTER SOAKING

Mold Number	3	
Wt. of Wet Soil + Mold + Base Plate (gm)	12481	
Weight of Mold+ Base Plate (gm)	7221	
Weight of Wet Soil (gm)	5260	
Mold Volume (cu.ft)	0.0818	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	427.92	422.97
Dry Wt. Soil + Container (gm)	400.16	395.25
Wt. Container (gm)	149.60	142.09
Mosture Content (%)	11.1	10.9
Average Moisture Content (%)	11.0	
Wet Density (pcf)	141.8	
After Test Dry Density (pcf)	127.7	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration (inch)	Mold No.: 3 LOAD (lb)	Stress (psi)
0.000	0	0.00
0.025	34	11.34
0.050	94	31.35
0.075	190	63.36
0.100	268	89.37
0.125	314	104.71
0.150	346	115.38
0.175	374	124.72
0.200	395	131.72
0.225	414	138.06
0.250	436	145.39
0.275	456	152.06
0.300	475	158.40
0.325	493	164.40
0.350	511	170.40
0.375	530	176.74
0.400	548	182.74
0.425	565	188.41
0.450	583	194.41
0.475	599	199.75
0.500	616	205.42

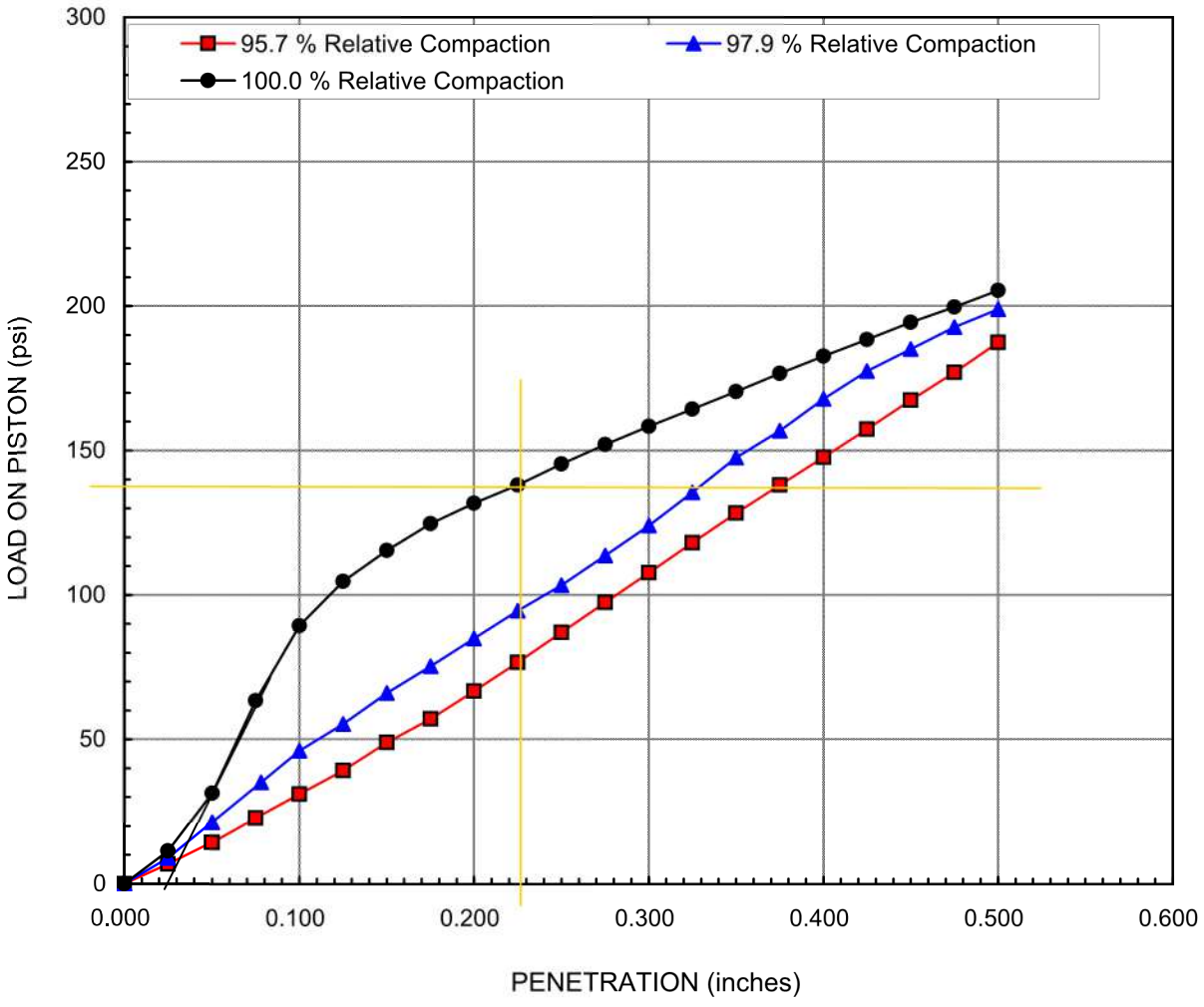
TEST RESULTS

CBR @ .1":	**11**
CBR @ .2":	**9**

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-1	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Clayey Sand				



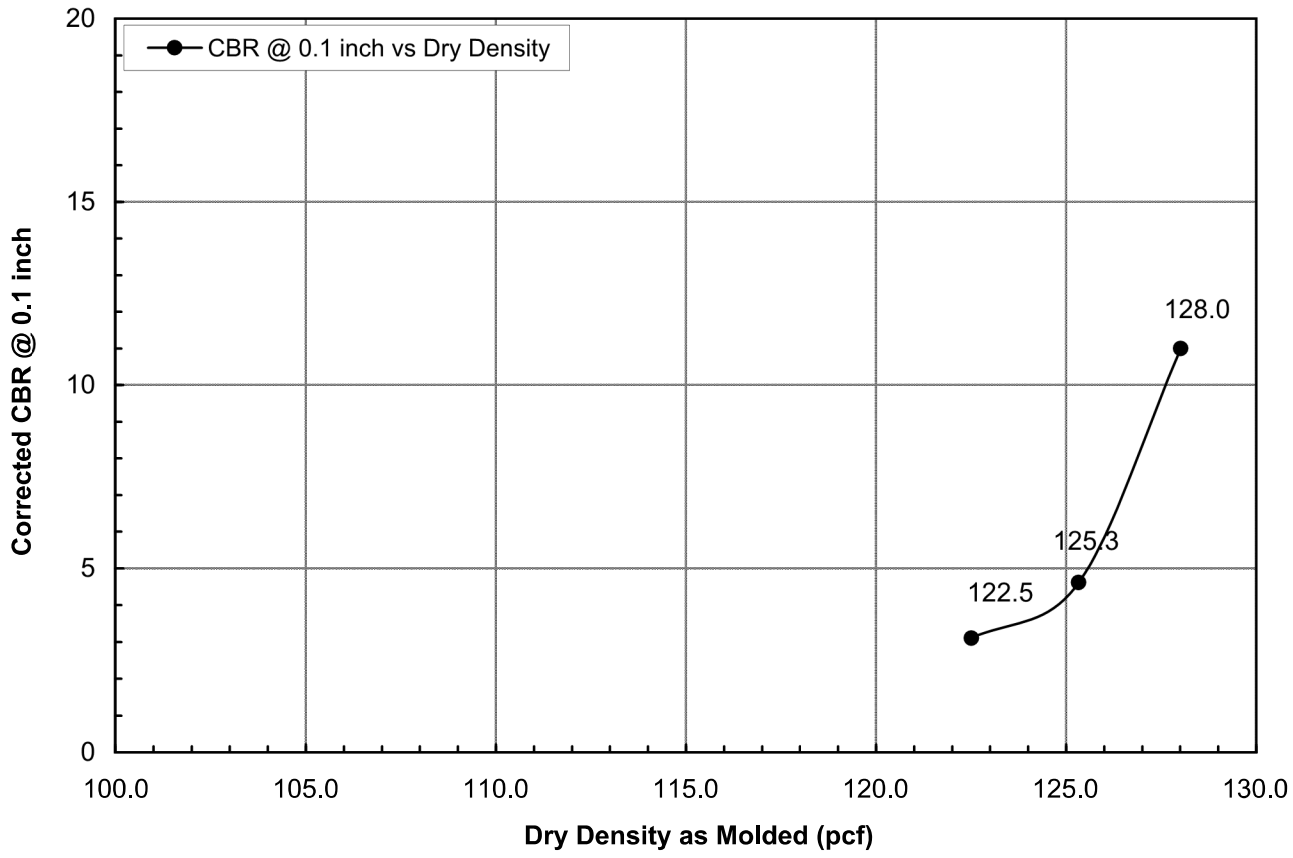
AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-1	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Clayey Sand				

TEST RESULTS

Dry Density (pcf)	Maximum Dry Density by ASTM D 698 (pcf)	Relative Compaction (%)	Blow Per Layer	CBR @0.1"	CBR @0.2"
122.5	128.0	95.7	10	3	4
125.3	128.0	97.9	25	5	6
128.0	128.0	100.0	56	11	9



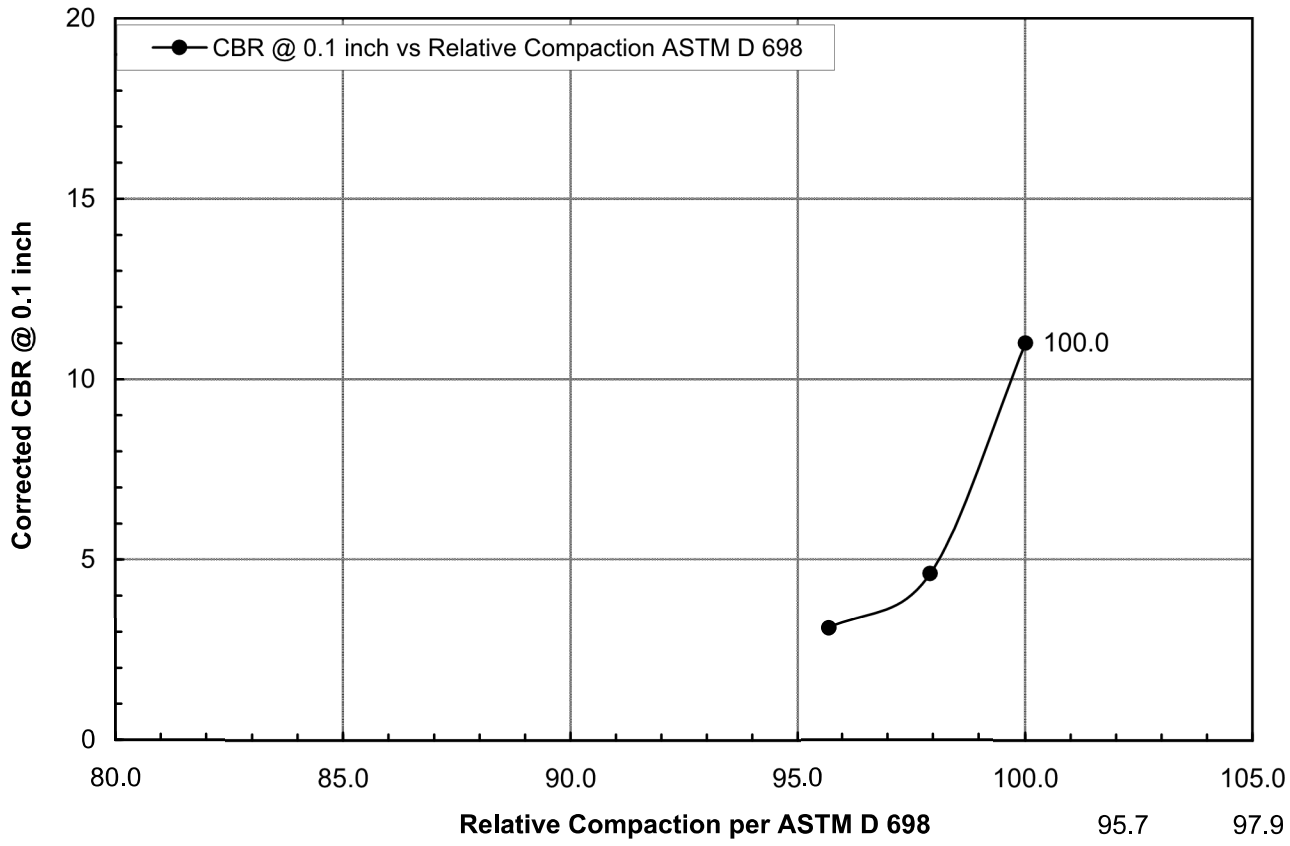
AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-1	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Clayey Sand				

TEST RESULTS

Dry Density (pcf)	Maximum Dry Density by ASTM D 698 (pcf)	Relative Compaction (%)	Blow Per Layer	CBR @0.1"	CBR @0.2"
122.5	128.0	95.7	10	3	4
125.3	128.0	97.9	25	5	6
128.0	128.0	100.0	56	11	9



AP Engineering & Testing, Inc.

COMPACTION TEST

Client: Kleinfelder
AP Number: 15-0313
Project Name: Apple Valley Airport Runway 18/36 Recon
Tested By: JT
Date: 03/16/15
Project No. : 20154622
Calculated By: JP
Date: 03/17/15
Boring No.: B-6
Checked By: AP
Date: 03/23/15
Sample No.: 1
Depth(ft.): 0-5
Visual Sample Description: Silty Sand

Compaction Method
[ ] ASTM D1557
[X] ASTM D698

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Preparation Method
[ ] Moist
[X] Dry

Wt. Comp. Soil + Mold (gm.)	3825	3947	3952	3908		
Wt. of Mold (gm.)	1866	1866	1866	1866		
Net Wt. of Soil (gm.)	1959	2081	2086	2042		
Container No.						
Wt. of Container (gm.)	149.25	148.78	149.56	149.51		
Wet Wt. of Soil + Cont. (gm.)	480.00	532.44	769.25	883.15		
Dry Wt. of Soil + Cont. (gm.)	464.73	506.21	714.53	807.62		
Moisture Content (%)	4.84	7.34	9.69	11.48		
Wet Density (pcf)	129.56	137.63	137.96	135.05		
Dry Density (pcf)	123.58	128.22	125.78	121.15		

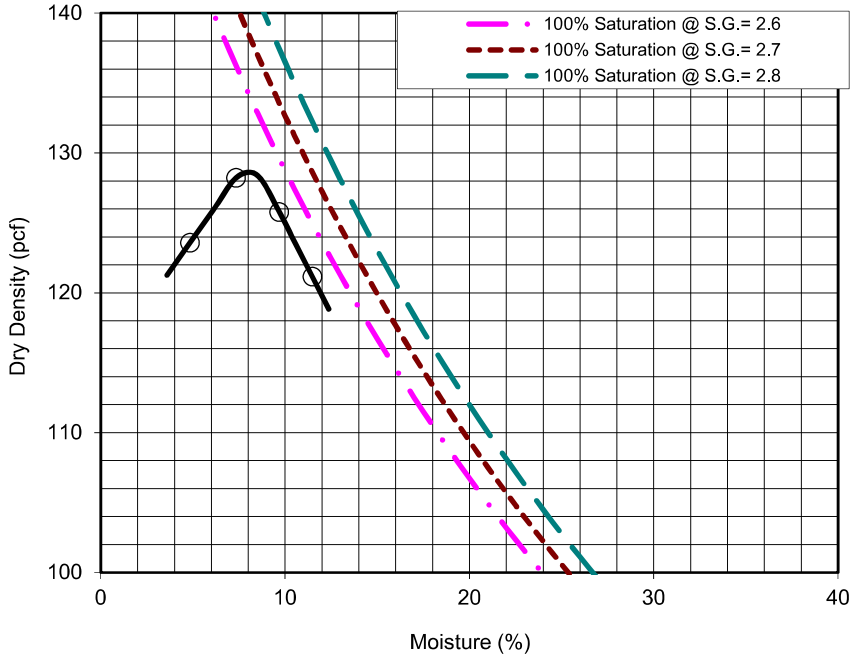
Maximum Dry Density (pcf): 128.4
Maximum Dry Density w/ Rock Correction (pcf): N/A
Optimum Moisture Content (%): 8.0
Optimum Moisture Content w/ Rock Correction (%): N/A

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* 4.1%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 3 (Three)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 3 (Three)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 3 (Three)
Blows per layer : 56 (fifty-six)



AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-6	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Silty Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	D
Blows Per Layer	10
Wt of Wet Soil & Mold (gm)	12775
Weight of Mold (gm)	7839
Weight of Wet Soil (gm)	4936
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	944
Dry Wt. Soil + Container (gm)	933.95
Wt. Container (gm)	803.93
Moisture Content (%)	7.73
Wet Density (pcf)	133.0
Dry Density (pcf)	123.5

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	10
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	128.4
Molded Relative Comp (%)	96.2
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698.

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	D
		Dial Rdgs	Swell (in)
03/18/15	17:11	0.5480	
03/20/15	15:46	0.5290	
03/23/15	17:53	0.5290	-0.0190
Percent Swell/Collapse (+/-)			-0.38

AFTER SOAKING

Mold Number	D	
Wt. of Wet Soil + Mold (gm)	12889	
Weight of Mold (gm)	7839	
Weight of Wet Soil (gm)	5050	
Mold Volume (cu.ft)	0.0815	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	492.69	561.22
Dry Wt. Soil + Container (gm)	463.99	520.47
Wt. Container (gm)	149.03	148.92
Mosture Content (%)	9.1	11.0
Average Moisture Content (%)	10.0	
Wet Density (pcf)	136.6	
After Test Dry Density (pcf)	124.2	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration	Mold No.:	D
(inch)	LOAD (lb)	Stress (psi)
0.000	0	0.00
0.025	69	23.00
0.050	147	49.00
0.075	225	75.03
0.100	308	102.71
0.125	374	124.72
0.150	427	142.39
0.175	466	155.40
0.200	501	167.07
0.225	532	177.41
0.250	559	186.41
0.275	585	195.08
0.300	615	205.09
0.325	648	216.09
0.350	680	226.76
0.375	718	239.43
0.400	760	253.44
0.425	804	268.11
0.450	844	281.45
0.475	888	296.12
0.500	937	312.46

TEST RESULTS

CBR @ .1": 10

CBR @ .2": 11

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL

ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-6	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Silty Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	E
Blows Per Layer	25
Wt of Wet Soil & Mold & Spacer (gm)	12978
Weight of Mold & Spacer (gm)	7835
Weight of Wet Soil (gm)	5143
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	944
Dry Wt. Soil + Container (gm)	933.95
Wt. Container (gm)	803.93
Moisture Content (%)	7.73
Wet Density (pcf)	138.6
Dry Density (pcf)	128.7

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	25
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	128.4
Molded Relative Comp (%)	100.2
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698.

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	E
		Dial Rdgs	Swell (in)
03/18/15	17:11	0.5000	
03/20/15	15:46	0.4860	
03/23/15	17:53	0.4890	-0.0110
Percent Swell/Collapse (+/-)			-0.22

AFTER SOAKING

Mold Number	E	
Wt. of Wet Soil + Mold + Base Plate (gm)	13017	
Weight of Mold+ Base Plate (gm)	7835	
Weight of Wet Soil (gm)	5182	
Mold Volume (cu.ft)	0.0816	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	536.34	408.87
Dry Wt. Soil + Container (gm)	507.31	387.63
Wt. Container (gm)	152.06	147.30
Mosture Content (%)	8.2	8.8
Average Moisture Content (%)	8.5	
Wet Density (pcf)	140.0	
After Test Dry Density (pcf)	129.0	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration	Mold No.:	E
(inch)	LOAD (lb)	Stress (psi)
0.000	0	0.00
0.025	34	11.34
0.050	105	35.01
0.078	221	73.70
0.100	374	124.72
0.125	540	180.08
0.150	701	233.76
0.175	851	283.79
0.200	986	328.80
0.225	1107	369.15
0.250	1227	409.17
0.275	1351	450.52
0.300	1476	492.21
0.325	1599	533.22
0.350	1719	573.24
0.375	1835	611.92
0.400	1957	652.61
0.425	2081	693.96
0.450	2207	735.98
0.475	2335	778.66
0.500	2461	820.68

TEST RESULTS

CBR @ .1":	**22**
CBR @ .2":	**27**

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-6	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Silty Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	3
Blows Per Layer	56
Wt of Wet Soil & Mold (gm)	13106
Weight of Mold (gm)	7829
Weight of Wet Soil (gm)	5277
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	944
Dry Wt. Soil + Container (gm)	933.95
Wt. Container (gm)	803.93
Moisture Content (%)	7.73
Wet Density (pcf)	142.2
Dry Density (pcf)	132.0

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	56
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	128.4
Molded Relative Comp (%)	102.8
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698.

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	3
		Dial Rdgs	Swell (in)
03/18/15	17:11	0.5180	
03/20/15	15:46	0.5100	
03/23/15	17:53	0.5110	-0.0070
Percent Swell/Collapse (+/-)			-0.14

AFTER SOAKING

Mold Number	3	
Wt. of Wet Soil + Mold + Base Plate (gm)	13127	
Weight of Mold+ Base Plate (gm)	7829	
Weight of Wet Soil (gm)	5298	
Mold Volume (cu.ft)	0.0817	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	569.33	455.60
Dry Wt. Soil + Container (gm)	537.48	433.30
Wt. Container (gm)	148.91	149.83
Mosture Content (%)	8.2	7.9
Average Moisture Content (%)	8.0	
Wet Density (pcf)	143.0	
After Test Dry Density (pcf)	132.4	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration (inch)	Mold No.: LOAD (lb)	3 Stress (psi)
0.000	0	0.00
0.025	25	8.34
0.050	69	23.01
0.075	148	49.35
0.100	272	90.70
0.125	441	147.06
0.150	635	211.76
0.175	828	276.12
0.200	1022	340.81
0.225	1215	405.17
0.250	1403	467.86
0.275	1588	529.56
0.300	1768	589.58
0.325	1943	647.94
0.350	2118	706.30
0.375	2286	762.32
0.400	2456	819.01
0.425	2628	876.37
0.450	2801	934.06
0.475	2980	993.75
0.500	3158	1053.11

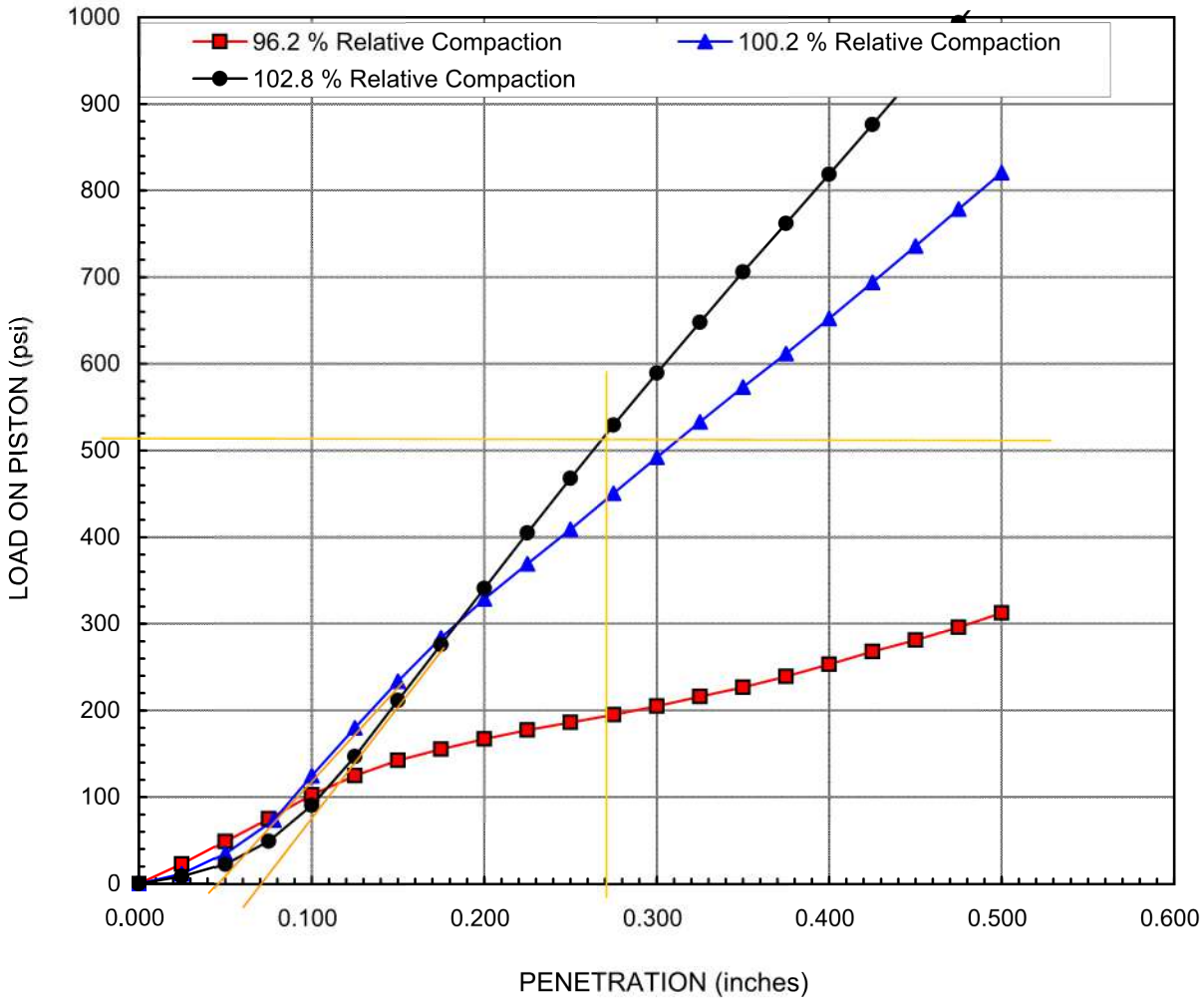
TEST RESULTS

CBR @ .1":	**26**
CBR @ .2":	**35**

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-6	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Silty Sand				



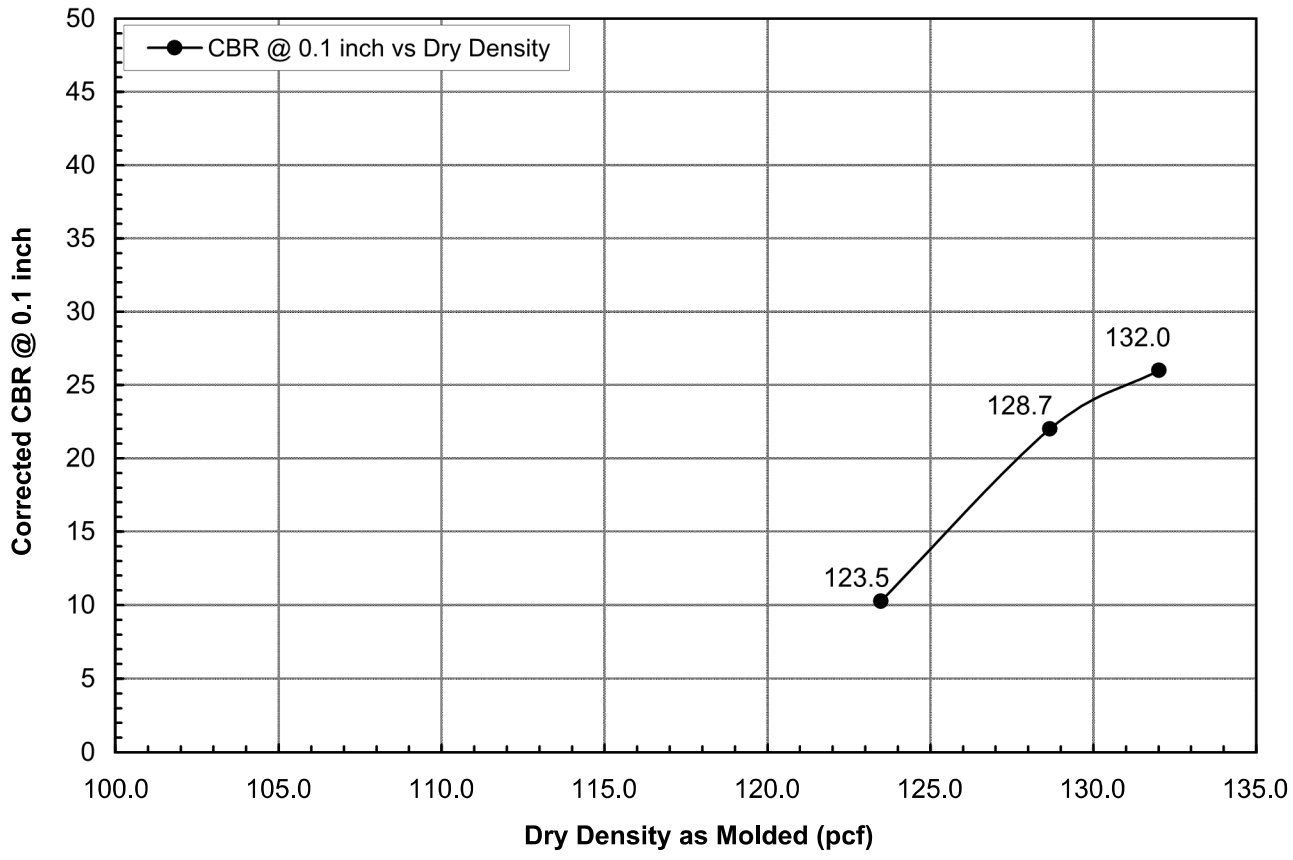
AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-6	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Silty Sand				

TEST RESULTS

Dry Density (pcf)	Maximum Dry Density by ASTM D 698 (pcf)	Relative Compaction (%)	Blow Per Layer	CBR @0.1"	CBR @0.2"
123.5	128.4	96.2	10	10	11
128.7	128.4	100.2	25	22	27
132.0	128.4	102.8	56	26	35



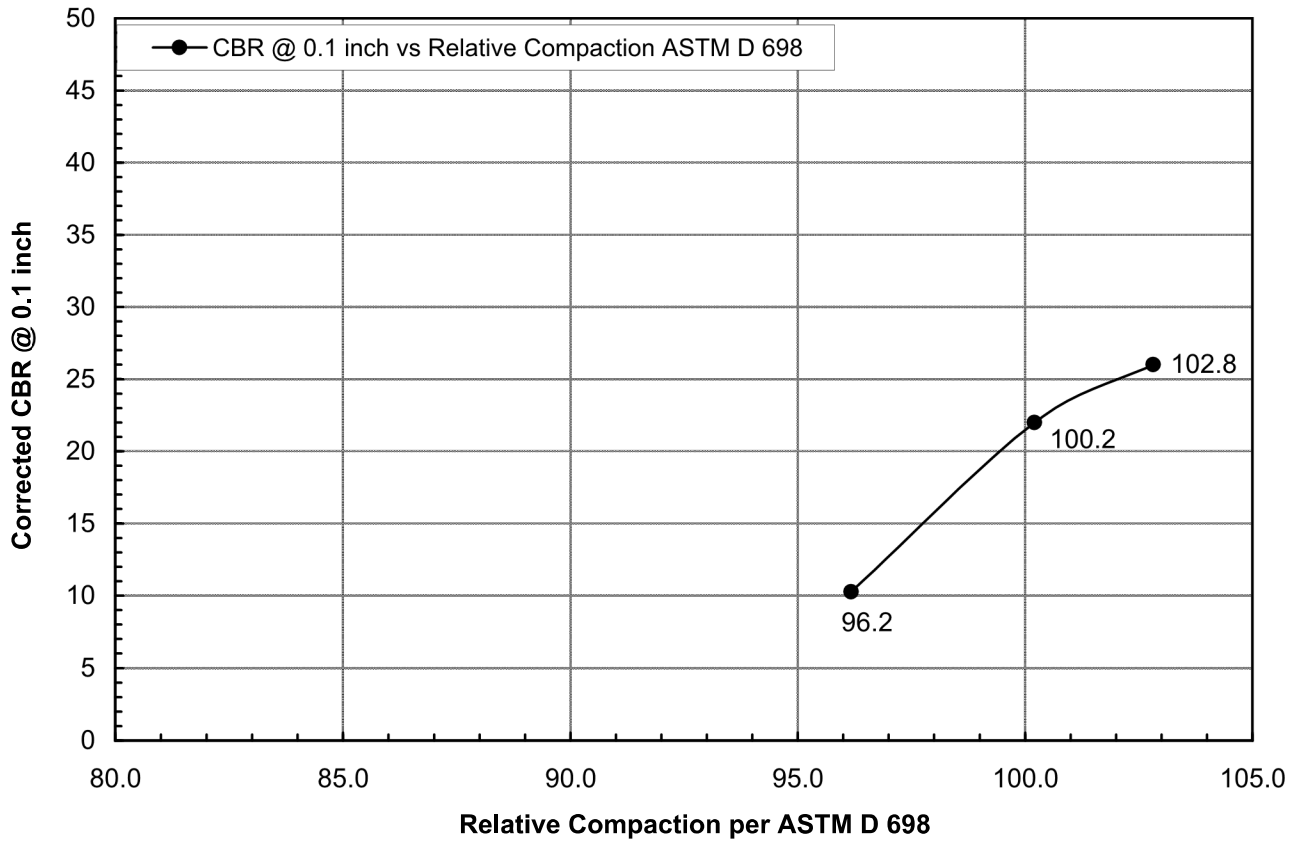
AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-6	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	0-5				
Soil Description :	Silty Sand				

TEST RESULTS

Dry Density (pcf)	Maximum Dry Density by ASTM D 698 (pcf)	Relative Compaction (%)	Blow Per Layer	CBR @0.1"	CBR @0.2"
123.5	128.4	96.2	10	10	11
128.7	128.4	100.2	25	22	27
132.0	128.4	102.8	56	26	35



AP Engineering & Testing, Inc.

COMPACTION TEST

Client: Kleinfelder
AP Number: 15-0313
Project Name: Apple Valley Airport Runway 18/36 Recon
Tested By: JT
Date: 03/16/15
Project No. : 20154622
Calculated By: JP
Date: 03/17/15
Boring No.: B-22
Checked By: AP
Date: 03/23/15
Sample No.: 1
Depth(ft.): 1-5
Visual Sample Description: Silty Sand

Compaction Method
[ ] ASTM D1557
[X] ASTM D698

METHOD: A
MOLD VOLUME (CU.FT): 0.0333

Preparation Method
[ ] Moist
[X] Dry

Wt. Comp. Soil + Mold (gm.)	3877	3981	3971	3908		
Wt. of Mold (gm.)	1866	1866	1866	1866		
Net Wt. of Soil (gm.)	2011	2115	2105	2042		
Container No.						
Wt. of Container (gm.)	151.54	142.09	137.06	129.08		
Wet Wt. of Soil + Cont. (gm.)	474.89	565.97	664.23	757.70		
Dry Wt. of Soil + Cont. (gm.)	453.80	529.15	608.99	682.83		
Moisture Content (%)	6.98	9.51	11.71	13.52		
Wet Density (pcf)	133.00	139.88	139.22	135.05		
Dry Density (pcf)	124.33	127.73	124.63	118.97		

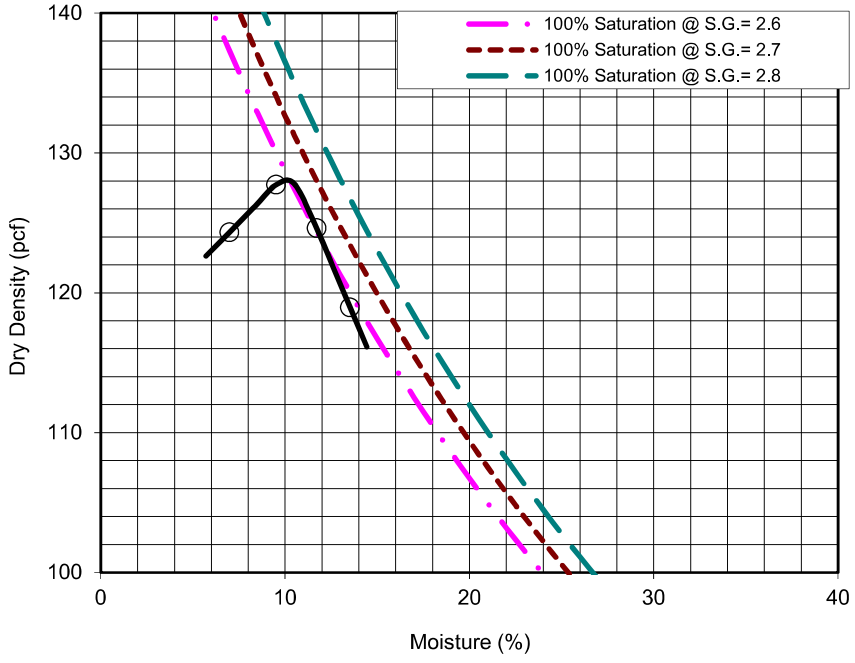
Maximum Dry Density (pcf): 127.9
Maximum Dry Density w/ Rock Correction (pcf): N/A
Optimum Moisture Content (%): 10.1
Optimum Moisture Content w/ Rock Correction (%): N/A

PROCEDURE USED

[X] *METHOD A: Percent of Oversize:* 4.0%
Soil Passing No. 4 (4.75 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 3 (Three)
Blows per layer : 25 (twenty-five)

[ ] *METHOD B: Percent of Oversize:* N/A
Soil Passing 3/8 in. (9.5 mm) Sieve
Mold : 4 in. (101.6 mm) diameter
Layers : 3 (Three)
Blows per layer : 25 (twenty-five)

[ ] *METHOD C: Percent of Oversize:* N/A
Soil Passing 3/4 in. (19.0 mm) Sieve
Mold : 6 in. (152.4 mm) diameter
Layers : 3 (Three)
Blows per layer : 56 (fifty-six)



AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-22	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	1-5				
Soil Description :	Silty Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	A
Blows Per Layer	10
Wt of Wet Soil & Mold (gm)	12897
Weight of Mold (gm)	7856
Weight of Wet Soil (gm)	5041
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	911.9
Dry Wt. Soil + Container (gm)	902.31
Wt. Container (gm)	803.93
Moisture Content (%)	9.75
Wet Density (pcf)	135.9
Dry Density (pcf)	123.8

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	10
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	127.9
Molded Relative Comp (%)	96.8
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698.

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	A
		Dial Rdgs	Swell (in)
03/18/15	15:57	0.5350	
03/20/15	15:05	0.5220	
03/23/15	07:40	0.5240	-0.0110
Percent Swell/Collapse (+/-)			-0.22

AFTER SOAKING

Mold Number	A	
Wt. of Wet Soil + Mold (gm)	12919	
Weight of Mold (gm)	7856	
Weight of Wet Soil (gm)	5063	
Mold Volume (cu.ft)	0.0816	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	486.71	521.59
Dry Wt. Soil + Container (gm)	454.34	490.73
Wt. Container (gm)	148.08	150.61
Mosture Content (%)	10.6	9.1
Average Moisture Content (%)	9.8	
Wet Density (pcf)	136.8	
After Test Dry Density (pcf)	124.5	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration	Mold No.:	A
(inch)	LOAD (lb)	Stress (psi)
0.000	0	0.00
0.025	12	4.00
0.050	34	11.34
0.075	62	20.68
0.100	101	33.68
0.125	149	49.69
0.150	206	68.70
0.175	264	88.04
0.200	323	107.71
0.225	380	126.72
0.250	438	146.06
0.275	495	165.07
0.300	548	182.74
0.325	607	202.42
0.350	663	221.09
0.375	723	241.10
0.400	779	259.78
0.425	839	279.78
0.450	891	297.12
0.475	945	315.13
0.500	1007	335.81

TEST RESULTS

CBR @ .1": 7

CBR @ .2": 10

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL

ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-22	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	1-5				
Soil Description :	Silty Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	E
Blows Per Layer	25
Wt of Wet Soil & Mold & Spacer (gm)	13008
Weight of Mold & Spacer (gm)	7839
Weight of Wet Soil (gm)	5169
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	911.9
Dry Wt. Soil + Container (gm)	902.31
Wt. Container (gm)	803.93
Moisture Content (%)	9.75
Wet Density (pcf)	139.3
Dry Density (pcf)	126.9

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	25
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	127.9
Molded Relative Comp (%)	99.2
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698.

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	E
		Dial Rdgs	Swell (in)
03/18/15	15:57	0.5540	
03/20/15	15:05	0.5570	
03/23/15	07:40	0.5480	-0.0060
Percent Swell/Collapse (+/-)			-0.12

AFTER SOAKING

Mold Number	E	
Wt. of Wet Soil + Mold + Base Plate (gm)	13018	
Weight of Mold+ Base Plate (gm)	7839	
Weight of Wet Soil (gm)	5179	
Mold Volume (cu.ft)	0.0817	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	586.04	572.76
Dry Wt. Soil + Container (gm)	542.29	532.28
Wt. Container (gm)	125.45	148.85
Mosture Content (%)	10.5	10.6
Average Moisture Content (%)	10.5	
Wet Density (pcf)	139.7	
After Test Dry Density (pcf)	126.4	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration	Mold No.:	E
(inch)	LOAD (lb)	Stress (psi)
0.000	0	0.00
0.025	18	6.00
0.050	48	16.01
0.078	93	31.01
0.100	150	50.02
0.125	221	73.53
0.150	308	102.54
0.175	410	136.56
0.200	512	170.57
0.225	624	208.09
0.250	743	247.60
0.275	864	288.12
0.300	975	325.14
0.325	1103	367.65
0.350	1230	410.17
0.375	1359	453.19
0.400	1487	495.71
0.425	1620	540.23
0.450	1751	583.74
0.475	1886	628.76
0.500	2015	671.78

TEST RESULTS

CBR @ .1":	**13**
CBR @ .2":	**19**

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date	03/14/15
Project No. :	20154622	Input By:	JP	Date	03/24/15
Boring No.:	B-22	Checked By:	AP	Date	03/24/15
Sample No.:	1				
Depth (ft.) :	1-5				
Soil Description :	Silty Sand				

SAMPLE DESCRIPTION BEFORE SOAKING

Mold Number	3
Blows Per Layer	56
Wt of Wet Soil & Mold (gm)	13108
Weight of Mold (gm)	7846
Weight of Wet Soil (gm)	5262
Mold Volume (cu.ft)	0.0818
Container No.	
Wet Wt. Soil + Container (gm)	911.9
Dry Wt. Soil + Container (gm)	902.31
Wt. Container (gm)	803.93
Moisture Content (%)	9.75
Wet Density (pcf)	141.8
Dry Density (pcf)	129.2

SAMPLE PREPARATION

Wt of Hammer (Lbs)	10
No. of Layers	5
No. of Blows/Layer	56
Drop Height (inches)	18
Surcharge Weight (Lbs)	10
Max. Dry Density * (pcf)	127.9
Molded Relative Comp (%)	101.0
Req'd % Moisture	13.5
No. of Trials	1
% Retained 3/4" Sieve	0.00%
Remarks:	* Based on ASTM D 698.

DEFORMATION DURING SOAKING PERIOD

Sample Length (inch) 5

DATE	TIME	Mold No.:	3
		Dial Rdgs	Swell (in)
03/18/15	15:57	0.5850	
03/20/15	15:05	0.5820	
03/23/15	07:40	0.5820	-0.0030
Percent Swell/Collapse (+/-)			-0.06

AFTER SOAKING

Mold Number	3	
Wt. of Wet Soil + Mold + Base Plate (gm)	13106	
Weight of Mold+ Base Plate (gm)	7846	
Weight of Wet Soil (gm)	5260	
Mold Volume (cu.ft)	0.0818	
Moisture Sample	Top	Bottom
Container No.		
Wet Wt. Soil + Container (gm)	555.23	567.70
Dry Wt. Soil + Container (gm)	518.89	530.17
Wt. Container (gm)	149.75	150.03
Mosture Content (%)	9.8	9.9
Average Moisture Content (%)	9.9	
Wet Density (pcf)	141.8	
After Test Dry Density (pcf)	129.1	

TEST LOAD DATA

Piston Diameter (inches): 1.954

Penetration (inch)	Mold No.: LOAD (lb)	3 Stress (psi)
0.000	0	0.00
0.025	22	7.34
0.050	60	20.01
0.075	116	38.68
0.100	198	66.03
0.125	298	99.38
0.150	412	137.39
0.175	548	182.74
0.200	700	233.43
0.225	858	286.12
0.250	1028	342.81
0.275	1198	399.50
0.300	1386	462.19
0.325	1554	518.22
0.350	1724	574.91
0.375	1900	633.60
0.400	2088	696.29
0.425	2274	758.32
0.450	2460	820.34
0.475	2652	884.37
0.500	2846	949.06

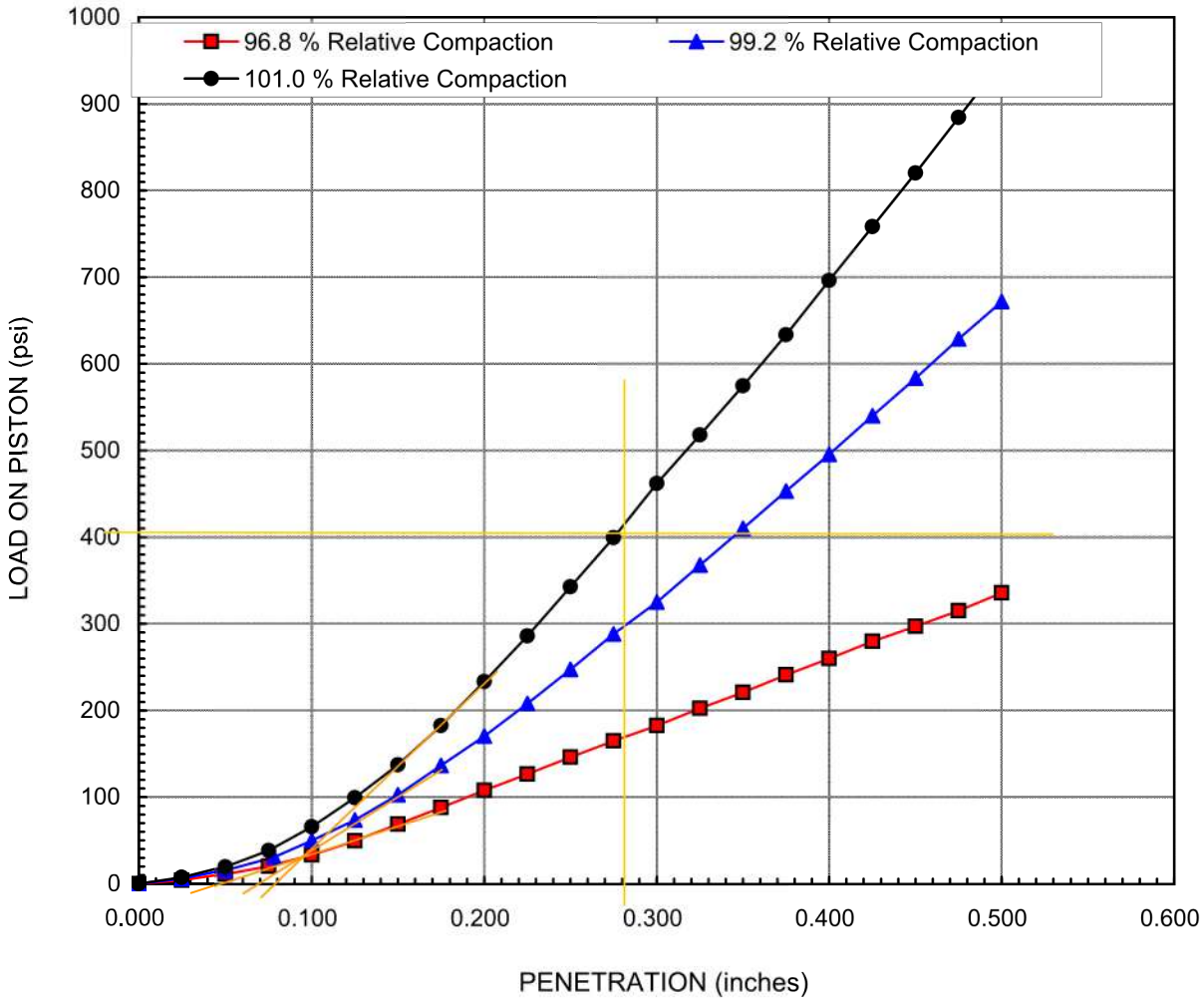
TEST RESULTS

CBR @ .1":	**20**
CBR @ .2":	**27**

AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR)
OF LABORATORY-COMPACTED SOIL
ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-22	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	1-5				
Soil Description :	Silty Sand				



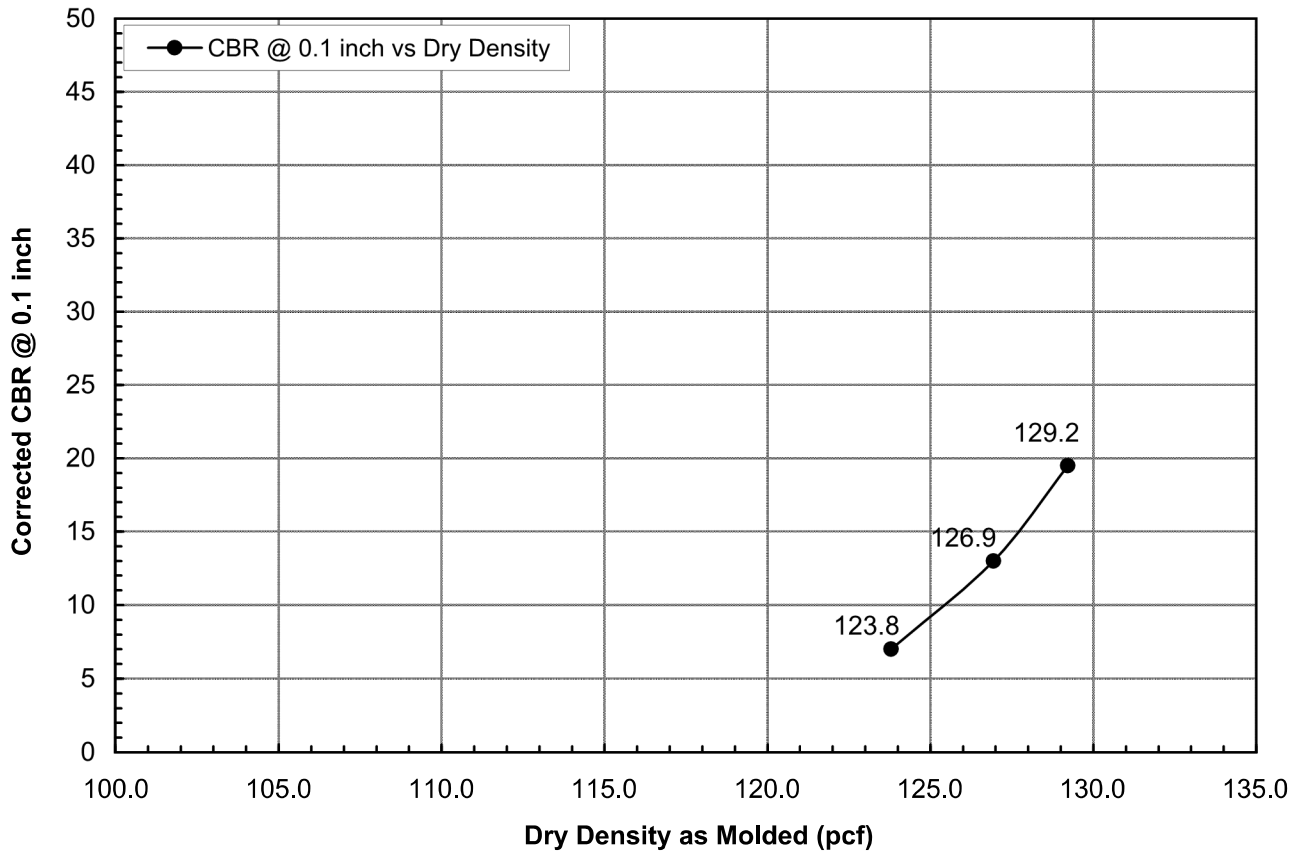
AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-22	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	1-5				
Soil Description :	Silty Sand				

TEST RESULTS

Dry Density (pcf)	Maximum Dry Density by ASTM D 698 (pcf)	Relative Compaction (%)	Blow Per Layer	CBR @0.1"	CBR @0.2"
123.8	127.9	96.8	10	7	10
126.9	127.9	99.2	25	13	19
129.2	127.9	101.0	56	20	27



AP Engineering & Testing, Inc.

CALIFORNIA BEARING RATIO (CBR) OF LABORATORY-COMPACTED SOIL ASTM D 1883-07

Project Name:	Apple Valley Airport Runway 18/36	Tested By :	LS	Date:	03/14/15
Project No. :	20154622	Data Input By:	JP	Date:	03/24/15
Boring No.:	B-22	Checked By:	AP	Date:	03/24/15
Sample No.:	1				
Depth (ft.) :	1-5				
Soil Description :	Silty Sand				

TEST RESULTS

Dry Density (pcf)	Maximum Dry Density by ASTM D 698 (pcf)	Relative Compaction (%)	Blow Per Layer	CBR @0.1"	CBR @0.2"
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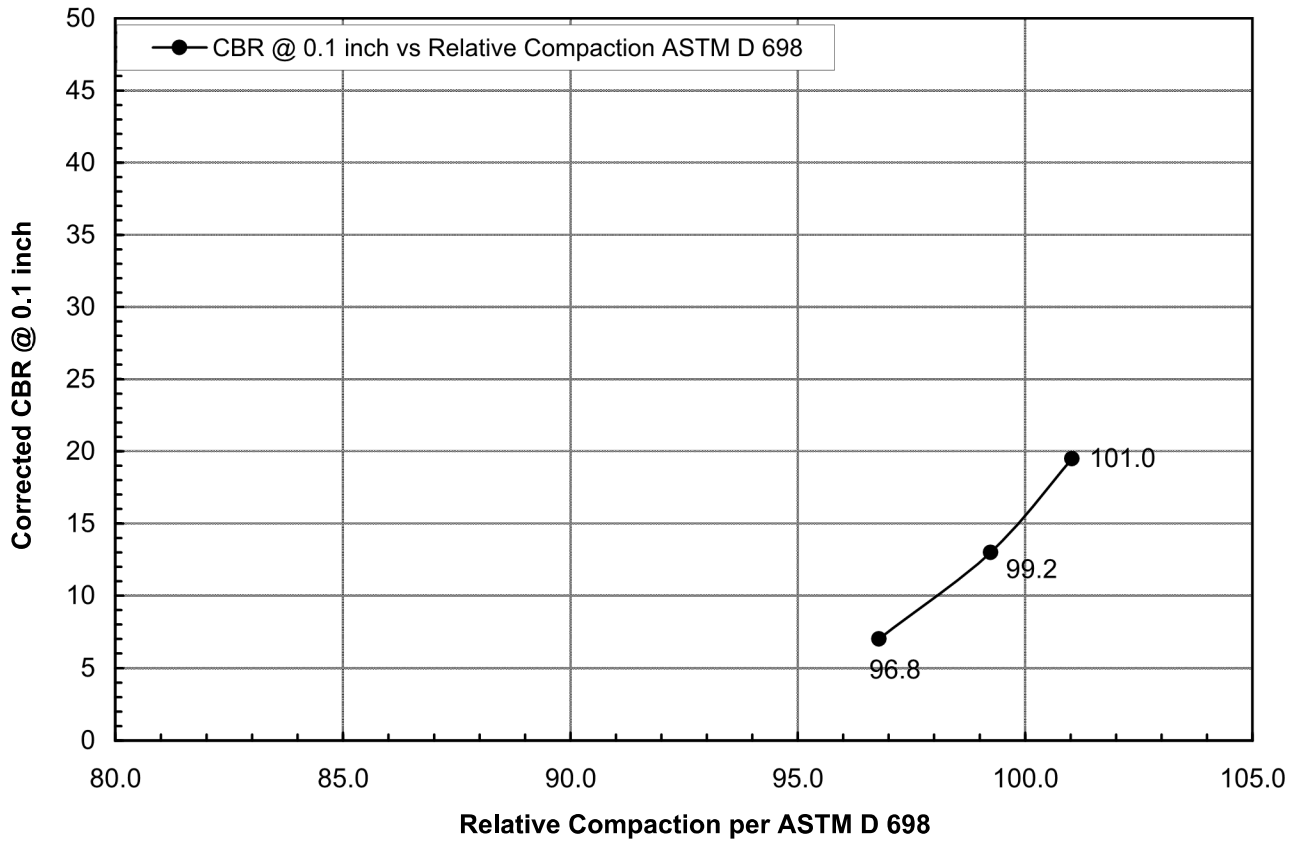
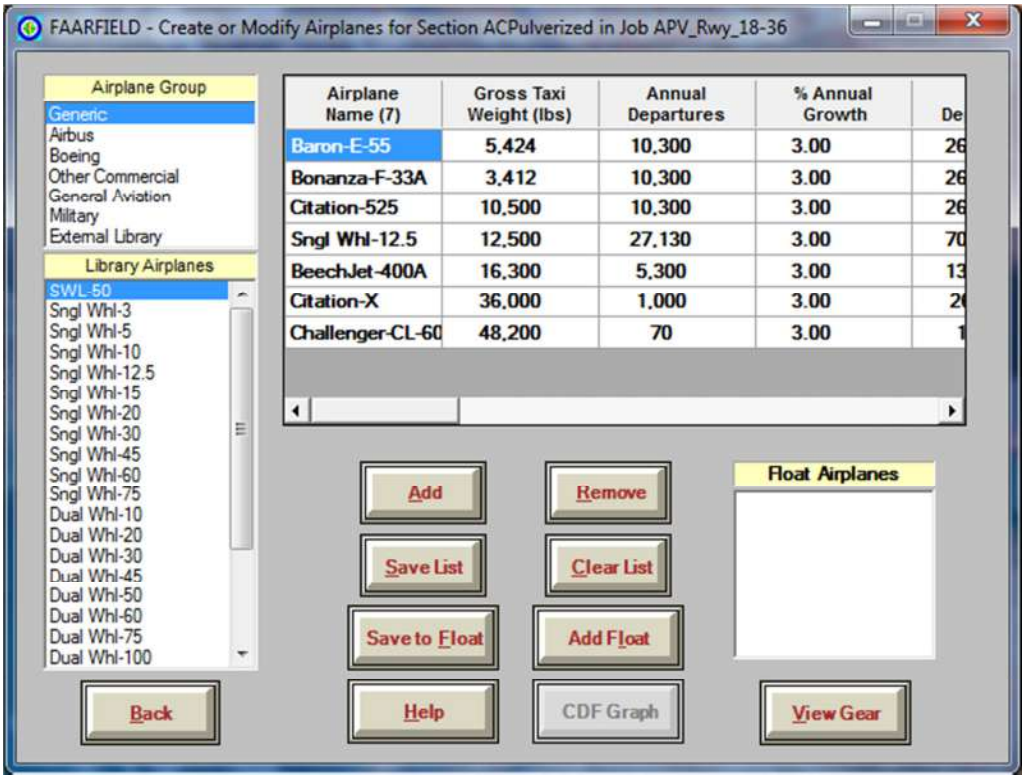
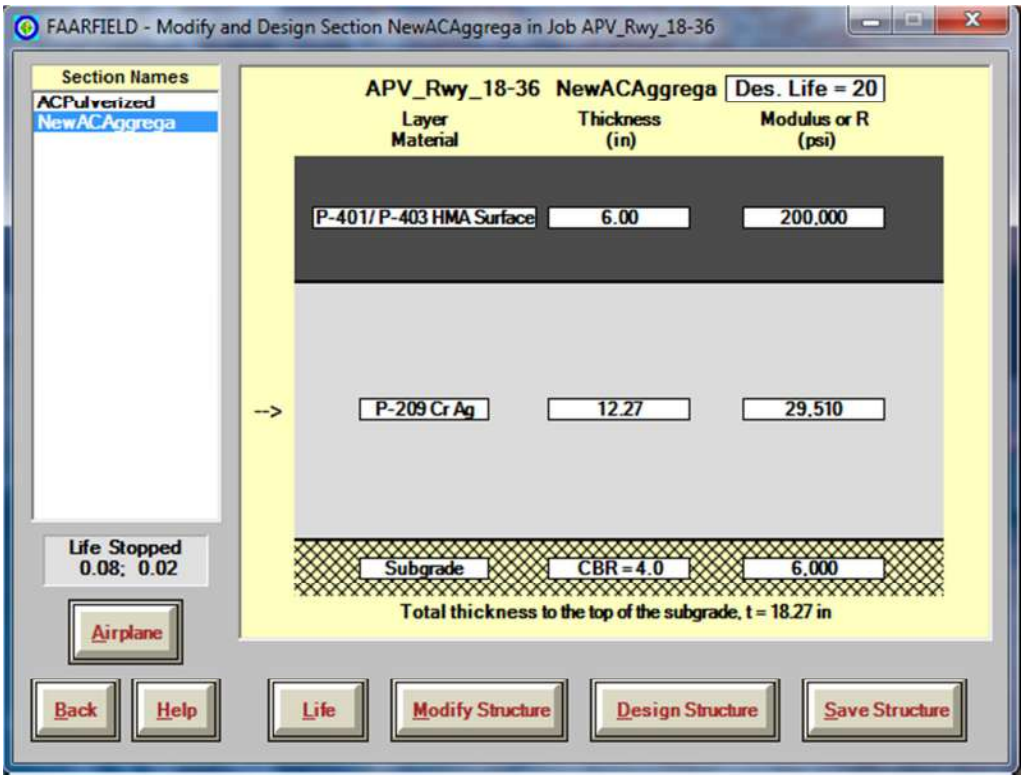
129.2	127.9	101.0	56	20	27



APPENDIX C
Calculations

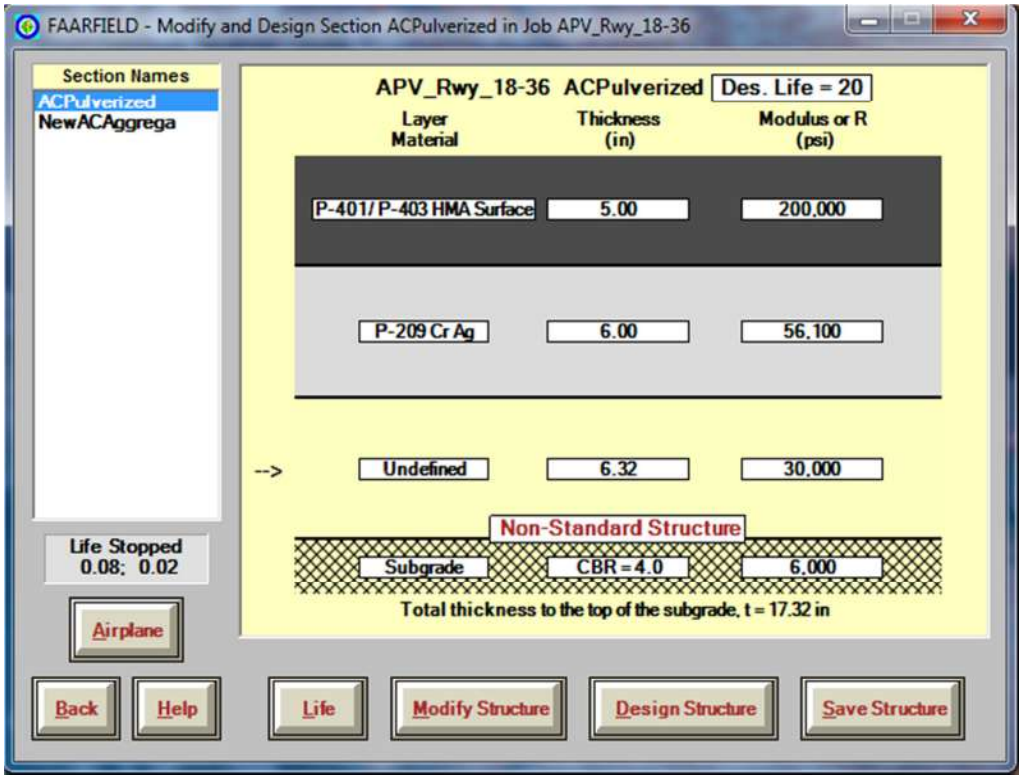


This list of aircraft was provided by C&S Engineers for the pavement section design. The Long Term total of 64,400 annual departures with 3% annual growth were used for the design.



The above pavement section was calculated by FAARFIELD using a CBR of 4. A new pavement section utilizing 6 inches of asphalt over 12 inches of P-209 Crushed Aggregate Base is sufficient.

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	FAARFIELD Calculation Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE C-1



Alternatively, the existing AC pavement and base can be pulvized in placed to serve as the subbase to be overlay by 5 inches of asphalt and 6 inches of P-209 Crushed Aggregate Base.

KLEINFELDER Bright People. Right Solutions.	PROJECT NO. 20154622 DRAWN BY: SK CHECKED BY: KH DATE: 4/6/15 REVISED: 4/6/15	FAARFIELD Calculation Proposed Runway 18-36 Reconstruction Apple Valley Airport 21600 Crowin Road, Apple Valley, CA	FIGURE C-2