February 19, 2019 CTE Job No. 40-3618G

Blue Wave Enterprise, LLC
Attention: Mr. David Brienza
11273 Caminito Aclara
San Diego, CA 92126
Telephone: (619) 981-1234 Via Email: davidbrienza619@gmail.com

Subject: Response to City of Imperial Beach Comments
Proposed Blue Wave Hotel and Residences
550 Highway 75
Imperial Beach, California

References: At end of document

Mr. Brienza:

As requested, Construction Testing & Engineering, Inc. (CTE) provides the following response to the referenced City of Imperial Beach review comments for the subject project.

Comment 1: Address the shoring requirements for parking structure in regards to proximity to existing development. Comment noted on page 13 of the referenced geotechnical investigation report (CTE 2018).

CTE Response 1: Excavations adjacent to existing building and improvements should not extend beneath a 1:1 plane extended downward from the bottom of the nearest edge of existing adjacent foundations. Within areas where proposed excavations must extend beneath the aforementioned 1:1 plane, temporary and/or permanent shoring may be required. Shoring can be designed based on the recommendations presented in the referenced geotechnical report. However, CTE should review and approve shoring plans once completed.

Comment 2: Address the foundation requirements for the combined underground parking and Multi-Story Improvements. Comment noted on page 17 of the referenced geotechnical investigation report (CTE 2018).

CTE Response 2: It is our understanding the project structural engineer incorporated recommendations provided in the referenced geotechnical report into the structural foundation, retaining wall, and structural slab-on-grade design and detailing. CTE is to review structural plans and calculations to ensure general conformance with the recommendations put forth in the referenced geotechnical report.

Comment 3: No specific parking lot recommendations for over the garage, provide recommendations. Comment noted on page 27 of the referenced geotechnical investigation report (CTE 2018).

CTE Response 3: As CTE understands, the proposed parking lot over the garage is an elevated slab and will be completely structural in nature as opposed to a slab-on-grade parking area. Therefore, the structural engineer should design the elevated slab thickness, concrete compressive strength, and reinforcement accordingly.

This letter is subject to the same limitations as previously issued CTE geotechnical documents for this project.

CTE appreciates the opportunity to be of service on this project. Should you have any questions or need further information please do not hesitate to contact this office.

Respectfully submitted,

CONSTRUCTION TESTING & ENGINEERING, INC.

Dan T. Math, GE #2665
Vice President, Principal

Jay F. Lynch, CEG #1890
Principal Engineering Geologist

Rodney J. Jones, RCE #84232
Project Engineer

RJJ/DTM/JFL:nri

Attached:

Geotechnical Related Comments (3 pages) From:
Updated with Engineering/Environmental/Building/Coastal Comments
Mf 1307/Cp 180066/Cup 180067/Drc 180068/Spr 180069/Tpm 180070/Eia 180071 – Construct A New Mixed-Use Development Featuring 47-Hotel Rooms, 51-Apartments, And 7,880 Square Feet Of Commercial
Community Development Department, City of Imperial Beach, dated January 28, 2019

REFERENCES

Report of Geotechnical Investigation
Proposed Blue Wave Hotel and Residences
550 Highway 75, Imperial Beach, California
CTE Job No. 40-3618G dated July 10, 2018

Updated with Engineering/Enviromental/Building/Coastal Comments
Mf 1307/Cp 180066/Cup 180067/Drc 180068/Spr 180069/Tpm 180070/Eia 180071 – Construct A New Mixed-Use Development Featuring 47-Hotel Rooms, 51-Apartments, And 7,880 Square Feet Of Commercial
Community Development Department, City of Imperial Beach, dated January 28, 2019

ATTACHMENT A

GEOTECHNICAL RELATED COMMENTS

If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to divert runoff water from entering the excavation and eroding the slope faces.

4.2.3 Shoring

4.2.3.1 General

Shoring methods such as cantilevered shoring, tied-back walls or bracing with struts may be considered. The actual method of support should be evaluated by a shoring specialist.

The following recommenda ...re detailed recommendations can be pro ...

RESPONSE TO: ADDRESS SHORING REQUIREMENTS FOR PARKING STRUCTURE IN REGARDS TO DEPTH AND PROXIMITY TO EXISTING DEVELOPMENT

Expand analysis

4.2.3.2 Lateral Pressures

For design of cantilevered sh... pressure may be used. It may be assu... ce behind the cantilevered shoring will ... ped by a fluid with a density of 40 poun... per cubic foot. The use of cantilevered shoring is usually limited to a retained height of approximately 15 to 20 feet and shoring adjacent to any existing structures should be carefully evaluated since such shoring will be subject to deflection greater than braced or tied-back shoring.

Footing reinforcement within continuous footings should consist of a minimum of four number 4 bars, two located at the top of the footing and two located at the bottom. This minimum reinforcement is due to geotechnical conditions and is not to be used in lieu of that needed for structural considerations. Reinforcement for isolated footings should be determined by the structural engineer.

Lateral loads for structures supported on spread footings may be resisted by soil friction and by the passive resistance of the soils. A coefficient of friction of 0.3 may be used between foundations and the properly compacted fill supporting materials. The passive resistance of the soils may be assumed equal to the pressure developed by a fluid with a density of 250 pounds per cubic foot. A one-third increase in the [illegible] used for wind or seismic loads.

NO RESPONSE TO:
ADDRESS THE FOUNDATION REQUIREMENTS FOR THE COMBINED UNDERGROUND PARKING & MULTI-STORY IMPROVEMENTS ABOVE.
[illegible] GEN. SUGGESTIONS.

4.3.3 Settlement of Shallow Foundations

We have analyzed settlement potential duri[illegible] performance. Construction settlement is expecte[illegible] structures are brought to their operational weight. [illegible] occur over time as a result of compression o[illegible] Anticipated settlements are related to an applied [illegible] building of 2,500 psf and a footing width of approximately 15 inches.

An unreinforced pavement with the minimum thickness indicated above should generally be constructed with maximum joint spacing of 24 times the pavement thickness, in both directions, and in nearly square patterns. As an alternative, the concrete pavement could be constructed with typical minimal reinforcement consisting of #4 bars at 18 inches, on-center, both ways, at or above mid-slab height and with proper concrete cover.

Recommended asphalt concrete pavement sections are presented below in Table 4.

TABLE 4

PRELIMINARY ASPHALT CONCRETE (AC) PAVEMENT SECTIONS

Traffic Area	Assumed Traffic Index	Design 'R' Value	AC Thickness (inches)	Aggregate Base Thickness* (inches)
Parking Stalls	5.0	10	3	9.0
Drive Lanes	6.0	10	3	12.0

* Minimum R Value of 78.

In addition, it is recommended that pavement areas conform to the following criteria:

- Placement and construction of the recommend performed in accordance with the Standard Construction (Greenbook, latest edition).
- Aggregate base should conform to the specificati Base (Caltrans, 2015) or Greenbook Crushed Aggr
- Pavement sections are prepared assuming that pe including sealing of cracks and other measures.

NO SPECIFIC PARKING LOT RECOMMENDATIONS FOR OVER THE GARAGE

Provide recommendations

Construction Testing & Engineering, South, Inc.
Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

REPORT OF GEOTECHNICAL INVESTIGATION (REVISED)
PROPOSED BLUE WAVE HOTEL AND RESIDENCES
550 HIGHWAY 75
IMPERIAL BEACH, CALIFORNIA

PREPARED FOR:

BLUE WAVE ENTERPRISE, LLC
MR. DAVID BRIENZA
11273 CAMINITO ACLARA
SAN DIEGO, CALIFORNIA 92126

PREPARED BY:

CONSTRUCTION TESTING & ENGINEERING, SOUTH, INC.
14538 MERIDIAN PARKWAY, SUITE A
RIVERSIDE, CA 92518

CTE JOB NO. 40-3618G **NOVEMBER 29, 2018**

TABLE OF CONTENTS

1.0 INTRODUCTION AND SCOPE OF SERVICES

1.1 Introduction

Construction Testing and Engineering, South, Inc. (CTE) has prepared this report for Blue Wave Enterprise, LLC. Presented herein are the results of the subsurface investigation performed as well as recommendations regarding the geotechnical engineering and dynamic loading criteria for the proposed improvements. Figure 1 shows the site location.

1.2 Site Description and Proposed Construction

The Blue Wave Hotel and Residences will be located at 550 Highway 75 in Imperial Beach, California. The site is relatively level with sparse vegetation. It has an area of approximately 1.27 acres. Site coordinates are 32.5853°N and 117.1189°W. The site existing ground surface elevations range from approximately 16 feet above mean sea level (MSL) to approximately 21 feet MSL. The site was previously occupied by a motel which has been removed. A pool was also located on the site which has been demolished and backfilled with site soils.

We understand that construction is to consist of developing the parcel into a mixed-use four-level hotel and residential units, with an underground parking garage. A restaurant building with surface level parking stalls is also proposed. An adjacent parcel to the east was obtained for the development to provide access to 7th Street. This parcel will be developed as an east wing to the hotel/residential structure, which will consist of ground level parking and residential units above. The underground parking garage will occupy a large portion of the site. Its floor slab will be at

an elevation of 9 feet MSL. The structures will be wood-framed with a post-tensioned base floor slabs. The slabs will be eight-inches thick. On-site soils will be utilized with approximately 17,000 cubic yards of export anticipated due to the parking garage excavation.

1.3 Scope of Services

The scope of services provided included:

- Review of referenced geologic and soils reports.
- Coordination of limited utility mark-out and location.
- Obtaining a San Diego County Department of Environmental Health (SD DEH) Boring Permit.
- Excavation of exploratory borings and soil sampling with a truck-mounted drill rig.
- Laboratory testing of selected soil samples.
- Description of the geology and evaluation of potential geologic hazards.
- Engineering and geologic analysis.
- On site percolation tests and calculation of storm water infiltration rates
- Preparation of this summary report.

2.0 FIELD INVESTIGATION AND LABORATORY TESTING

2.1 Field Investigation

CTE conducted a field investigation on May 21, 2018 that included visual reconnaissance and the excavation of seven exploratory borings and four percolation test holes. The geotechnical borings were excavated with a CME 75 truck-mounted drill rig equipped with six-inch diameter, hollow-stem augers extending to a maximum explored depth of up to approximately 46.5 feet below the ground surface (bgs). Additionally, four borings were excavated for percolation

testing. Bulk and relatively undisturbed samples were collected from the cuttings and by driving Standard Penetration Test and Modified California samplers.

The soils were logged in the field by a CTE Engineering Geologist, and were visually classified in general accordance with the Unified Soil Classification System. The field descriptions have been modified, where appropriate, to reflect laboratory test results. Boring logs, including descriptions of the soils encountered, are included in Appendix A. Approximate locations of the borings are shown on Figure 2.

2.2 Laboratory Testing

Laboratory tests were conducted on selected soil samples for classification purposes and to evaluate physical properties and engineering characteristics. Laboratory tests conducted include: In-Place Moisture Content and Dry Density, Direct Shear, Consolidation, Gradation, Expansion Index (EI), Atterberg Limits, and Chemical Characteristics. Test descriptions and laboratory test results for the selected soils are included in Appendix B.

2.3 Percolation Tests

Percolation tests were performed for BMP basin design. Results are included in Appendix C.

3.0 GEOLOGY

3.1 General Setting

The San Diego region is located within the Peninsular Ranges physiographic province that is characterized by northwest-trending mountain ranges, intervening valleys, and predominantly

northwest trending regional faults. The San Diego region can be further subdivided into the coastal plain area, a central mountain–valley area, and the eastern mountain valley area. The project site is located within the coastal plain area, which is generally underlain by Cretaceous and Tertiary sedimentary deposits that onlap an eroded basement surface consisting of Jurassic and Cretaceous crystalline rocks.

3.2 Geologic Conditions

Based on the regional geologic map prepared by Kennedy and Tan (2008), the near surface geologic unit underlying the site consists of Quaternary Older Paralic Deposits- Unit 6. Based on recent site explorations, Quaternary Previously Placed Fill was encountered at the surface. The fill was observed to be underlain at shallow depths by the Paralic Deposits. Descriptions of the geologic units encountered during the investigation are presented below.

3.2.1 Quaternary Previously Placed Fill

Quaternary Previously Placed Fill was encountered in each of the explorations to a maximum depth of approximately 2.5 feet below ground surface (bgs). The fill soils observed were variable across the site and consisted generally of loose to medium dense, slightly moist, light brown to red brown, silty to clayey fine grained sand. Localized depths of fill soils may be greater than encountered during the explorations. Based on the noted conditions, fill soils are generally not suitable for support of improvements or additional fill in their current condition.

3.2.2 Quaternary Older Paralic Deposits, Unit 6

Quaternary Older Paralic Deposits, Unit 6 were encountered beneath the surficial fill in the borings and extended to the maximum explored depth of 43 feet bgs. Paralic Deposits observed in the explorations consist generally of stiff to hard, fine sandy clays and clayey sands beneath the fill soil (clays observed as deep as nine feet bgs in boring, B-1) as well as medium dense to very dense, slightly moist to wet (near groundwater elevation), gray brown to red brown, silty, fine grained to poorly graded sands with gravels and cobbles. Some interbedded silts were also observed.

3.3 Groundwater Conditions

Groundwater was encountered in Borings B-1 and B-2 at approximately 16.5 to 17 feet bgs, respectively. Groundwater conditions are anticipated to vary, especially during and after periods of sustained precipitation or irrigation, and may be tidally influenced based on the site's proximity to the San Diego Bay to the north and Pacific Ocean to the west. As such, deep excavations may require dewatering and stabilization. Subsurface water could seasonally impact excavations or earthwork during the proposed development and moisture conditioning of site soils may be necessary during grading.

3.4 Geologic Hazards

Geologic hazards that were considered to have potential impacts to site development were evaluated based on field observations, literature review, and laboratory test results. It appears that the geologic hazards at the site are primarily limited to those caused by shaking from earthquake-generated ground motions. It is noted that a tsunamic inundation risk is mapped near

but not onto the site. The following paragraphs discuss the geologic hazards considered and their potential risk to the site.

3.4.1 Surface Fault Rupture

Based on the site reconnaissance and review of referenced literature, the site is not within a State of California-designated Alquist-Priolo Earthquake Fault Studies Zone or City Special Studies Zone, and no known active fault traces underlie, or project toward the site. According to the California Division of Mines and Geology, a fault is active if it displays evidence of activity in the last 11,000 years (Hart and Bryant, revised 2007). Therefore, the potential for surface rupture from displacement or fault movement beneath the proposed improvements is considered to be low.

3.4.2 Local and Regional Faulting

The California Geological Survey (CGS) and the United States Geological Survey (USGS) broadly group faults as “Class A” or “Class B” (Cao, 2003; Frankel et al., 2002). Class A faults are generally identified based upon relatively well-defined paleoseismic activity, and a fault-slip rate of more than 5 millimeters per year (mm/yr). In contrast, Class B faults have comparatively less defined paleoseismic activity, and are considered to have a fault-slip rate less than 5 mm/yr. The controlling faults in the region are generally strike–slip. The nearest known Class B fault is the Rose Canyon Fault that is approximately 14.7 kilometers west of the site (Blake, T.F., 2000). The nearest known Class A fault is the Julian segment of the Elsinore Fault that is located approximately 77.2 kilometers northeast of the site. The following Table 1 presents the known faults

nearest to the site, including estimated magnitude and fault classification. Figure 4 shows regional faults and seismicity with respect to the site.

TABLE 1
NEAR-SITE FAULT PARAMETERS

FAULT NAME	APPROXIMATE DISTANCE FROM SITE (KM)	MAXIMUM ESTIMATED EARTHQUAKE MAGNITUDE	CLASSIFICATION
Rose Canyon	14.0	7.2	B
Coronado Bank	17.6	7.6	B
Newport-Inglewood	69.8	7.1	B
Elsinore-Julian	76.4	7.1	A
Elsinore-Coyote Mountain	82.6	6.8	A
Earthquake Valley	82.6	6.5	B

The site could be subjected to significant shaking in the event of a major earthquake on any of the faults listed above or other faults in the southern California or northern Baja California area.

North trending faults are mapped by Kennedy and Tan (2008) to be offshore at an approximate distance of 6,800 feet west of the site. These faults do not trend toward or underlie the site. Activity of these faults has not been established.

3.4.3 Liquefaction and Seismic Settlement Evaluation

Liquefaction occurs when saturated fine sands, silts or low plasticity clays lose their physical strength during earthquake-induced shaking and behave as a liquid. This is due

to loss of point-to-point grain contact and transfer of normal stress to the pore water. Liquefaction potential varies with groundwater level, soil type, material gradation, relative density, and the intensity and duration of ground shaking.

A quantitative liquefaction analysis was performed using the computer program LiquefyPro and the data obtained from borings B-1 and B-2. An anticipated high groundwater level of 15 feet was used for the analysis. A peak ground acceleration of 0.499g and earthquake magnitude of 7.2 were used. As recommended in California Geological Survey Special Publication 117A, a safety factor of 1.3 was used. The output file for the analysis is presented in Appendix C.

Potential total liquefaction settlement is estimated to be 1.69 inches and differential settlement of less than ½ inch over a distance of 30 feet. These settlements should be anticipated in the event of a major magnitude earthquake in the immediate vicinity of the site and should be incorporated into the design of the project, as necessary.

3.4.4 Tsunamis and Seiche Evaluation

According to State of California Emergency Management Agency (CalEMA, 2009) mapping, the site is not located within a tsunami inundation zone. It appears that tsunami inundation potential is located approximately 250 feet north of the northern property line. The inundation zone is subject to the limitations and uncertainties as stated by CalEMA

(2009). Damage resulting from oscillatory waves (seiches) is considered unlikely due to the absence of nearby confined bodies of water.

3.4.5 Landsliding

According to mapping by Tan (1995), the site is within an urbanized area considered "Marginally Susceptible" to landsliding. However, landslides are not mapped in the site area, and no evidence of landsliding was encountered during the recent field exploration. Based on the site conditions, such as low surface gradient relief, landsliding is not considered to be a significant geologic hazard within the subject site.

3.4.6 Compressible and Expansive Soils

Based on recent observations and testing, the Previously Placed Fill encountered at the site is generally considered to be compressible under the proposed loading conditions. Surficial soils were also found to be locally disturbed and weathered. Therefore, it is recommended that the Previously Placed Fill and disturbed soils be overexcavated, processed and compacted beneath improvement areas as recommended herein. Based on the investigation data, underlying dense native material is not considered to be subject to significant compressibility under the proposed loads.

Based on geologic observation and laboratory testing, the near-surface materials at the site are anticipated to exhibit a low expansion potential (Expansion Index of less than 51). However, clay soils tested from Boring B-6 at five feet bgs indicates an Expansion Index of 64, corresponding to a medium expansion potential. Therefore, the

recommendations provided herein are based upon the anticipated low to medium expansion potential of the site soils encountered. Additional evaluation of soil expansion potential should be conducted during grading and upon completion of rough grading.

3.4.7 Corrosive Soils

Chemical testing was performed to evaluate the potential effects that site soils may have on concrete foundations and various types of buried metallic utilities. Soil environments detrimental to concrete generally have elevated levels of soluble sulfates and/or pH levels less than 5.5. According to American Concrete Institute (ACI) Table 318 4.3.1, specific guidelines have been provided for concrete where concentrations of soluble sulfate (SO_4) in soil exceed 0.1 percent by weight. These guidelines include low water/cement ratios, increased compressive strength, and specific cement type requirements. Based on the results of the sulfate and pH testing performed, onsite soils are anticipated to generally have a low to moderate corrosion potential to portland cement concrete improvements (ACI Exposure Category S0). We recommend that Type II or Type V cement be used. We further recommend that at least a 3-inch thick concrete cover be maintained over the reinforcing steel in concrete in contact with the soil.

A minimum resistivity value less than approximately 5,000 ohm-cm, and/or soluble chloride levels in excess of 200 ppm generally indicate a corrosive environment to buried metallic utilities and untreated conduits. Based on the obtained minimum resistivity values of 285 ohm-cm and soluble chloride level of 473 ppm in Boring, B-2, on-site soils are anticipated to have a moderate to very severe corrosion potential for buried

uncoated/unprotected metallic conduits. Based on these results, at a minimum, the use of buried plastic piping or conduits would appear logical, where feasible.

The results of the chemical tests performed are presented in Appendix B. CTE does not practice corrosion engineering. Therefore, a corrosion engineer or other qualified consultant could be contacted if site specific corrosivity evaluation is needed.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 General

Based on our investigation, the proposed construction on the site is feasible from a geotechnical standpoint, provided the recommendations in this report are incorporated into design and construction of the project. Preliminary recommendations for the design and construction of the proposed development are included in the subsequent sections of this report. Additional recommendations could be required based on the actual conditions encountered during earthwork and/or improvement construction.

4.2 Site Preparation

4.2.1 General

Prior to grading, the site should be cleared of existing pavement, debris and deleterious materials including utilities, flatwork and footings, if present from previous site improvements. In areas to receive structures or distress-sensitive improvements, expansive, surficial eroded, desiccated, burrowed, or otherwise loose or disturbed soils should be removed to the depth of competent natural material. Concrete, organic and

other deleterious materials not suitable for use as structural backfill, should be disposed of offsite at a legal disposal site. The former pool location should be excavated and backfilled with compacted fill. Excavated fill from the pool area used for backfill should be free of debris and deleterious materials, including concrete and other pool materials.

4.2.2 Remedial Grading and Excavations

In order to provide uniform slab support, building pads not over the underground parking garage should be excavated to a depth of five feet below existing grade. The excavations should extend 5 feet beyond the outside edge of the proposed footings. The soils exposed at the base of the excavations should be observed by a geotechnical representative of this office to determine their suitability prior to fill placement.

Over-excavation for the underground parking garage is not expected to be needed, as competent natural sandy soils are anticipated at the proposed garage foundation depth. Remedial grading for the underground parking garage foundation should consist of 8-inch scarification and compaction of the subgrade to provide relatively uniform slab support.

Temporary, unsurcharged excavations up to four feet deep may be cut vertically. Deeper excavations should be sloped back or shored. Temporary sloped excavations should be cut at a slope of 1:1 (horizontal:vertical) or flatter. Permanent slopes should be no steeper than 2:1. Vehicles and storage loads should not be placed within 10 feet of the top of the excavation. Deeper temporary slopes may be sloped or retained with shoring.

If temporary slopes are to be maintained during the rainy season, berms are recommended along the tops of slopes to divert runoff water from entering the excavation and eroding the slope faces.

4.2.3 Shoring

4.2.3.1 General

Shoring methods such as cantilevered shoring, tied-back walls or bracing with struts may be considered. The actual method of support should be evaluated by a shoring specialist.

The following recommendations are preliminary. Additional and more detailed recommendations can be provided on request.

4.2.3.2 Lateral Pressures

For design of cantilevered shoring, a triangular distribution of lateral earth pressure may be used. It may be assumed that the retained soils with a level surface behind the cantilevered shoring will exert a lateral pressure equal to that developed by a fluid with a density of 40 pounds per cubic foot. The use of cantilevered shoring is usually limited to a retained height of approximately 15 to 20 feet and shoring adjacent to any existing structures should be carefully evaluated since such shoring will be subject to deflection greater than braced or tied-back shoring.

4.2.3.3 Design of Soldier Piles

For the design of soldier piles spaced at least two diameters on-center, the allowable lateral bearing value (passive value) of the soils below the level of excavation may be assumed to be 250 pounds per square foot per foot of depth. To develop the full lateral value, provisions should be taken to assure firm contact between the soldier piles and the undistributed soils. The concrete placed in the soldier pile excavations may be a lean-mix concrete. However, the concrete used in that portion of the pile which is below the planned excavated level should be of sufficient strength to adequately transfer the imposed loads to the surrounding materials.

4.2.3.4 Lagging

Continuous lagging will be required between the soldier piles. The lagging should be installed as the excavation proceeds. The soldier piles should be designed for the full anticipated lateral pressure. However, the pressure on the lagging will be less due to arching in the soils. We recommend that the lagging be designed for the recommended earth pressure but limited to a maximum value of 400 pounds per square foot.

4.2.3.5 Monitoring

Some means of monitoring the performance of the shoring system is recommended. The monitoring should consist of periodic surveying of the lateral and vertical locations of the tops of soldier piles and the lateral movement along the lengths of selected soldier piles.

4.2.4 Preparation of Areas to Receive Fill

Exposed excavation bottoms and subgrade surfaces to receive fill should be scarified to a minimum depth of 8 inches, brought to above optimum moisture content and compacted to at least 90 percent of the maximum dry density as determined by ASTM D 1557.

4.2.5 Fill Placement and Compaction

Structural fill and backfill should be compacted to at least 90 percent of the maximum dry density (per ASTM D 1557) at a moisture content above optimum. Compaction equipment should be appropriate for the materials being compacted. The optimum lift thickness for fill soils will be dependent on the type of compaction equipment being utilized. Generally, fill should be placed in uniform horizontal lifts not exceeding 8 inches in loose thickness. Placement and compaction of fill should be performed in general conformance with geotechnical recommendations and local ordinances.

Rocks or other soil fragments greater than three inches in least dimension should not be used in the fills. On-site soils are considered to be acceptable for fill provided they do not contain deleterious materials. Proposed import material should be evaluated by the project geotechnical engineer prior to being placed at the site. Import materials should consist of non-corrosive, granular material with an expansion index less than 20.

4.2.6 Utility Trenches

Utility trenches should be excavated in accordance with the recommendations presented in Section 4.2.2. Backfill should be placed in loose lifts no greater than eight inches and

mechanically compacted to a relative compaction of at least 90 percent of the maximum dry density (per ASTM D 1557) at a moisture content above optimum.

4.3 Foundations and Slab Recommendations

4.3.1 General

Foundations and slabs for the proposed structures should be designed in accordance with structural considerations and the following minimum preliminary geotechnical recommendations. Foundations for the underground parking garage are expected to be supported in competent natural soils. Foundations for structures not above the parking garage are expected to be supported in properly compacted fill, as recommended herein. These recommendations assume that the foundation soils will have medium potential for expansion.

4.3.2 Shallow Foundations

It is our opinion that the use of isolated and continuous footings will be geotechnically suitable for this project. We recommend that continuous footings be constructed a minimum of 15 inches wide and be founded at least 18 inches below the lowest adjacent rough grade elevation. Dimensions for isolated footings should be a minimum of 24 inches square and founded at least 18 inches below top of slab elevation.

Foundation dimensions should be based on an allowable bearing pressure of 2,500 pounds per square foot (psf) for the minimum footing dimensions noted above. The allowable bearing value may be increased by one-third for short-duration loading which includes the effects of wind or seismic forces.

Footing reinforcement within continuous footings should consist of a minimum of four number 4 bars, two located at the top of the footing and two located at the bottom. This minimum reinforcement is due to geotechnical conditions and is not to be used in lieu of that needed for structural considerations. Reinforcement for isolated footings should be determined by the structural engineer.

Lateral loads for structures supported on spread footings may be resisted by soil friction and by the passive resistance of the soils. A coefficient of friction of 0.3 may be used between foundations and the properly compacted fill supporting materials. The passive resistance of the soils may be assumed equal to the pressure developed by a fluid with a density of 250 pounds per cubic foot. A one-third increase in the passive value may be used for wind or seismic loads.

4.3.3 Settlement of Shallow Foundations

We have analyzed settlement potential during construction and for long-term performance. Construction settlement is expected to occur as loads are applied and structures are brought to their operational weight. Long-term settlement is expected to occur over time as a result of compression of wetted or partially saturated soil. Anticipated settlements are related to an applied bearing pressure for the proposed building of 2,500 psf and a footing width of approximately 15 inches.

It is anticipated that shallow foundations designed and constructed as recommended will experience maximum total settlement of less than 1 inch and differential static settlement of less than 1/2 inch over a distance of 30 feet or more.

4.3.4 Concrete Slabs-On-Grade

Concrete slabs-on-grade should be designed for the anticipated loading. Lightly loaded concrete slabs should measure a minimum of 5 inches thick, and parking garage slabs-on-grade should be at least 6½ inches thick. Slabs should be reinforced with a minimum of number 4 reinforcing bars placed on 18-inch centers, each way at mid-slab height, and as recommended by the structural engineer. An uncorrected modulus of subgrade reaction of 200 pci may be used for elastic design. The correct placement of the reinforcement in the slab is vital for satisfactory performance under normal conditions. For drive areas above the parking garage, slabs should be designed by the structural engineer for the anticipated vehicle loads.

In areas to receive moisture-sensitive floor coverings or used to store moisture-sensitive materials, a polyethylene moisture vapor retarder (10-mil or thicker) should be placed beneath the slab. A four-inch layer of crushed stone (#4 x3/4") should underlie the moisture vapor retarder. To protect the membrane during steel and concrete placement, a maximum two-inch layer of sand may be placed over the moisture vapor retarder.

It is recommended that a water-cement ratio of 0.5 or less be used for concrete, and that the slab be moist-cured for at least five days in accordance with methods recommended

by the American Concrete Institute. On-site quality control should be used to confirm the design conditions.

As an alternative, a post-tensioned slab may be constructed. Based on our analysis, the following design recommendations may be used:

Allowable Bearing Capacity- 2,500 psf
Building Pad Over-excavation- 5 feet
Friction Coefficient- 0.3
Lateral Load Resistance- 250 pcf
Modulus of Subgrade Reaction- 200 pci (uncorrected)

The following are our recommendations for a post-tensioned slab based on the methods of the Post Tensioning Institute:

Expansion Index		Low to Medium
Assumed Percent Clay		50
Clay Type		Montmorillonite
Approximate Depth of Constant Suction (feet)		7.0
Approximate Soil Suction (pF)		3.6
Approximate Velocity or Moisture Flow (Inches per Month)		0.7
Thornwaite Index		-20
Average Edge Moisture Variation Depth, em (Feet)	Center Lift	5.3
	Edge Lift	2.5
Anticipated Swell, ym (Inches)	Center Lift	3.2
	Edge Lift	0.8

4.3.5 Pipe Bedding and Thrust Blocks

We recommend that pipes be supported on a minimum of 6 inches of sand, gravel, or crushed rock. The pipe bedding material should be placed around the pipe, without voids, and to an elevation of at least 12 inches above the top of the pipe. The pipe bedding material should be compacted in accordance with the recommendations in the earthwork section of this report.

Thrust forces may be resisted by thrust blocks and/or the friction between the pipe and adjacent soil. Thrust blocks may be designed using a passive resistance equal to the pressure developed by a fluid with a density of 250 pounds per cubic foot. A friction value of 0.25 may be used between the pipe and adjacent soil.

4.4 Seismic Design Criteria

The seismic ground motion values listed in Table 2 below were derived in accordance with the ASCE 7-10 Standard that is incorporated into the California Building Code, 2016 (effective January 1, 2017). This was accomplished by establishing the Site Class based on the soil properties at the site, and then calculating the site coefficients and parameters using the United States Geological Survey Seismic Design Maps application for the 2016 CBC values. These values are intended for the design of structures to resist the effects of earthquake ground motions. The site coordinates used in the application were 32.5853°N and 117.1189°W. Site Class D was used for the analysis.

TABLE 2
SEISMIC GROUND MOTION VALUES

PARAMETER	VALUE	CBC REFERENCE (2016)
Site Class	D	ASCE 7, Chapter 20
Mapped Spectral Response Acceleration Parameter, S_S	1.137g	Figure 1613.3.1 (1)
Mapped Spectral Response Acceleration Parameter, S_1	0.432g	Figure 1613.3.1 (2)
Seismic Coefficient, F_a	1.000	Table 1613.3.3 (1)
Seismic Coefficient, F_v	1.500	Table 1613.3.3 (2)
MCE Spectral Response Acceleration Parameter, S_{MS}	1.189g	Section 1613.3.3
MCE Spectral Response Acceleration Parameter, S_{M1}	0.678g	Section 1613.3.3
Design Spectral Response Acceleration Parameter, S_{DS}	0.792g	Section 1613.3.4
Design Spectral Response Acceleration Parameter, S_{D1}	0.452g	Section 1613.3.4
Mapped MCE Geometric Peak Ground Acceleration, PGA_m	0.499g	ASCE 7, Chapter 11
Seismic Design Category	D	ASCE 7, Chapter 11

4.5 Retaining Walls

The following recommendations should be incorporated into retaining wall design and construction. For the design of walls where the surface of the backfill is level, it may be assumed that the on-site sandy soils will exert an active lateral pressure equal to that developed by a fluid with a density of 40 pounds per cubic foot (pcf). The active pressure should be used for walls free to yield at the top at least 0.2 percent of the wall height. For walls restrained at the top so that such movement is not permitted, a pressure corresponding to an equivalent fluid

density of 60 pcf should be used, based on at-rest soil conditions. These pressures should be increased by 20 pcf for walls retaining soils inclined at 2:1 (horizontal:vertical).

For cantilever retaining walls (yielding walls) 6 feet or more in height, lateral pressures due to earthquake motions may be calculated based on work by Seed and Whitman (1970). The total lateral thrust against a properly drained and backfilled cantilever retaining wall above the groundwater level can be expressed as:

$$P_{AE} = P_A + \Delta P_{AE}$$

For non-yielding (or "restrained") walls, the total lateral thrust may be similarly calculated based on work by Wood (1973):

$$P_{KE} = P_K + \Delta P_{KE}$$

Where:

P_A = Static Active Thrust

P_K = Static Restrained Wall Thrust

ΔP_{AE} = Dynamic Active Thrust Increment = $(3/8)\ k_h\ \gamma H^2$

ΔP_{KE} = Dynamic Restrained Thrust Increment = $k_h\ \gamma H^2$

k_h = 2/3 Peak Ground Acceleration =2/3 (PGA_M) = 0.33g

H = Total Height of the Wall

γ = Total Unit Weight of Soil ≈ 135 pounds per cubic foot

The increment of dynamic thrust in both cases should be distributed as an inverted triangle, with a resultant located at 0.6H above the bottom of the wall.

Recommendations for waterproofing the walls to reduce moisture infiltration should be provided by the project architect or structural engineer.

We recommend that walls be backfilled with soil having an expansion index of 20 or less with less than 30 percent passing the #200 sieve. The backfill area should include the zone defined by a 1:1 sloping plane, extended back from the base of the wall footing. Wall backfill should be compacted to at least 90 percent relative compaction, based on ASTM D 1557. Backfill should not be placed until walls have achieved adequate structural strength. Heavy compaction equipment, which could cause distress to walls, should not be used.

The recommended lateral earth pressures presented herein assume that drainage will be provided behind the walls to prevent the accumulation of hydrostatic pressures. A backdrain system (similar to that shown on Figure 5) should be provided to reduce the potential for the accumulation of hydrostatic pressures.

4.6 Underground Parking Garage

The underground parking finish surface will be at an average elevation of 9 feet above MSL (approximately seven to twelve feet below the existing ground surface). Based on the anticipated grading, the garage structure may be founded on spread footings designed in accordance with the foundation recommendations previously presented.

For parking structure walls below grade, we recommend that they be designed for a triangular pressure distribution of 40 pcf. The seismic pressure should be added as outlined in section 4.5. The recommended earth pressure assumes that a drainage system will be installed the behind the base of the walls, so that external water pressure will not develop against the basement walls.

In addition to the recommended earth pressures, the walls adjacent to vehicular traffic areas should be designed to resist a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot surcharge behind the walls due to normal traffic.

4.6.1 Drainage System

Walls below grade should be properly drained. Drainage behind the parking garage walls may be provided by a geosynthetic drainage composite. In our opinion, Miradrain 6000 (or the equivalent), attached to the back of the wall before backfilling, would provide satisfactory drainage. The drain should be placed continuously along the back of the wall and connected to a 6-inch-diameter perforated discharge pipe. The pipe should be sloped at least 2% and surrounded by one cubic foot per foot of filter gravel wrapped in geo-fabric. The drain should discharge through a solid pipe to a sump or other appropriate outlet. The wall should be appropriately waterproofed.

The filter gravel should meet the requirements of Class II Permeable Material as defined in the current State of California, Department of Transportation, Standard Specifications. If Class II Permeable Material is not available, 3/4-inch crushed rock or gravel can be

used. The crushed rock or gravel should have less than 5% passing a No. 200 sieve.

4.7 Vehicular Pavements

Pavement sections were evaluated using a design 'R' value of 10, correlating to a modulus of subgrade reaction of approximately 50 pci for site subgrade soil. The pavement section recommendations are based on the assumption that the subgrade soil (the top 12-inches minimum) will be compacted to a minimum of 95 percent of the maximum dry density (per ASTM D 1557).

If concrete pavement is used, it should have a minimum modulus of rupture (flexural strength) of 600 psi. We estimate that a 4,500 psi 28-day compressive strength concrete would generally provide the minimum required flexural strength; however, other mix designs could also meet the requirements. As such, we recommend that the contractor submit the proposed mix design with necessary documentation to offer a proper level of confidence in the proposed concrete materials. Recommended concrete pavement sections are presented below in Table 3.

TABLE 3

PORTLAND CEMENT CONCRETE (PCC) PAVEMENT SECTION

Traffic Area	Assumed Traffic Index	Design Modulus of Subgrade Reaction (pci)	PCC Thickness (inches)
Parking Stalls	5.0	50	6.5
Drive Lanes	6.0	50	6.5

An unreinforced pavement with the minimum thickness indicated above should generally be constructed with maximum joint spacing of 24 times the pavement thickness, in both directions, and in nearly square patterns. As an alternative, the concrete pavement could be constructed with typical minimal reinforcement consisting of #4 bars at 18 inches, on-center, both ways, at or above mid-slab height and with proper concrete cover.

Recommended asphalt concrete pavement sections are presented below in Table 4.

TABLE 4

PRELIMINARY ASPHALT CONCRETE (AC) PAVEMENT SECTIONS

Traffic Area	Assumed Traffic Index	Design 'R' Value	AC Thickness (inches)	Aggregate Base Thickness* (inches)
Parking Stalls	5.0	10	3	9.0
Drive Lanes	6.0	10	3	12.0

* Minimum R Value of 78.

In addition, it is recommended that pavement areas conform to the following criteria:

- Placement and construction of the recommended pavement section should be performed in accordance with the Standard Specifications for Public Works Construction (Greenbook, latest edition).
- Aggregate base should conform to the specification for Caltrans Class 2 Aggregate Base (Caltrans, 2015) or Greenbook Crushed Aggregate Base.
- Pavement sections are prepared assuming that periodic maintenance will be done, including sealing of cracks and other measures.

4.8 Exterior Flatwork

Exterior concrete flatwork should have a minimum thickness of four inches, unless otherwise specified by the project architect. To reduce the potential for distress to exterior flatwork caused by minor settlement of foundation soils, we recommend that such flatwork be installed with crack-control joints at appropriate spacing as recommended by the structural engineer. Flatwork, such as driveways, sidewalks, and architectural features, should be installed with crack control joints. Subgrade should be prepared in accordance with the earthwork recommendations provided herein. Positive drainage should be established and maintained adjacent to flatwork as per the recommendations of the project civil engineer of record.

4.9 Drainage

Positive drainage at a slope of 2 percent or more should be established for a minimum distance of five feet away from structures and improvements, and as recommended by the project civil engineer of record. To facilitate this, the proper use of construction elements such as roof drains, downspouts, earthen and/or concrete swales, sloped external slabs-on-grade, and subdrains may be employed. Downspouts should have extensions at least three feet long to direct water away from the foundations. The project civil engineer should thoroughly evaluate the on-site drainage and make provisions as necessary to keep surface water from entering structural areas.

4.10 Plan Review

CTE should be authorized to review project grading and foundation plans and the project specifications before the start of earthwork to identify potential conflicts with the recommendations contained in this report.

5.0 LIMITATIONS

The recommendations provided in this report are based on the anticipated construction and the subsurface conditions found in our explorations. The interpolated subsurface conditions should be checked in the field during construction to document that conditions are as anticipated.

Recommendations provided in this report are based on the understanding and assumption that CTE will provide the observation and testing services for the project. Earthwork should be observed and tested to document that grading activity has been performed according to the recommendations contained within this report. The project geotechnical engineer should evaluate footing excavations prior to placement of reinforcing steel.

The field evaluation, laboratory testing and geotechnical analysis presented in this report have been conducted according to current engineering practice and the standard of care exercised by reputable geotechnical consultants performing similar tasks in this area. No other warranty, expressed or implied, is made regarding the conclusions, recommendations and opinions expressed in this report. Variations may exist and conditions not observed or described in this report may be encountered during construction.

This report is applicable to the site for a period of three years after the issue date provided the project remains as described herein. Modifications to the standard of practice and regulatory requirements may necessitate an update to this report prior to the three years from issue.

Our conclusions and recommendations are based on an analysis of the observed conditions. If conditions different from those described in this report are encountered, our office should be notified and additional recommendations, if required, will be provided upon request. CTE should review project specifications for earthwork and foundation related activities prior to the solicitation of construction bids.

We appreciate this opportunity to be of service on this project. If you have questions regarding this report, please do not hesitate to contact the undersigned.

Respectfully submitted,
CONSTRUCTION TESTING & ENGINEERING, SOUTH, INC.

Clifford A. Craft, GE #243
Senior Geotechnical Engineer

Vincent J. Patula, CEG #2057
Senior Engineering Geologist

Robert L. Ellerbusch
Staff Geologist

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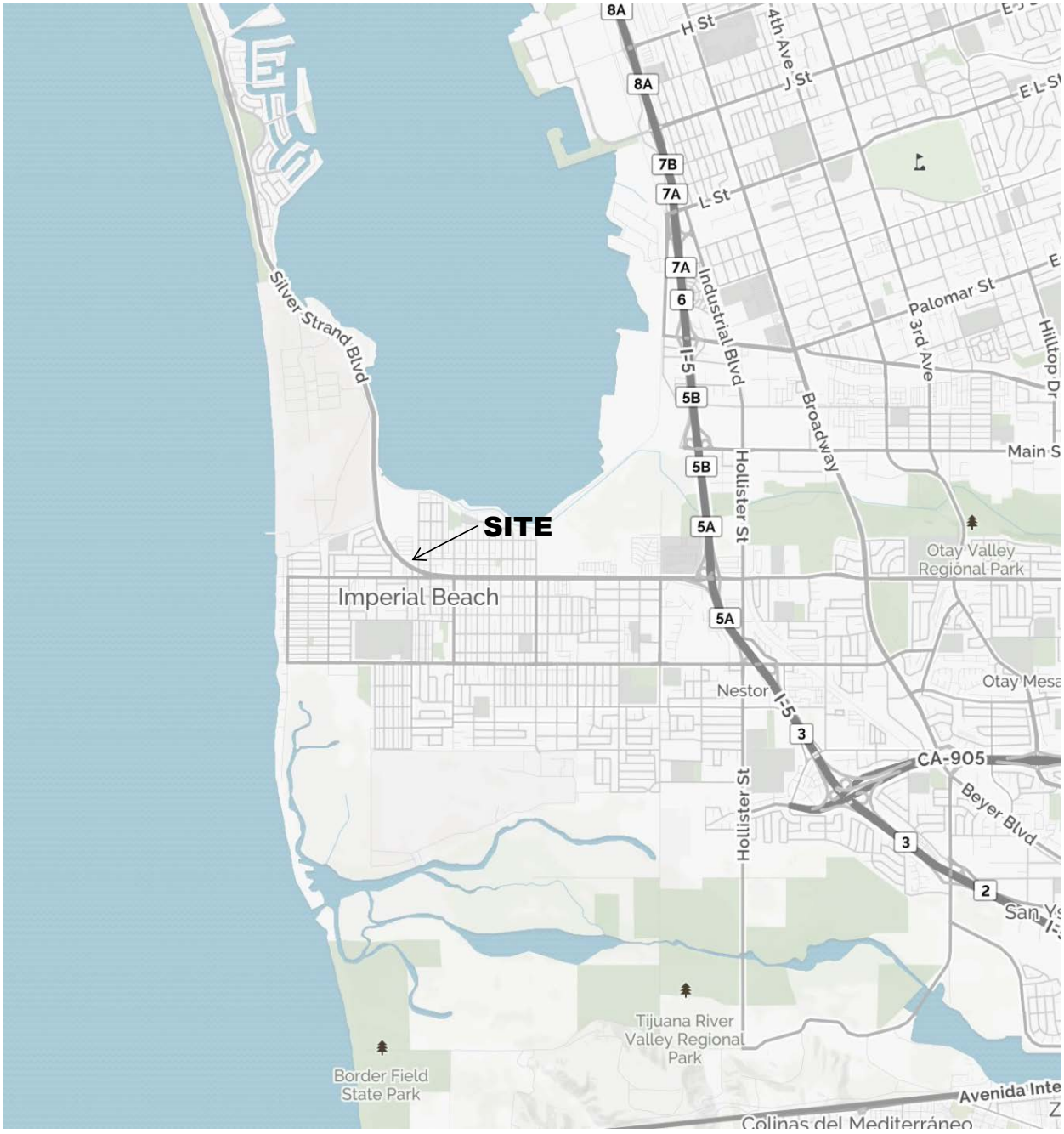

NORTH

NO SCALE

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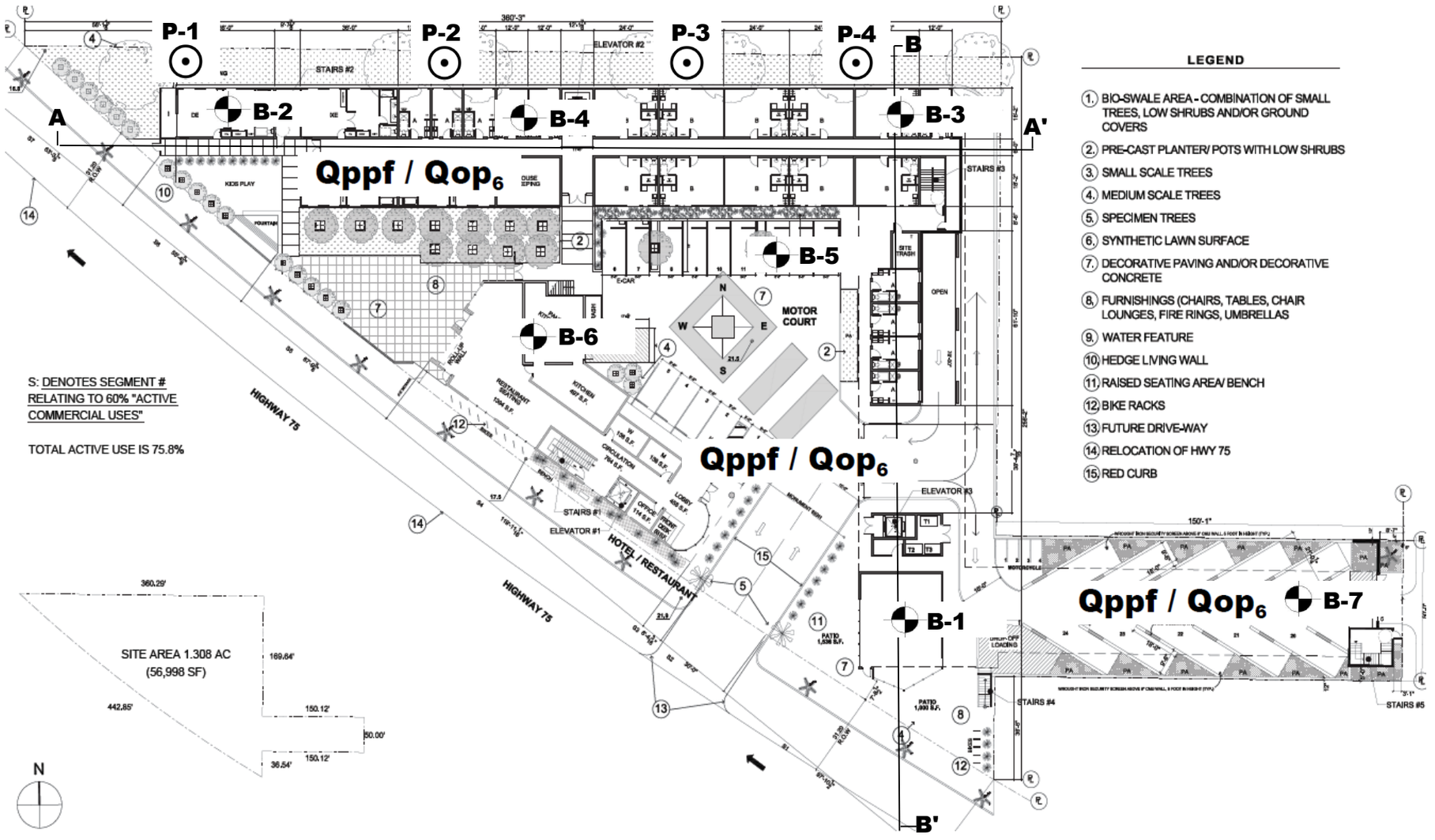
SITE LOCATION MAP

PROPOSED BLUE WAVE HOTEL & RESIDENCES
555 HIGHWAY 75, IMPERIAL BEACH, CALIFORNIA

Job No.	Date	Figure
40-3618G	JUNE 2018	1



GEOTECHNICAL LEGEND

B-1 Approximate Boring Location
P-1 Approximate Percolation Test Location
Qppf Quaternary Previously Placed Fill
Qop6 Quaternary Old Paralic Deposits, Unit 6
A___A' Geologic Cross Section

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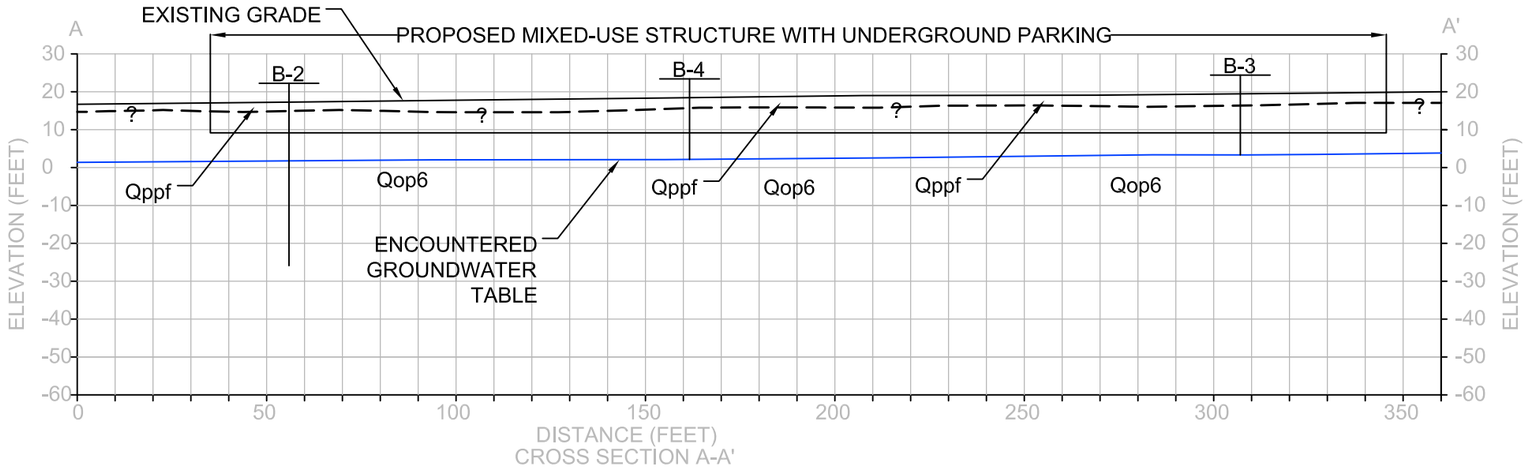
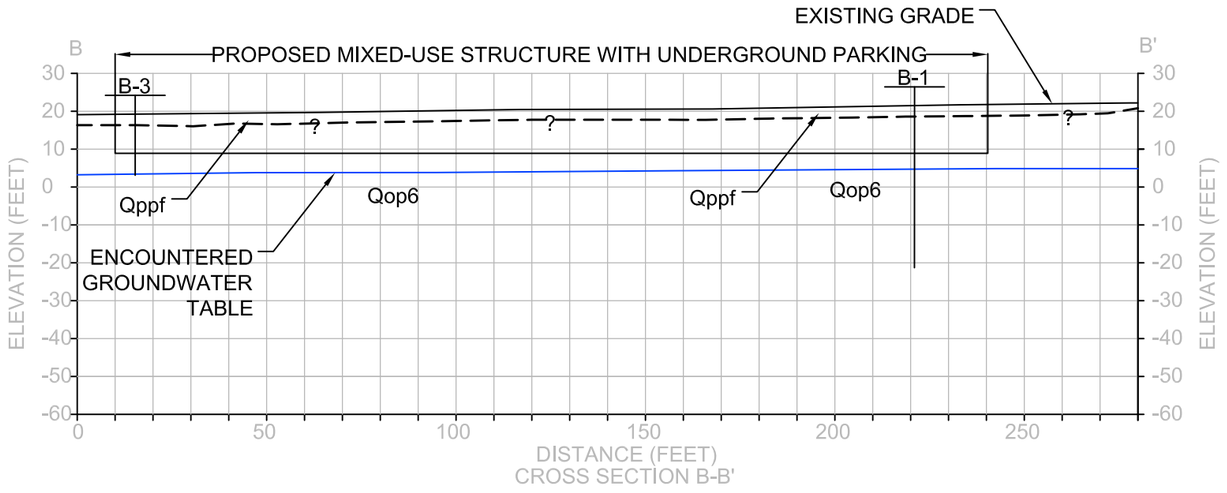
SITE GEOLOGIC & EXPLORATION LOCATION MAP

PROPOSED BLUE WAVE HOTEL & RESIDENCES
IMPERIAL BEACH, CALIFORNIA

Job No.	Date	Figure
40-3618G	NOV 2018	2





LEGEND

B-1	APPROXIMATE BORING LOCATION
– – – – –?– –	APPROXIMATE GEOLOGIC CONTACT QUERIED WHERE UNCERTAIN
Qppf	QUATERNARY PREVIOUSLY PLACED FILL
Qop6	QUATERNARY OLD PARALIC DEPOSITS, UNIT 6

0 20’ 40’ 80’

1 inch = 40’ ft.

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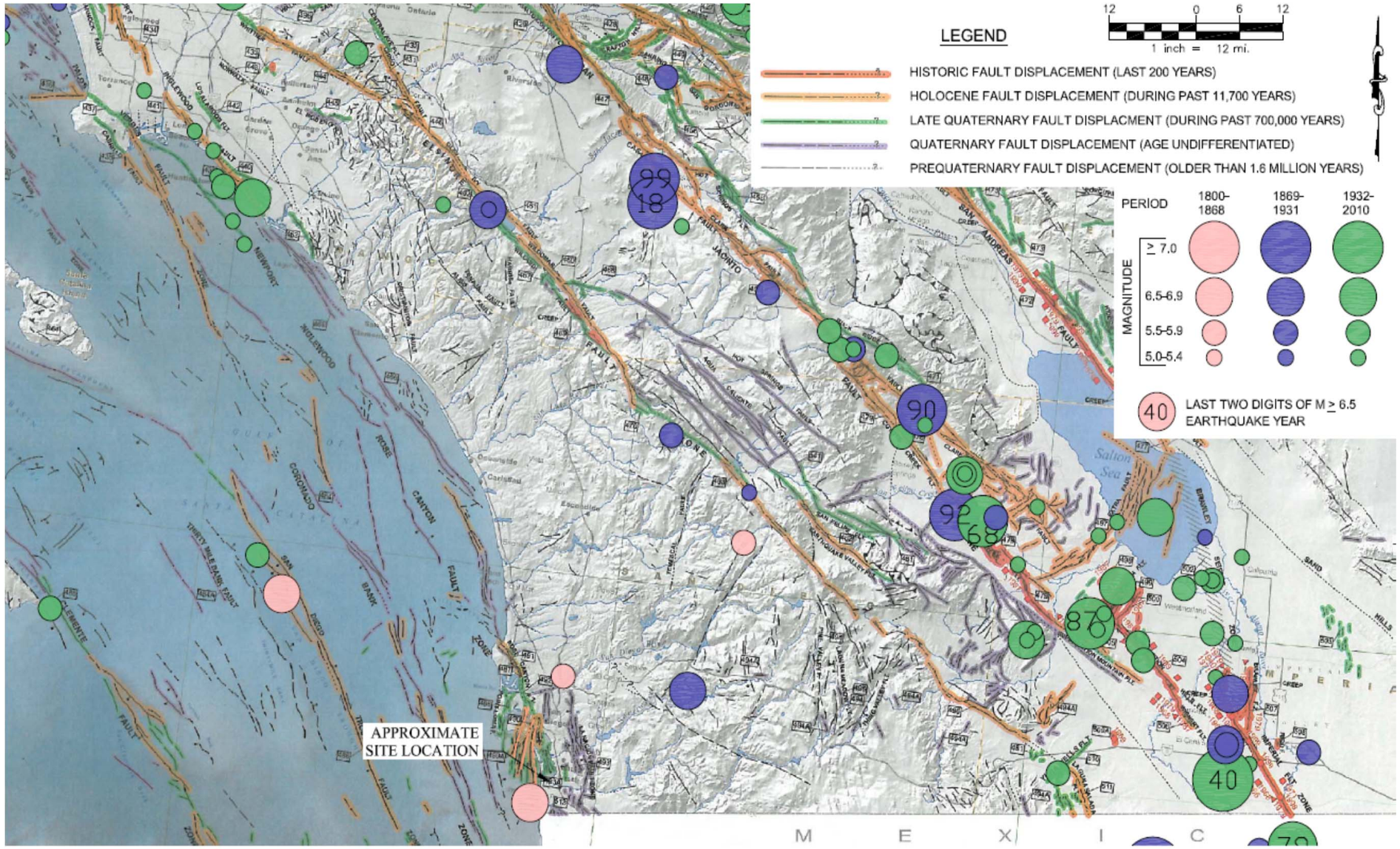
GEOLOGIC CROSS SECTIONS A–A’ & B–B’
Proposed Blue Wave Hotel & Residences
550 Highway 75
Imperial Beach, California

CTE JOB NO: 40-3618G
SCALE: 1” = 40’
DATE: 11/18
FIGURE: 3

C:\Users\Michael\Desktop\Fig 2 (cross sections).dwg



NOTES: FAULT ACTIVITY MAP OF CALIFORNIA, 2010, CALIFORNIA GEOLOGIC DATA MAP SERIES MAP NO. 6;
EPICENTERS OF AND AREAS DAMAGED BY M> 5 CALIFORNIA EARTHQUAKES, 1800–1999 ADAPTED AFTER TOPPOZADA, BRANUM, PETERSEN, HALLSTORM, CRAMER, AND REICHLE, 2000, CDMG MAP SHEET 49
REFERENCE FOR ADDITIONAL EXPLANATION; MODIFIED WITH CISN AND USGS SEISMIC MAPS

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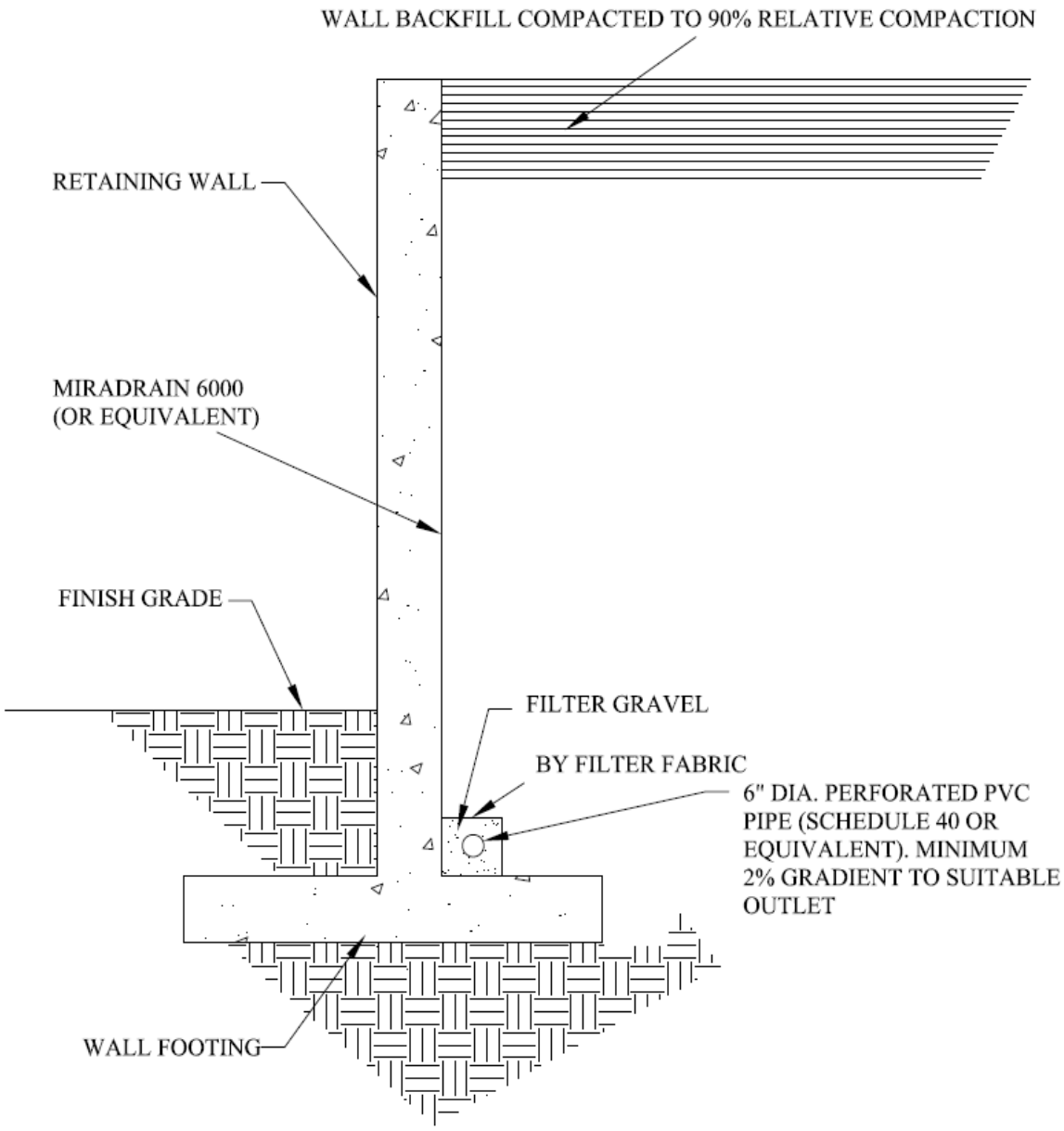
REGIONAL FAULT ACTIVITY MAP

PROPOSED BLUE WAVE HOTEL & RESIDENCES
IMPERIAL BEACH, CALIFORNIA

Job No.	Date	Figure
40-3618G	NOV 2018	4



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RETAINING WALL DRAIN DETAIL

PROPOSED BLUE WAVE HOTEL & RESIDENCES
IMPERIAL BEACH, CALIFORNIA

Job No.	Date	Figure
40-3618G	NOV 2018	5

APPENDIX A

FIELD EXPLORATION METHODS AND EXPLORATION LOGS

APPENDIX A

FIELD EXPLORATION METHODS AND EXPLORATION LOGS

Soil Boring Methods

Relatively "Undisturbed" Soil Samples

Relatively "undisturbed" soil samples were collected using a modified California-drive sampler (2.4-inch inside diameter, 3-inch outside diameter) lined with sample rings. Drive sampling was conducted in general accordance with ASTM D-3550. The steel sampler was driven into the bottom of the borehole with successive drops of a 140-pound weight falling 30-inches. Blow counts (N) required for sampler penetration are shown on the boring logs in the column "Blows/Foot." The soil was retained in brass rings (2.4 inches in diameter, 1.0 inch in height) and sealed in waterproof plastic containers for shipment to the CTE, South, Inc. geotechnical laboratory.

Disturbed Soil Sampling

Bulk soil samples were collected for laboratory analysis using two methods. Standard Penetration Tests (SPT) were performed according to ASTM D-1586 at selected depths in the borings using a standard (1.4-inches inside diameter, 2-inches outside diameter) split-barrel sampler. The steel sampler was driven into the bottom of the borehole with successive drops of a 140-pound weight falling 30-inches. Blow counts (N) required for sampler penetration are shown on the boring logs in the column "Blows/Foot." Samples collected in this manner were placed in sealed plastic bags. Bulk soil samples of the drill cuttings were also collected in large plastic bags. The disturbed soil samples were returned to the CTE, South, Inc. geotechnical laboratory for analysis.

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DEFINITION OF TERMS

PRIMARY DIVISIONS			SYMBOLS	SECONDARY DIVISIONS
COARSE GRAINED SOILS MORE THAN HALF OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS < 5% FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES LITTLE OR NO FINES
			GP	POORLY GRADED GRAVELS OR GRAVEL SAND MIXTURES, LITTLE OF NO FINES
		GRAVELS WITH FINES	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES
			GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES
	SANDS MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS < 5% FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
			SP	POORLY GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES	SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES
			SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES
FINE GRAINED SOILS MORE THAN HALF OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50		ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS, SLIGHTLY PLASTIC CLAYEY SILTS
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, SILTS OR LEAN CLAYS
			OL	ORGANIC SILTS AND ORGANIC CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS, ELASTIC SILTS
			CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
			OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTY CLAYS
HIGHLY ORGANIC SOILS			PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

BOULDERS	COBBLES	GRAVEL		SAND			SILTS AND CLAYS
		COARSE	FINE	COARSE	MEDIUM	FINE	

12" 3" 3/4" 4 10 40 200

CLEAR SQUARE SIEVE OPENING U.S. STANDARD SIEVE SIZE

ADDITIONAL TESTS

(OTHER THAN TEST PIT AND BORING LOG COLUMN HEADINGS)

MAX- Maximum Dry Density
GS- Grain Size Distribution
SE- Sand Equivalent
EI- Expansion Index
CHM- Sulfate and Chloride Content , pH, Resistivity
COR - Corrosivity
SD- Sample Disturbed
PM- Permeability
SG- Specific Gravity
HA- Hydrometer Analysis
AL- Atterberg Limits
RV- R-Value
CN- Consolidation
CP- Collapse Potential
HC- Hydrocollapse
REM- Remolded
PP- Pocket Penetrometer
WA- Wash Analysis
DS- Direct Shear
UC- Unconfined Compression
MD- Moisture/Density
M- Moisture
SC- Swell Compression
OI- Organic Impurities

FIGURE: BL1

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PROJECT: | DRILLER: | SHEET: of
CTE JOB NO: | DRILL METHOD: | DRILLING DATE:
LOGGED BY: | SAMPLE METHOD: | ELEVATION:

Depth (Feet) | Bulk Sample | Driven Type | Blows/Foot | Dry Density (pcf) | Moisture (%) | U.S.C.S. Symbol | Graphic Log

BORING LEGEND

DESCRIPTION

Laboratory Tests

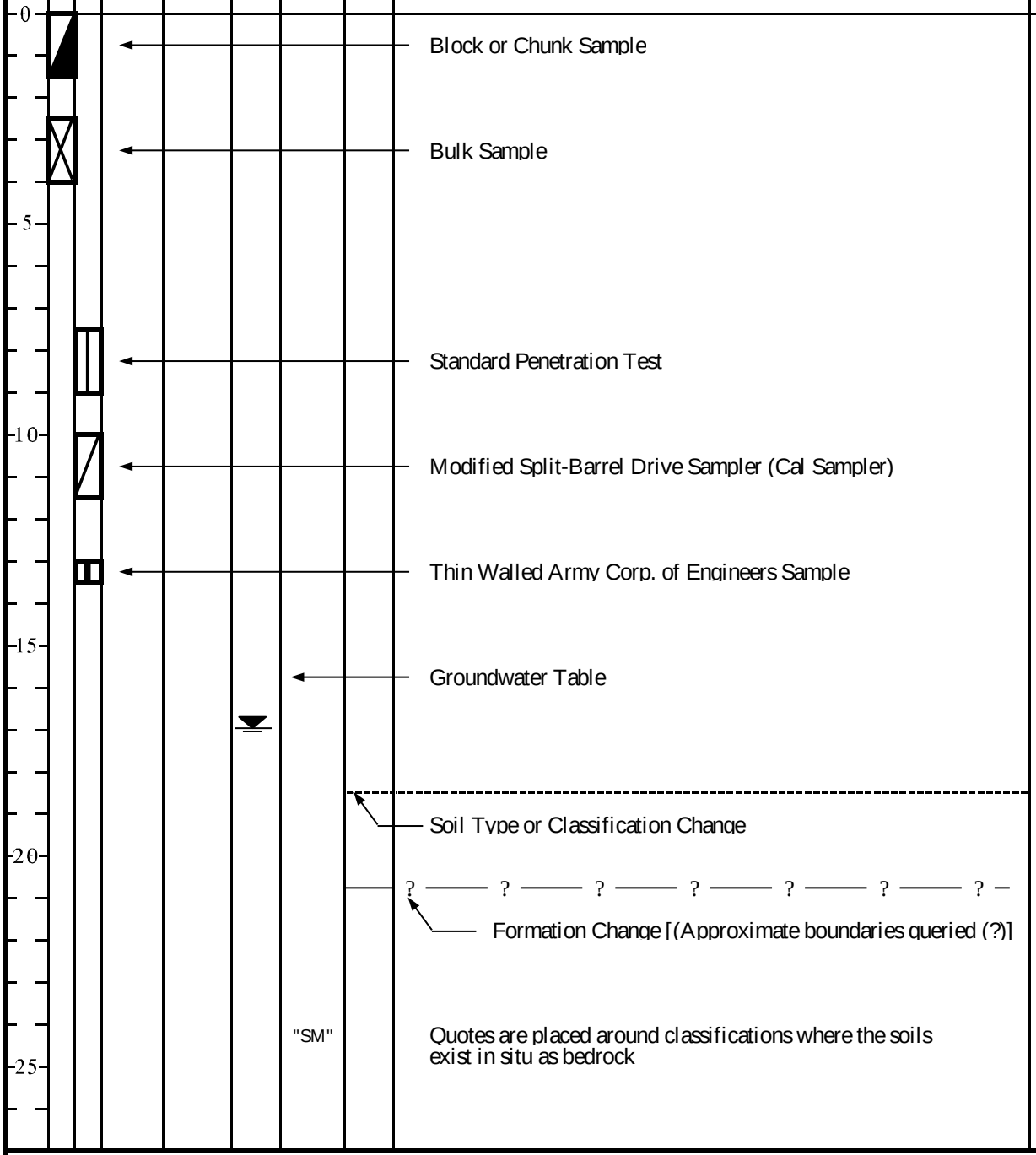

FIGURE: BL2

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~19'

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/PID Readings
0						SM		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, light brown to red brown silty fine SAND, trace clay and gravel.	PID: Ambient: 1-2 ppm
						CL		Quaternary Old Paralic Deposits, Unit 6 (Qop_6). Stiff to very stiff, slightly moist, red brown, fine sandy CLAY with silt.	EI, CHEM
			10 14 21	109.5	14.3				MD
5			12 20 21		15.5			Hard.	PID: <5 ppm AL, M
10			18 32 30			SM		Dense, slightly moist, light gray brown, silty fineSAND, friable.	GS
15			22 21 20		▼	SP-SM		Dense, moist, light gray brown, poorly graded SAND with silt. Hydrocarbon odor noted. Groundwater @ ~17 feet.	GS PID: 60-65 ppm
20			12 15 20					Wet, increasing silt.	GS 22-23 ppm
25									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	2 of 2
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~19'

BORING: B-1

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/PID Readings
25			10 21 25			SM		Dense, wet, gray brown, silty fine SAND with medium to coarse sands, trace mica.	GS 3 ppm
30			3 3 7			SP-SM		Loose, wet, gray brown, poorly graded SAND with silt.	GS 2 ppm
35			12 20 27			ML		Interbedded very stiff, wet, gray, fine sandy SILT. Oxidation lamination, trace gravel @36'.	3 ppm GS
						SM		Dense, wet, gray brown, silty fine SAND with medium to coarse sands, trace mica.	
40			35 50/5"					Gravels. Difficult drilling on gravel/cobble.	5 ppm
45								Total Depth: 43' Groundwater @ ~17' Backfilled Per San Diego DEH SAM Manual and CA Well Standards Bulletin Guidelines	
50									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~17'

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/PID Readings
0						SM		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, light brown to red brown silty fine SAND, trace clay and concrete debris.	CHEM
						CL		Quaternary Old Paralic Deposits, Unit 6 (Qop_6). Stiff to very stiff, slightly moist, red brown, fine sandy CLAY.	
5			9 8 8			SM		Medium dense, slightly moist, mottled gray and red brown, silty fine grained SAND.	61 ppm
10			8 10 9			SP-SM		Medium dense, slightly moist, gray and brown, silty to poorly graded fine SAND with trace medium to coarse sand.	GS 0 ppm
15			11 17 16		▼			Dense, wet. Groundwater @ ~16.5'.	GS 9 ppm
						ML		Very stiff, moist, gray, fine sandy SILT, interbedded to laminated.	
20			12 18 43			SM/SP		Silty to poorly graded SAND.	
						SM		Silty SAND.	5 ppm
						SM/SP		Silty to poorly graded SAND.	
25						SM			

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	2 of 4
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~17'

BORING: B-2

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/PID Readings
25			19 23 36			SM		Dense, moist, gray brown, silty fine SAND, trace shell fragments.	GS 3 ppm
30			16 14 23					With interbedded silt.	GS
35			21 48 37					With gravel and cobble, interbedded silts.	3 ppm
40			14 25 19					Dense to very dense with cobble.	GS
								Gravel/cobble, difficulty drilling.	
45			27 32 35						
								Total Depth: 43' Groundwater @ ~16.5' Backfilled Per San Diego DEH SAM Manual and CA Well Standards Bulletin Guidelines	
50									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~17'

BORING: B-3

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/PID Readings
0						SM		Quaternary Previously Placed Fill (Qppf): Medium dense, dry to slightly moist, brown, silty fine SAND.	
								Quaternary Old Paralic Deposits, Unit 6 (Qop_6).	
5			4 7 11			SP-SM		Medium dense, slightly moist, gray brown to orange brown, poorly graded SAND with silt.	GS
10			13 31 34			SM		Very dense, slightly moist, gray brown to orange brown, silty fine SAND with trace medium sands and gravel.	<2 ppm
15			7 14 15					Moist, laminated gray and brown, friable.	<2 ppm
20								Total Depth: 16' No Groundwater Backfilled with Bentonite and Cuttings.	
25									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~17'

BORING: B-4

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SC		Quaternary Previously Placed Fill (Qppf): Medium dense, dry to slightly moist, brown, silty to clayey fine SAND with gravel.	
								Quaternary Old Paralic Deposits, Unit 6 (Qop_6).	
5			8 9 10			SM/SC		Medium dense, slightly moist, gray brown to red brown, silty to clayey fine grained SAND.	
10			19 25 28	112.4	7.5	SM		Dense, slightly moist, light gray, silty fine SAND.	DS, MD
15			11 18 26					Dense, moist, friable.	
								Total Depth: 16.5 No Groundwater Backfilled with Bentonite and Cuttings.	
20									
25									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~18'

BORING: B-5

Depth (Feet)	Sample: Bulk	Sample: Driven	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM/SC		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, brown to red brown, silty to clayey fine SAND.	RV
								Quaternary Old Paralic Deposits, Unit 6 (Qop_6).	
5			10 14 16			SC		Dense, slightly moist, red brown, clayey fine SAND.	
10			7 7 7			SM/SC		Medium dense, slightly moist,red brown, silty to clayey fine SAND, trace medium to coarse sands.	
15			8 14 27					Dense.	
								Total Depth: 16.5 No Groundwater Backfilled with Bentonite and Cuttings.	
20									
25									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~18'

BORING: B-6

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		Quaternary Previously Placed Fill (Qppf): Medium dense, slightly moist, light brown to red brown, silty fine SAND.	
								Quaternary Old Paralic Deposits, Unit 6 (Qop_6).	
5		▮	10 14 16			CL		Very stiff to hard, slightly moist, brown to gray brown, fine sandy CLAY with silt, trace manganese nodules.	EI
10		▮	7 7 7			SM		Medium dense, slightly moist,pale gray brown, silty fine SAND, becoming poorly graded, friable.	
15		▮	8 14 27	116.5	15.2	SP-SM		Medium dense, moist, gray brown to red brown, poorly graded SAND with silt.	CN, MD
								Total Depth: 16.5 No Groundwater Backfilled with Bentonite and Cuttings.	
20									
25									

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PROJECT:	Blue Wave Imperial Beach	DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G	DRILL METHOD:	CME 75	DRILLING DATE:	5.21.18
LOGGED BY:	DK	SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~22'

BORING: B-7

Depth (Feet)	Bulk Sample	Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests/PID Readings
0								Concrete Flatwork: 3"	
	X	X				SM		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, dark red brown, silty fine SAND.	
								Quaternary Old Paralic Deposits, Unit 6 (Qop_6). Stiff , slightly moist, red brown, fine sandy CLAY. CLAY with silt, trace manganese nodules.	
5			14 22 27		16.6	CL		Hard, with silt.	AL, M
10			8 12 13			SM		Medium dense, slightly moist, gray brown to red brown, silty fine SAND, friable.	
15			8 13 18					Dense.	<2 ppm
								Total Depth: 16.5 No Groundwater Backfilled with Bentonite and Cuttings.	
20									
25									

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PROJECT:	Blue Wave Imperial Beach			DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G			DRILL METHOD:	CME 45-Equivalent	DRILLING DATE:	5.21.18
LOGGED BY:	DK			SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~17'

BORING: P-1

Depth (Feet)	Sample: Bulk	Sample: Driven Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0						SM		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, light brown to red brown silty fine SAND, trace clay.	
						CL		Quaternary Old Paralic Deposits, Unit 6 (Qop_6). Stiff to very stiff, slightly moist, red brown, fine sandy CLAY.	
5								Total Depth: 5' No Groundwater Backfilled on 5.22.18	
10									
15									
20									
25									

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PROJECT:	Blue Wave Imperial Beach			DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G			DRILL METHOD:	CME 45-Equivalent	DRILLING DATE:	5.21.18
LOGGED BY:	DK			SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~17'

BORING: P-2

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, dark red brown silty fine SAND, trace clay.	
5									Total Depth: 3' No Groundwater Backfilled on 5.22.18	
10										
15										
20										
25										

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PROJECT:	Blue Wave Imperial Beach			DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G			DRILL METHOD:	CME 45-Equivalent	DRILLING DATE:	5.21.18
LOGGED BY:	DK			SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~18'

BORING: P-3

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM/SC		Quaternary Previously Placed Fill (Qppf): Medium dense, dry to slightly moist, brown, silty to clayey fine SAND with gravel.	
							SM		Quaternary Old Paralic Deposits, Unit 6 (Qop_6). Dense, slightly moist, light gray, silty fine SAND.	
5									Total Depth: 5' No Groundwater Backfilled on 5.22.18	
10										
15										
20										
25										

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PROJECT:	Blue Wave Imperial Beach			DRILLER:	Baja Exploration	SHEET:	1 of 1
CTE JOB NO:	40-3618G			DRILL METHOD:	CME 45-Equivalent	DRILLING DATE:	5.21.18
LOGGED BY:	DK			SAMPLE METHOD:	Bulk, CAL, SPT	ELEVATION:	~18'

BORING: P-4

Depth (Feet)	Sample: Bulk	Sample: Driven	Type	Blows/Foot	Dry Density (pcf)	Moisture (%)	U.S.C.S. Symbol	Graphic Log	DESCRIPTION	Laboratory Tests
0							SM		Quaternary Previously Placed Fill (Qppf): Loose to medium dense, slightly moist, red brown silty fine SAND, trace clay.	
5									Total Depth: 3' No Groundwater Backfilled on 5.22.18	
10										
15										
20										
25										

APPENDIX B

LABORATORY METHODS AND RESULTS

APPENDIX B
LABORATORY METHODS AND RESULTS

Laboratory tests were performed on selected soil samples to evaluate their engineering properties. Tests were performed following test methods of the American Society for Testing and Materials (ASTM), or other accepted standards. The following presents a brief description of the various test methods used. Laboratory results are presented in the following section of this Appendix.

Atterberg Limits
The liquid limit and plasticity index were determined on selected soil samples in accordance with ASTM D4318.

Chemical Analysis
Soil materials were collected and tested for Sulfate and Chloride content, pH, and Resistivity.

Classification
Soils were classified visually according to the Unified Soil Classification System. Visual classifications were supplemented by laboratory testing of selected samples according to ASTM D 2487.

Consolidation/Swell
To assess compressibility and volume change behavior when loaded and wetted, relatively undisturbed samples were subjected to consolidation in accordance with ASTM D 2435.

Direct Shear
A direct shear test was performed on a relatively undisturbed sample. Direct shear testing was performed in accordance with ASTM D 3080. The sample was inundated during shearing to represent adverse field conditions.

Expansion Index
Expansion Index testing was performed on selected samples of the on-site soils according to ASTM D 4829.

In-Place Moisture/Density
The in-place moisture content and dry unit weight of selected relatively undisturbed samples in accordance with ASTM D 2216 and D 2937, respectively.

Resistance “R” Value
The resistance “R”-value was measured by the CTM 301. The graphically determined “R” value at an exudation pressure of 300 pounds per square inch is the value used for pavement section calculation.

Sieve Analysis (Gradation)
Sieve analyses and/or 200 washes were performed on selected representative samples according to ASTM C 136 and D 1140 to determine grain-size distribution.

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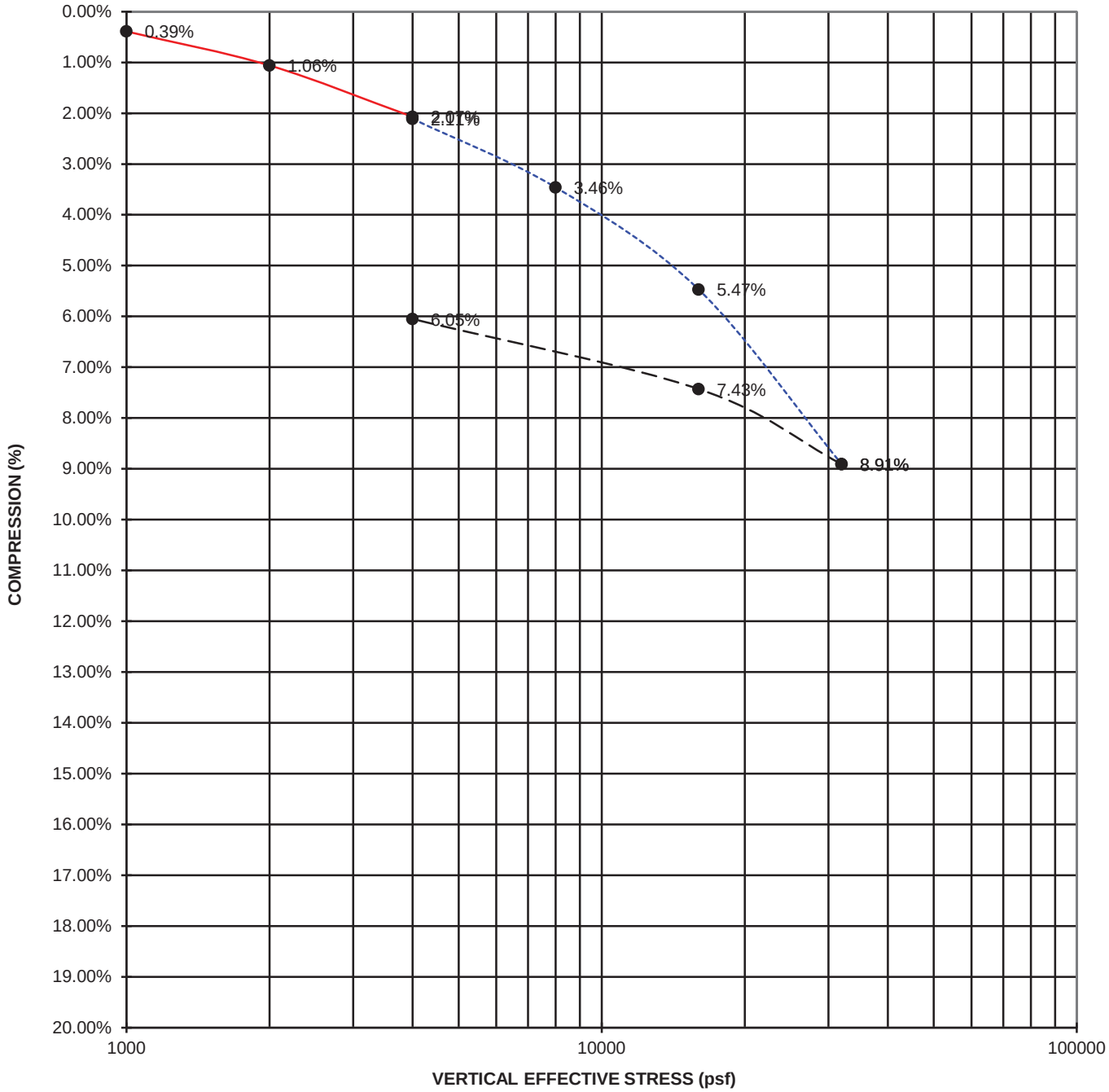
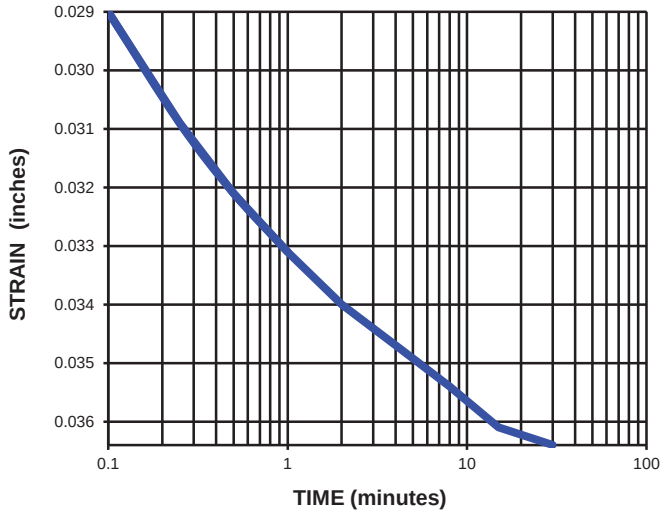


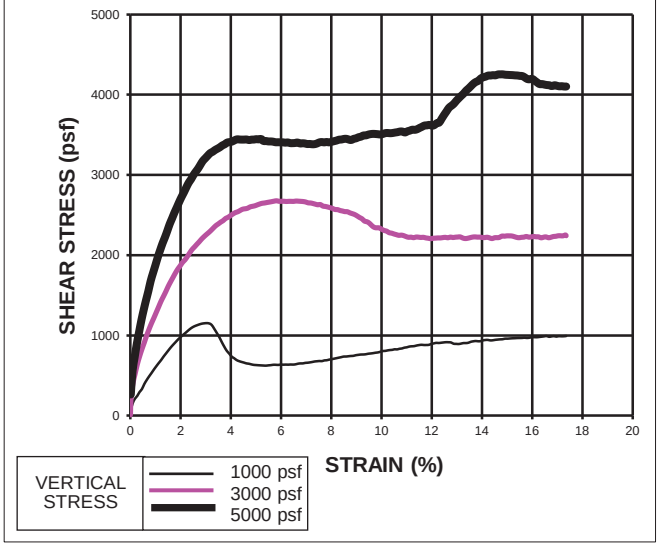
Consolidation Test ASTM D2435

Project Name:	Imperial Beach Hotel and Residential				
Project Number:	40-3618	Sample Date:	5/21/2018	Initial Moisture (%):	15.5
Lab Number:	28475	Test Date:	5/29/2018	Final Moisture (%):	16.4
Sample Location:	B-6 @ 15'	Tested By:	JNC	Initial Dry Density (PCF):	116.5
Sample Description:	Moderate grayish-brown SM			Final Dry Density (PCF):	123.7

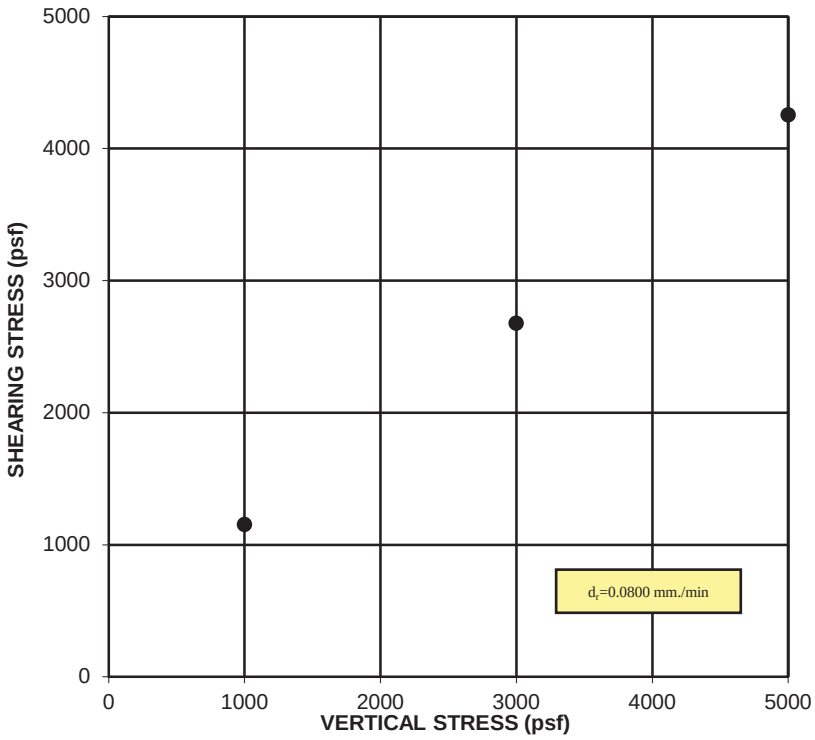
PRECONSOLIDATION



SHEARING DATA



FAILURE ENVELOPE



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SHEAR STRENGTH TEST - ASTM D3080

Job Name:	Imperial Beach Hotel and Residential			Initial Dry Density (pcf):	112.4
Project Number:	40-3618G	Sample Date:	5/21/2018	Initial Moisture (%):	7.5
Lab Number:	28475	Test Date:	6/1/2018	Final Moisture (%):	15.8
Sample Location:	B-4 @ 10'	Tested by:	JNC	Cohesion:	360 psf
Sample Description:	Moderate brown SM			Angle Of Friction:	37.8

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REPORT OF RESISTANCE 'R' VALUE-EXPANSION PRESSURE

Project Name: Imperial Beach Hotel & Residential
Project No.: 40-3618
Sample Location: B-5 @ 0-5'
Soil Description: Moderate brown SM
Test Procedure: Cal 301

Lab No.: 28475
Sampled By: D.K. **Date:** 5/21/2018
Submitted By: D.K. **Date:** 5/22/2018
Tested By: Larry Sachs **Date:** 5/30/2018
Reviewed By: Chase Velarde **Date:** 6/5/2018

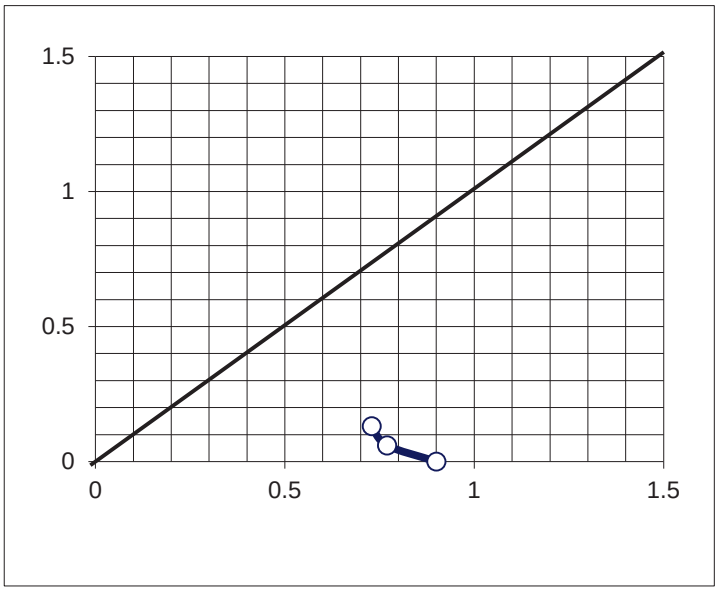
Specimen/ Mold No.	1	2	3	
Compactor Air Pressure, ft.lbs.	310	300	100	
Initial Moisture, %	4.1	4.1	4.1	
Wet Weight / Tare (g)	1946.0	1946.0	1946.0	
Dry Weight / Tare (g)	1898.3	1898.3	1898.3	
Tare (g)	745.2	745.2	745.2	
Water Added, ml	60	70	80	
Moisture at Compaction, %	9.3	10.2	11.1	
Wt. Of Briquette and Mold, g	3241	3201	3293	
Wt. Of Mold, g	2096	2096	2110	
Wt. Of Briquitte,g	1146	1104	1183	
Height of Briquette, in	2.44	2.41	2.59	
Dry Density, pcf	130.2	126.0	124.6	
Stabilometer PH @ 1000 lbs	41	48	62	
Stabilometer PH @ 2000 lbs	100	108	140	
Displacement	4.28	4.40	6.00	
R' Value	25	21	5	
Corrected 'R' Value	23	19	6	
Exudation Pressure, lbs	6500	5980	3350	
Exudation Pressure, psi	520	478	268	
Stabilometer Thickness - ft	0.73	0.77	0.90	
Expansion Pressure	0.0004	0.0002	0.0000	
Expansion Press, Thick-ft	0.13	0.06	0.00	

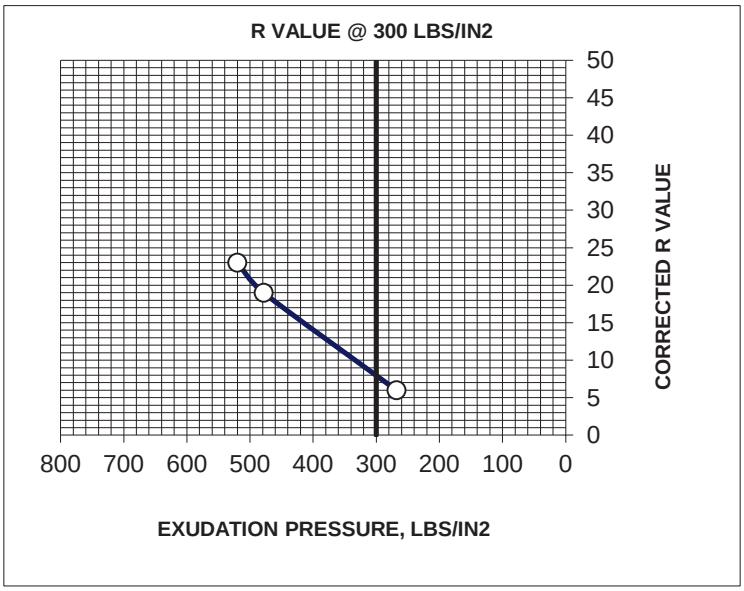
Exudation 8

Expansion 45

R-value **8**

TI	4.5
Expansion	45





Cover Thickness by Expansion Pressure-Feet

Expansion From Graph:	0.53

Chase Velarde
Laboratory Manager

Job Name:	Imperial Beach Hotel and Residential		
Job No:	40-3618G	**Tested By:**	JNC
Lab No:	28475	**Date Sampled:**	5/21/2018
Soil Location:	B-1 @ 0-5'	**Date Tested:**	5/29/2018
Soil Description:	Moderate Reddish Brown SC		

LAB WORK SHEET — EXPANSION INDEX TEST

ASTM D 4829

TEST RESULTS

		Initial	Final
WET WEIGHT	(g)	114.9	438.5
DRY WEIGHT	(g)	105.8	375.5
% MOISTURE	(%)	8.6	16.8
WEIGHT OF RING & SOIL	(g)	**623.1**	
WEIGHT OF RING	(g)	207.3	
WEIGHT OF SOIL	(lbs.)	0.9166	
VOLUME OF RING	($ft.^3$)	0.0073	
WET DENSITY	(pcf)	126.0	
DRY DENSITY	(pcf)	116.1	
% SATURATION	(%)	**51.5**	

EXPANSION READING

DATE TIME: INITIAL READING INCH: 0.1540

FINAL READING: 0.1810

EXPANSION INDEX: 27

VERY LOW	**0-20**
LOW	**21-50**
MEDIUM	**51 -90**
HIGH	**91-130**
VERY HIGH	**130>**

NOTES:

EI at saturation between 48-52%

Measured EI:	27
Measured Saturation:	51.5

EI at 48-52% Saturation: 27

Job Name:	Imperial Beach Hotel and Residential		
Job No:	40-3618	**Tested By:**	JNC
Lab No:	28475	**Date Sampled:**	5/21/2018
Soil Location:	B-6 @ 5'	**Date Tested:**	6/5/2018
Soil Description:	Light Brown CL		

LAB WORK SHEET — EXPANSION INDEX TEST

ASTM D 4829

TEST RESULTS

		Initial	Final
WET WEIGHT	(g)	114.7	428.7
DRY WEIGHT	(g)	103.8	347.6
% MOISTURE	(%)	10.5	23.3
WEIGHT OF RING & SOIL	(g)	**749.8**	
WEIGHT OF RING	(g)	366.3	
WEIGHT OF SOIL	(lbs.)	0.8454	
VOLUME OF RING	($ft.^3$)	0.0073	
WET DENSITY	(pcf)	116.2	
DRY DENSITY	(pcf)	105.2	
% SATURATION	(%)	**47.5**	

EXPANSION READING

DATE TIME: INITIAL READING INCH: 0.0192

FINAL READING: 0.0828

EXPANSION INDEX: 64

VERY LOW	**0-20**
LOW	**21-50**
MEDIUM	**51 -90**
HIGH	**91-130**
VERY HIGH	**130>**

NOTES:

EI at saturation between 48-52%

Measured EI:	63.6
Measured Saturation:	47.5

EI at 48-52% Saturation: 64

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Report of Soil Testing

Project Name: Imperial Beach Hotel and Residential
Project Number: 40-3618G
Lab Number: 28475
Tested By: JNC/KG
Date Sampled: 5/21/2018
Date Tested: 5/23/2018

Sample	B-1	B-1	B-1	B-1	B-1	
Depth	10'	15'	20'	25'	30'	
Sieve Size	%Passing					
1 inch (25.4 mm)						
3/4 inch (19.1 mm)						
1/2 inch (12.7 mm)						
3/8 inch (9.5 mm)	100	100		100		
#4 (4.75 mm)	83	99	100	99	100	
#8 (2.36 mm)	81	98	98	98	98	
#16 (1.18 mm)	80	94	92	91	93	
#30 (0.6 mm)	72	70	62	74	73	
#50 (0.3 mm)	58	35	45	54	42	
#100 (0.15 mm)	37	15	10	39	22	
#200 (0.075 mm)	17.8	8.2	5.4	14.1	8.1	

Tested in Accordance with ASTM D6913, D1140

Reviewed By: Chase Velarde
Chase Velarde
Laboratory Manager

Date: June 1, 2018

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Report of Soil Testing

Project Name: Imperial Beach Hotel and Residential
Project Number: 40-3618G **Date Sampled:** 5/21/2018
Lab Number: 28475 **Date Tested:** 5/23/2018
Tested By: JNC/KG

Sample	B-1	B-2	B-2	B-2	B-2	
Depth	35'	10'	15'	25'	30'	
Sieve Size	%Passing					
1 inch (25.4 mm)			100			
3/4 inch (19.1 mm)			85			
1/2 inch (12.7 mm)			76			
3/8 inch (9.5 mm)		100	73		100	
#4 (4.75 mm)	100	94	64		99	
#8 (2.36 mm)	99	92	49	100	99	
#16 (1.18 mm)	98	88	35	99	97	
#30 (0.6 mm)	97	66	22	97	91	
#50 (0.3 mm)	92	33	13	90	69	
#100 (0.15 mm)	74	14	9	75	49	
#200 (0.075 mm)	41.8	8.1	5.8	18.8	29.7	

Tested in Accordance with ASTM D6913, D1140

Reviewed By: Chase Velarde
Chase Velarde
Laboratory Manager

Date: June 1, 2018

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Report of Soil Testing

Project Name: Imperial Beach Hotel and Residential
Project Number: 40-3618G
Lab Number: 28475
Tested By: JNC/KG
Date Sampled: 5/21/2018
Date Tested: 5/23/2018

Sample	B-2	B-3				
Depth	40'	5'				
Sieve Size	%Passing					
1-1/2 inch (38.1 mm)	100					
1 inch (25.4 mm)	85	100				
3/4 inch (19.1 mm)	83	98				
1/2 inch (12.7 mm)	83	95				
3/8 inch (9.5 mm)	82	93				
#4 (4.75 mm)	79	90				
#8 (2.36 mm)	78	85				
#16 (1.18 mm)	76	76				
#30 (0.6 mm)	70	52				
#50 (0.3 mm)	47	26				
#100 (0.15 mm)	27	15				
#200 (0.075 mm)	15.7	10.1				

Tested in Accordance with ASTM D6913, D1140

Reviewed By: Chase Velarde
Chase Velarde
Laboratory Manager

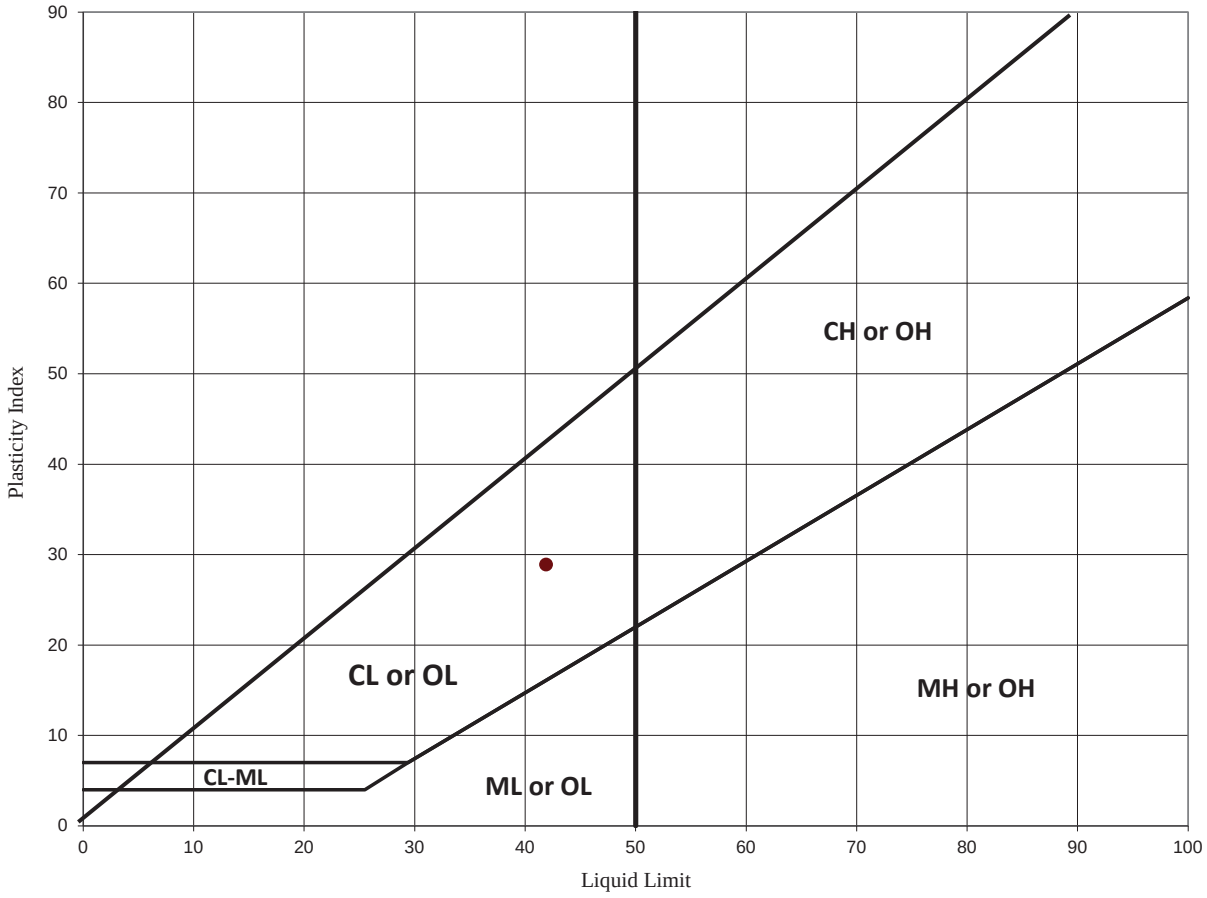
Date: May 29, 2018

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Standard Test Method for Atterberg Limits ASTM D4318

Job Name:	Imperial Beach Hotel and Residential		
Project Number:	40-3618G	**Sampled By:**	DK
Lab Number:	28475	**Tested By:**	JNC
Sample Location:	B-1 @ 5'	**Date Sampled:**	5/21/2018
Sample Description:	Moderate Brown	**Date Tested**	6/1/2018



Liquid Limit:	**42**
Plastic Limit:	**13**
Plasticity Index:	**29**

Procedures Used			
☐	Wet preparation	☐	Procedure A - Multipoint Test
☒	Dry Preparation	☒	Procedure B - One Point Test

Reviewed By: _____ **Date:** 6/1/2018

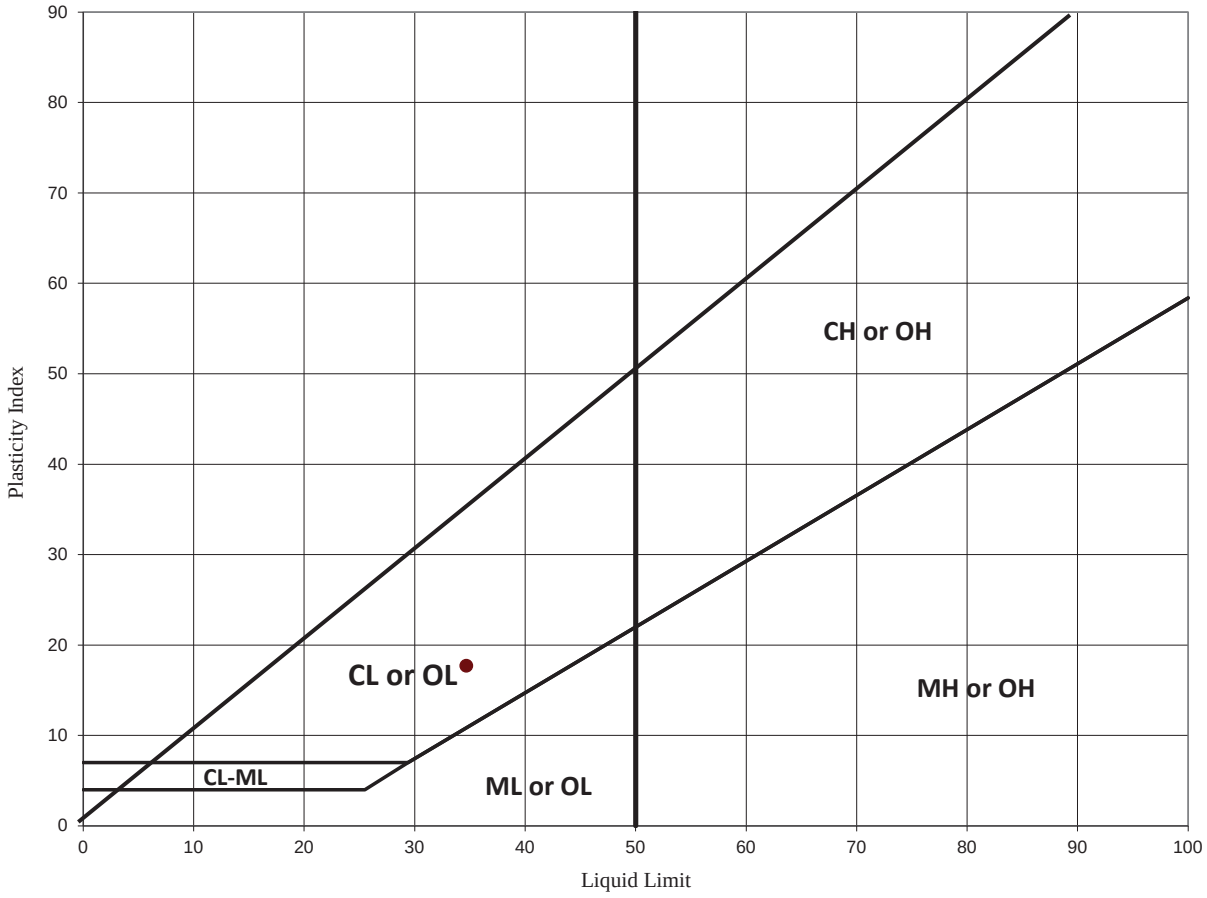
Chase Velarde, Laboratory Manager

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Standard Test Method for Atterberg Limits ASTM D4318

Job Name:	Imperial Beach Hotel and Residential		
Project Number:	40-3618G	**Sampled By:**	DK
Lab Number:	28475	**Tested By:**	JNC
Sample Location:	B-7 @ 5'	**Date Sampled:**	5/21/2018
Sample Description:	Moderate Brown	**Date Tested**	5/31/2018



Liquid Limit:	**35**
Plastic Limit:	**17**
Plasticity Index:	**18**

Procedures Used			
☐	Wet preparation	☐	Procedure A - Multipoint Test
☒	Dry Preparation	☒	Procedure B - One Point Test

Reviewed By: _____ **Date:** 6/1/2018

Chase Velarde, Laboratory Manager

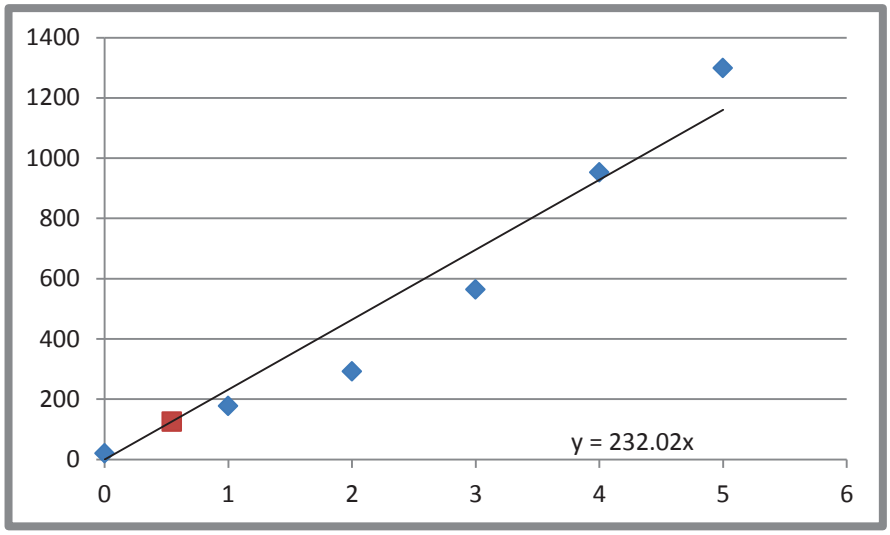
Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Standard Test Method for Sulfate Content CTM 417

Project Name:	Blue Walk IB	Date Sampled:	5/21/2018
Project Number:	40-3618G	Date Tested:	5/29/2018
Lab Number:	28475	Tested By:	K.Gallagher
Sample Number:	B-1 @ 0-5	Description:	Moderate brown SC/Cl

SULFATE CONCENTRATION



BLANK	82
FINAL	208
DELTA	126
Mg SO4	0.543

SULFATE CONTENT (PPM) 81.5

Standard Test Method For Testing Chloride Content CTM 422

CHLORIDE CONCENTRATION

SAMPLE	50	DELTA	1.3
INITIAL	3.3	**Chloride (PPM)**	**39.0**
FINAL	4.6		

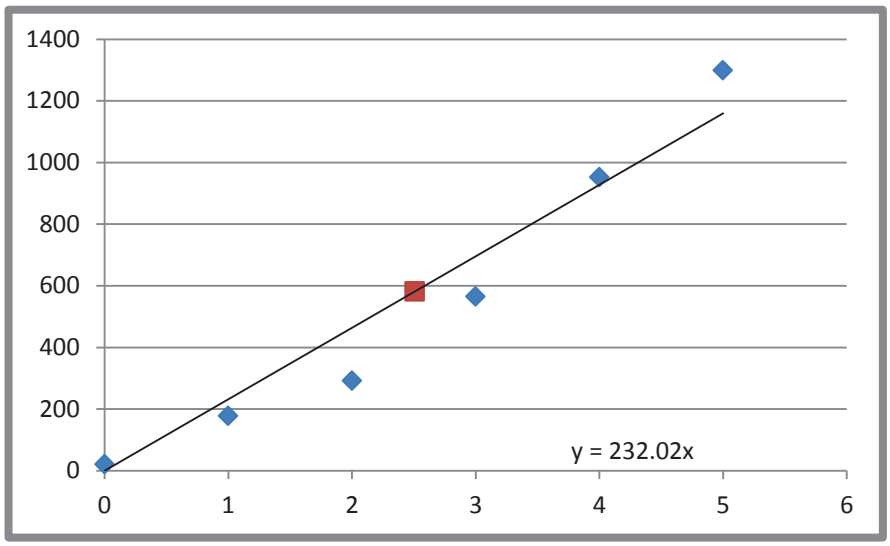
Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Standard Test Method for Sulfate Content CTM 417

Project Name:	Blue Walk IB	Date Sampled:	5/21/2018
Project Number:	40-3618G	Date Tested:	5/29/2018
Lab Number:	28475	Tested By:	K.Gallagher
Sample Number:	B-2 @ 0-5	Description:	Moderate brown SM/SC

SULFATE CONCENTRATION



BLANK	26.3
FINAL	608
DELTA	581.7
Mg SO4	2.507

SULFATE CONTENT (PPM) 376.1

Standard Test Method For Testing Chloride Content CTM 422

CHLORIDE CONCENTRATION

SAMPLE	39	DELTA	12.3
INITIAL	0.7	**Chloride (PPM)**	**473.0**
FINAL	13		

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Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Standard Test Method for pH and Resistivity (CTM 643)

Project Name:	Blue Walk IB		
Project Number:	40-3618G	Date Sampled:	5/21/2018
Lab Number:	28475	Date Tested:	5/29/2018
Sample Location:	B-1 @ 0-5		

pH OF SAMPLE

TEST RESULTS	8.82	**pH**

RESISTIVITY OF SAMPLE

SAMPLE WEIGHT	300.5	g

TRIAL NO.	WATER ADDED (ml)	RESISTANCE (ohm)
1	30	2800
2	40	1800
3	50	1800
4		
5		
6		
7		
8		
9		
10		

Box Constants (CM): Small (1.000), Medium (0.432), Large (6.458)

RESISTIVITY

A) BOX CONSTANT (SMALL, MEDIUM, OR LARGE)	1.0	CM
B) LOW RESISTANCE X BOX CONSTANT (A)	1800	OHM-CM
C) TEMPERATURE AT MINIMUM RESISTIVITY	23.7	°C
D) CORRECTED RESISTIVITY FOR 15.5 °C	2169	OHM-CM

$$D = [B * (24.5 + C)]/ 40$$

Construction Testing & Engineering, Inc.

Inspection | Testing | Geotechnical | Environmental & Construction Engineering | Civil Engineering | Surveying

Standard Test Method for pH and Resistivity (CTM 643)

Project Name:	Blue Walk IB		
Project Number:	40-3618G	Date Sampled:	5/21/2018
Lab Number:	28475	Date Tested:	5/29/2018
Sample Location:	B-2 @ 0-5		

pH OF SAMPLE

TEST RESULTS	8.44	**pH**

RESISTIVITY OF SAMPLE

SAMPLE WEIGHT	303.1	g

TRIAL NO.	WATER ADDED (ml)	RESISTANCE (ohm)
1	30	1000
2	40	500
3	50	280
4	60	260
5	70	250
6	80	240
7	90	250
8		
9		
10		

Box Constants (CM): Small (1.000), Medium (0.432), Large (6.458)

RESISTIVITY

A) BOX CONSTANT (SMALL, MEDIUM, OR LARGE)	1.0	CM
B) LOW RESISTANCE X BOX CONSTANT (A)	240	OHM-CM
C) TEMPERATURE AT MINIMUM RESISTIVITY	23.0	°C
D) CORRECTED RESISTIVITY FOR 15.5 °C	285	OHM-CM

$$D = [B * (24.5 + C)]/ 40$$

APPENDIX C

PERCOLATION TEST RESULTS AND CALCULATED INFILTRATION RATES

APPENDIX C

PERCOLATION TEST RESULTS AND CALCULATED INFILTRATION RATES

Appendix E provides calculated infiltration rates based upon the percolation test results placed within the proposed BMP basin. The work performed herein was conducted during the planning phase of the project. We understand that a BMP basin is proposed running east to west along the northern property line of the site. As such, four percolation test holes were placed to depths from 30 to 65 inches bgs within the proposed basin. Additionally, soil borings were placed within 50 feet of the proposed basin, and extended to at least 10 feet below the basin bottom excavation to allow an evaluation of the potential presence of groundwater at those locations. This report generally follows the City of San Diego storm water infiltration design requirements January 2018 edition Appendix C "Geotechnical and Groundwater Investigation Requirements: and Appendix D "Approved Infiltration Rate Assessment Methods for Selection of Storm Water BMPs." Geotechnical information including soil boring locations and distribution of geologic units is shown on the attached Figure 2. Soil boring logs are provided in Appendix B.

The proposed infiltration basin location was as directed to CTE by the client and has not been detailed on the project plans as of this writing. Depths tested are near anticipated infiltration elevations, however, grading plans and basin details were not provided as of this writing. CTE understands the project is in the planning phase of development, and a site specific evaluation of infiltration basins was performed as requested and necessary per Appendix C of the City of San Diego "Geotechnical and Groundwater Investigation Requirements". Associated Worksheet C.4-1 is attached at the end of this Appendix.

1.0 PERCOLATION TESTS AND CALCULATED INFILTRATION RATES

1.1 Percolation Tests

Four percolation tests were performed in general accordance with Appendix D of the City of San Diego Storm Water Design requirements. Based on visual and tactile identification, the percolation tests were performed in native materials and/or fill soils that were generally encountered as medium dense, silty to clayey sands and occasionally stiff, moist clays. Boring logs of the soils encountered in the test holes are included in Appendix B. The measured percolation rates are shown on following Table 1.1.

Project: BLUE WAVE PROJECT IMPERIAL BEACH

Project No. 40-3618G Table 1.2

Percolation Field Data and Calculated Rates

Boring P-1						**Total Depth**	**61.5 inches**
Time	Test Interval Time (minutes)	Test Refill	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minutes	Percolation Rate inches/hour
9:30:00	Initial	None	49.5000	initial	initial		
10:00:00	0:30	"	49.5000	49.5000	0.0000	0.0000	0.0000
10:30:00	0:30	"	49.5000	49.6250	0.1250	0.0042	0.2500
11:00:00	0:30	47.563	47.5625	47.5625	0.0000	0.0000	0.0000
11:30:00	0:30	"	47.5625	47.5625	0.0000	0.0000	0.0000
12:00:00	0:30	"	47.5625	47.6250	0.0625	0.0021	0.1250
12:30:00	0:30	"	47.6250	47.8125	0.1875	0.0063	0.3750
13:00:00	0:30	"	47.8125	47.9375	0.1250	0.0042	0.2500
13:30:00	0:30	"	47.9375	48.0625	0.1250	0.0042	0.2500

Boring P-2						**Total Depth**	**44 inches**
Time	Test Interval Time (minutes)	Test Refill	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minutes	Percolation Rate inches/hour
9:32:00	Initial	None	36.5000	initial	initial		
10:02:00	0:30	"	36.5000	36.5000	0.0000	0.0000	0.0000
10:32:00	0:30	"	36.5000	36.5000	0.0000	0.0000	0.0000
11:02:00	0:30	"	36.5000	36.5625	0.0625	0.0021	0.1250
11:32:00	0:30	"	36.5625	36.6250	0.0625	0.0021	0.1250
12:02:00	0:30	"	36.6250	36.6875	0.0625	0.0021	0.1250
12:32:00	0:30	"	36.6875	36.8750	0.1875	0.0063	0.3750
13:02:00	0:30	"	36.8750	36.9375	0.0625	0.0021	0.1250
13:32:00	0:30	"	36.9375	37.0000	0.0625	0.0021	0.1250

Boring P-3						Total Depth	65.5 inches
Time	Test Interval Time (minutes)	Test Refill	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minutes	Percolation Rate inches/hour
9:34:00	Initial	None	55.5625	initial	initial		
10:04:00	0:30	"	55.5625	56.6875	1.1250	0.0375	2.2500
10:34:00	0:30	55.250	55.2500	56.1250	0.8750	0.0292	1.7500
11:04:00	0:30	"	56.1250	56.5625	0.4375	0.0146	0.8750
11:34:00	0:30	55.500	55.5000	55.7500	0.2500	0.0083	0.5000
12:04:00	0:30	"	55.7500	56.1250	0.3750	0.0125	0.7500
12:34:00	0:30	"	56.1250	56.5625	0.4375	0.0146	0.8750
13:04:00	0:30	55.688	55.6875	56.0000	0.3125	0.0104	0.6250
13:34:00	0:30	"	56.0000	56.3125	0.3125	0.0104	0.6250

Boring P-4						Total Depth	40 inches
Time	Test Interval Time (minutes)	Test Refill	Water Level Initial/Start Depth /Inches	Water Level End/Final Depth /Inches	Incremental Water Level Change (inches)	Percolation Rate inches/minutes	Percolation Rate inches/hour
9:36:00	Initial	None	32.6875	initial	initial		
10:06:00	0:30	"	32.6875	33.1250	0.4375	0.0146	0.8750
10:36:00	0:30	"	33.1250	33.3750	0.2500	0.0083	0.5000
11:06:00	0:30	"	33.3750	33.6875	0.3125	0.0104	0.6250
11:36:00	0:30	31.625	31.6250	31.8125	0.1875	0.0063	0.3750
12:06:00	0:30	"	31.8125	32.0625	0.2500	0.0083	0.5000
12:36:00	0:30	"	32.0625	32.3750	0.3125	0.0104	0.6250
13:06:00	0:30	"	32.3750	32.5625	0.1875	0.0063	0.3750
13:36:00	0:30	"	32.5625	32.8125	0.2500	0.0083	0.5000

NOTES: Water Level as measured from a fixed location at the top of the hole.
The borehole had a 6-inch diameter.
The percolation test holes were presoaked approximately 24 hours prior to the tests.
Weather was overcast during the percolation test.

1.2 Calculated Infiltration Rates

As per the City of San Diego BMP design documents (January, 2018) infiltration rates are to be evaluated through the Porchet Method. CTE utilized the Porchet Method through guidance of the County of Riverside (2011). The intent of the infiltration rate is to account for the inherent bias in the percolation test borehole sidewall infiltration, as this would not occur at a basin bottom where such sidewalls are not present.

The infiltration rate (It) is derived by the equation:

$$I_t = \frac{\Delta H\ \pi r2\ 60}{\Delta t(\pi r2 + 2\pi r H_{avg})} = \frac{\Delta H\ 60\ r}{\Delta t(r + 2H_{avg})}$$

Where:

I_t = tested infiltration rate, inches/hour
ΔH = change in head over the time interval, inches
Δt = time interval, minutes
* r = effective radius of test hole
H_{avg} = average head over the time interval, inches

Given the measurement values of Table 1.1, the calculated infiltration rates without Safety Factor are as follows.

TABLE 1.2

JOB NAME: BLUE WAVE IMPERIAL BEACH PROJECT, 40-3618G

Percolation Rate Conversion P-1

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	48.0625
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	47.9375
Total Depth of Test Hole,	D_T =	61.5

H_o =	13.5625	in		
H_f =	13.4375	in		
$\Delta H = \Delta D$ =	0.125	in		
H_{avg} =	13.5	in		
I_t =	0.032	in/hr	=	**IF-1**

Percolation Rate Conversion P-2

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	37
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	36.9375
Total Depth of Test Hole,	D_T =	44

H_o =	7.0625	in		
H_f =	7	in		
$\Delta H = \Delta D$ =	0.0625	in		
H_{avg} =	7.03125	in		
I_t =	0.028	in/hr	=	**IF-2**

Percolation Rate Conversion P-3

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	56.3125
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	56
Total Depth of Test Hole,	D_T =	65.5

H_o =	9.5	in		
H_f =	9.1875	in		
$\Delta H = \Delta D$ =	0.3125	in		
H_{avg} =	9.34375	in		
I_t =	0.110	in/hr	=	**IF-3**

Percolation Rate Conversion P-4

		Inches
Time Interval,	Δt =	30
Final Depth of Water,	D_f =	32.8125
Test Hole Radius,	r =	4
Initial Depth to Water,	D_0 =	32.5625
Total Depth of Test Hole,	D_T =	40

H_o =	7.4375	in		
H_f =	7.1875	in		
$\Delta H = \Delta D$ =	0.25	in		
H_{avg} =	7.3125	in		
I_t =	0.107	In/hr	=	**IF-4**

1.3 Summary of Percolation and Infiltration Test Results

The following Table 1.3 presents the percolation rates observed in the field, the converted infiltration rates as discussed in Section 1.2 and as shown in Table 1.2, and the recommended rate for design (with safety factor applied).

TABLE 1.3
SUMMARY OF PERCOLATION AND INFILTRATION TEST RESULTS

Test Location	Soil Type	Soil Type (USCS)	Treatment Area	San Diego County Percolation Procedure	Depth (inches)	Percolation Rate (inches/hour)	Infiltration Rate (inches/hour)	Recommended Rate for Design* (inches/hour)
P-1	Qop6	SM/SC	Northern BMP	Case 3	61.5	0.250	0.032	0.016
P-2	Qppf	SM/SC	Northern BMP	Case 3	44	0.125	0.028	0.014
P-3	Qop6	SM/SC	Northern BMP	Case 3	65.5	0.625	0.110	0.055
P-4	Qop6	SM/SC	Northern BMP	Case 3	40	0.500	0.107	0.054

Qppf: Quaternary Previously Placed Fill, Qop6: Quaternary Older Paralic Deposits, Unit 6
* A safety factor of two (2) was applied to the calculated design infiltration rate

As stated in Appendix C of the Model BMP Design Manual, San Diego Region, (2018), and Worksheet C.4-1, sites with full infiltration potential should have infiltration rates at or above 0.5 inches per hour. The BMP Design Manual also considers infiltration rates of 0.05 inches per hour to be the cutoff between sites with partial infiltration potential and sites not suited for infiltration. Based on these parameters, and utilizing the lowest (conservative) rate, the infiltration rates of the soils within the BMP area are not suited for infiltration (see the attached Worksheet C.4-1. Therefore, based on the rates obtained, the basins should be lined with an impermeable geofabric/barrier and the filtered storm water collected via subsurface piping and discharged off site as designed by the project civil engineer or as required by the local governing agency. Additionally, infiltration at the site is not recommended as discussed below.

2.0 FEASIBILITY OF INFILTRATION

2.1 Groundwater

Groundwater was encountered in Boring B-2, adjacent to the proposed BMP at an approximate depth of 16.5 feet bgs. Based on regional information, redoximorphic features observed in borings, and a review of nearby groundwater data (Geotracker online at Geotracker.waterboards.ca.gov) seasonally high groundwater depths at the site are anticipated to fluctuate as high as 13 feet bgs in the BMP area. Therefore groundwater may be anticipated to rise within ten feet of the bottom of the proposed BMP limiting infiltration at the site. However, the approval agency should determine if this requirement can be reduced based upon the basin supporting beneficial use and maintaining groundwater quality. Potential existing contamination of the groundwater may be a limiting factor

in reducing the groundwater requirement. However, CTE does not recommend infiltration due to the groundwater elevation.

2.2 Slope Stability

Infiltration is not anticipated to destabilize existing or proposed slopes. However, as stated above, the rates indicate that the site is not suited for infiltration. Lining the BMP with an impermeable liner is recommended.

2.3 Settlement and Volume Change

Settlement and volume change of soils underlying biofiltration basins can limit the amount of infiltration of water into those soils. Less than one percent settlement of site soils once fully saturated would be anticipated. However, as stated above, the rates indicate that the site is not suited for infiltration. No significant volume change is anticipated with lining the BMP as recommended.

2.4 Utility Considerations

As stated above, the rates indicate that the site is not suited for infiltration. Infiltration has the potential to damage subsurface utilities, and geotechnical hazards can result from the introduction of infiltrated water.

2.5 Retaining Walls and Foundations

As stated above, the rates indicate that the site is not suited for infiltration. The proposed BMP's are anticipated to be lined with an impermeable geofabric as recommended herein. Any proposed retaining walls should be equipped with subdrains as standard practice and BMP's should be designed such that in the event of an overflow, the structural integrity of the wall is not compromised.

2.6 Separation from Seasonal High Water

As stated above, the rates indicate that the site is not suited for infiltration. Additionally, based upon the subsurface explorations in combination with regional information, redoximorphic features observed in borings, and a review of nearby groundwater data, groundwater may be anticipated to rise within ten feet of the bottom of the proposed BMP, limiting infiltration at the site.

2.7 Wellhead Protection

It is understood that the site does not include wells, and wells were not observed during CTE's site observations. As stated above, the rates indicate that the site is not suited for infiltration. Therefore, basins are not anticipated to adversely affect such wellheads.

2.8 Water Balance Impacts on Stream Flow

As stated above, the rates indicate that the site is not suited for infiltration. Therefore, infiltrate is not anticipated to adversely affect the natural water balance of regional streams or drainages.

2.9 Contaminated Soil and Groundwater

Based upon information obtained from Geotracker online, observed conditions during field explorations, and as noted in the CTE (2018) Phase 1 Environmental Site Assessment (performed under separate contract), impacted soil and groundwater from petroleum releases in the site vicinity have the potential to be affected by infiltration at the site BMP. Therefore, lining the BMP as noted

herein is recommended in reducing the potential to spread potential contaminates.

4.0 WORKSHEETS

The City of San Diego Appendix C (January 2018) required Worksheets C.4-1 “Categorization of Infiltration Feasibility Condition” is attached with this Appendix E.

5.0 CLOSING

This report has been prepared as per City of San Diego storm water control requirements. CTE does not accept any liabilities toward preparation of the City of San Diego required design requirements. It is noted that implementation of information provided herein is subject to interpretation and approval of the City of San Diego who has adopted the subject storm water requirements. CTE does not accept the rationale of the subject City of San Diego storm water design requirements other than preparation of this report as required by the City of San Diego storm water design documents.

APPENDIX D

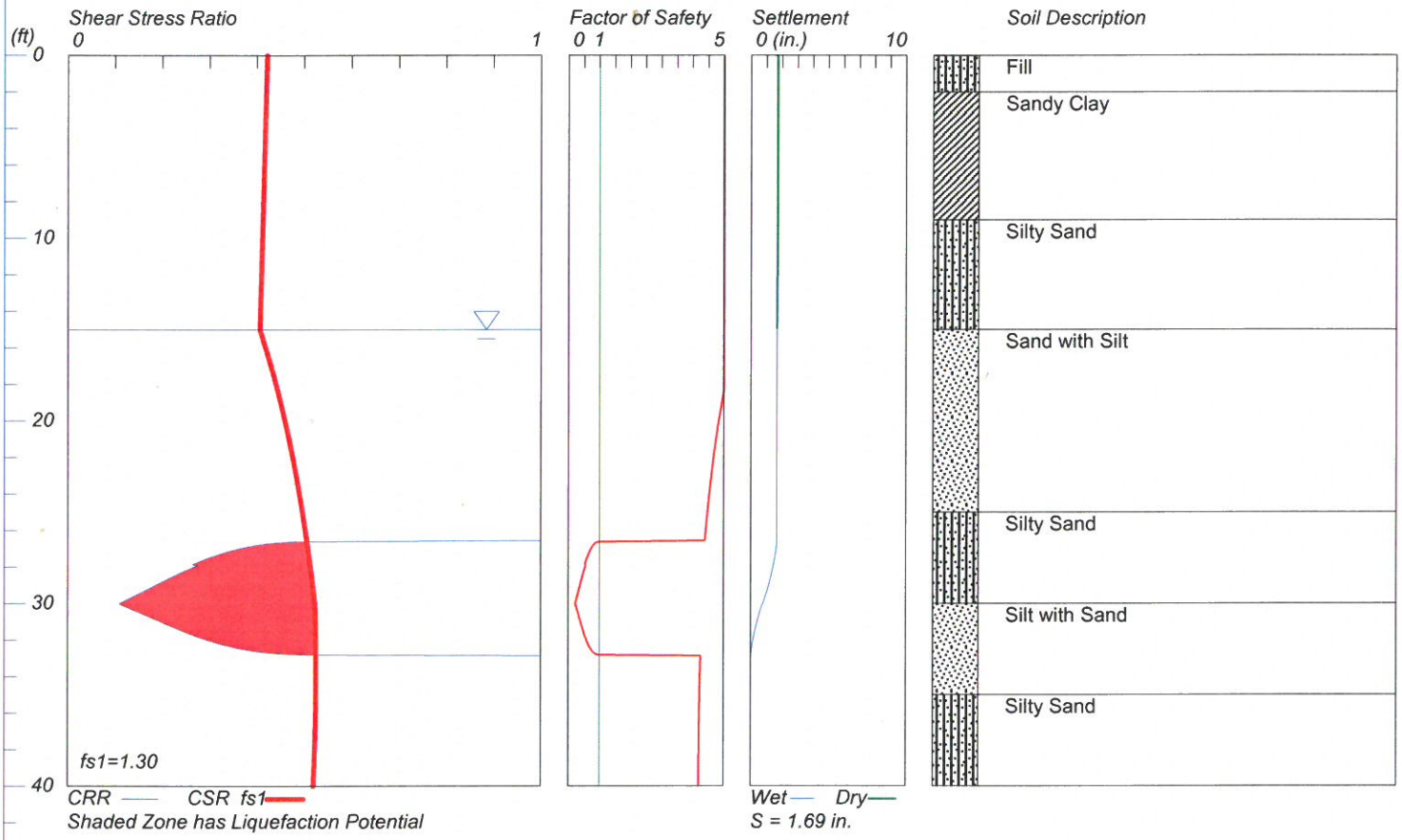
SEISMIC SETTLEMENT ANALYSIS

LIQUEFACTION ANALYSIS

Blue Wave Hotel & Residences

Hole No.=B-1 Water Depth=15 ft Surface Elev.=18

Magnitude=7.2
Acceleration=0.499g



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LIQUEFACTION ANALYSIS CALCULATION SHEET

****

Licensed to , 6/21/2018 12:14:40 PM

Input File Name: \\Server\projects\40-3618G Imperial Beach Hotel and Residential\B-1.liq
Title: Blue Wave Hotel & Residences
Subtitle: 40-3618G

Surface Elev.=18
Hole No.=B-1
Depth of Hole= 40.0 ft
Water Table during Earthquake= 15.0 ft
Water Table during In-Situ Testing= 17.0 ft
Max. Acceleration= 0.5 g
Earthquake Magnitude= 7.2

Input Data:
Surface Elev.=18
Hole No.=B-1
Depth of Hole=40.0 ft
Water Table during Earthquake= 15.0 ft
Water Table during In-Situ Testing= 17.0 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.2

Earthquake Magnitude=7.2
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.0	21.0	125.0	NoLiq
5.0	41.0	125.0	NoLiq
10.0	37.0	120.0	18.0
15.0	41.0	125.0	8.0
20.0	35.0	125.0	5.0
25.0	46.0	125.0	14.0
30.0	10.0	125.0	8.0
35.0	47.0	125.0	42.0
40.0	100.0	130.0	20.0

Output Results:

Settlement of saturated sands=1.65 in.
Settlement of dry sands=0.03 in.
Total settlement of saturated and dry sands=1.69 in.
Differential Settlement=0.843 to 1.113 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.42	5.00	1.65	0.03	1.69
0.05	2.00	0.42	5.00	1.65	0.03	1.69
0.10	2.00	0.42	5.00	1.65	0.03	1.69
0.15	2.00	0.42	5.00	1.65	0.03	1.69
0.20	2.00	0.42	5.00	1.65	0.03	1.69
0.25	2.00	0.42	5.00	1.65	0.03	1.69
0.30	2.00	0.42	5.00	1.65	0.03	1.69
0.35	2.00	0.42	5.00	1.65	0.03	1.69
0.40	2.00	0.42	5.00	1.65	0.03	1.69
0.45	2.00	0.42	5.00	1.65	0.03	1.69
0.50	2.00	0.42	5.00	1.65	0.03	1.69
0.55	2.00	0.42	5.00	1.65	0.03	1.69
0.60	2.00	0.42	5.00	1.65	0.03	1.69
0.65	2.00	0.42	5.00	1.65	0.03	1.69
0.70	2.00	0.42	5.00	1.65	0.03	1.69
0.75	2.00	0.42	5.00	1.65	0.03	1.69
0.80	2.00	0.42	5.00	1.65	0.03	1.69
0.85	2.00	0.42	5.00	1.65	0.03	1.69
0.90	2.00	0.42	5.00	1.65	0.03	1.69
0.95	2.00	0.42	5.00	1.65	0.03	1.69
1.00	2.00	0.42	5.00	1.65	0.03	1.69
1.05	2.00	0.42	5.00	1.65	0.03	1.69
1.10	2.00	0.42	5.00	1.65	0.03	1.69
1.15	2.00	0.42	5.00	1.65	0.03	1.69
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1.70	2.00	0.42	5.00	1.65	0.03	1.69
1.75	2.00	0.42	5.00	1.65	0.03	1.69
1.80	2.00	0.42	5.00	1.65	0.03	1.69
1.85	2.00	0.42	5.00	1.65	0.03	1.69
1.90	2.00	0.42	5.00	1.65	0.03	1.69
1.95	2.00	0.42	5.00	1.65	0.03	1.69
2.00	2.00	0.42	5.00	1.65	0.03	1.69
2.05	2.00	0.42	5.00	1.65	0.03	1.69
2.10	2.00	0.42	5.00	1.65	0.03	1.69
2.15	2.00	0.42	5.00	1.65	0.03	1.69
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2.80	2.00	0.42	5.00	1.65	0.03	1.69
2.85	2.00	0.42	5.00	1.65	0.03	1.69
2.90	2.00	0.42	5.00	1.65	0.03	1.69
2.95	2.00	0.42	5.00	1.65	0.03	1.69
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3.80	2.00	0.42	5.00	1.65	0.03	1.69
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3.90	2.00	0.42	5.00	1.65	0.03	1.69
3.95	2.00	0.42	5.00	1.65	0.03	1.69
4.00	2.00	0.42	5.00	1.65	0.03	1.69
4.05	2.00	0.42	5.00	1.65	0.03	1.69
4.10	2.00	0.42	5.00	1.65	0.03	1.69
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4.80	2.00	0.42	5.00	1.65	0.03	1.69
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4.95	2.00	0.42	5.00	1.65	0.03	1.69
5.00	2.00	0.42	5.00	1.65	0.03	1.69
5.05	2.00	0.42	5.00	1.65	0.03	1.69
5.10	2.00	0.42	5.00	1.65	0.03	1.69
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6.00	2.00	0.42	5.00	1.65	0.03	1.69
6.05	2.00	0.42	5.00	1.65	0.03	1.69
6.10	2.00	0.42	5.00	1.65	0.03	1.69
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6.95	2.00	0.41	5.00	1.65	0.03	1.69
7.00	2.00	0.41	5.00	1.65	0.03	1.69
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9.05	2.00	0.41	5.00	1.65	0.03	1.69
9.10	2.00	0.41	5.00	1.65	0.03	1.69
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10.00	2.22	0.41	5.00	1.65	0.03	1.69
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10.90	2.22	0.41	5.00	1.65	0.03	1.68
10.95	2.22	0.41	5.00	1.65	0.03	1.68
11.00	2.22	0.41	5.00	1.65	0.03	1.68
11.05	2.22	0.41	5.00	1.65	0.03	1.68
11.10	2.22	0.41	5.00	1.65	0.03	1.68
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11.75	2.22	0.41	5.00	1.65	0.02	1.68
11.80	2.22	0.41	5.00	1.65	0.02	1.68
11.85	2.22	0.41	5.00	1.65	0.02	1.68
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12.40	2.22	0.41	5.00	1.65	0.02	1.67
12.45	2.22	0.41	5.00	1.65	0.02	1.67
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12.60	2.22	0.41	5.00	1.65	0.02	1.67
12.65	2.22	0.41	5.00	1.65	0.02	1.67
12.70	2.22	0.41	5.00	1.65	0.02	1.67
12.75	2.22	0.41	5.00	1.65	0.02	1.67
12.80	2.22	0.41	5.00	1.65	0.02	1.67
12.85	2.22	0.41	5.00	1.65	0.02	1.67
12.90	2.22	0.41	5.00	1.65	0.02	1.67
12.95	2.22	0.41	5.00	1.65	0.02	1.67
13.00	2.22	0.41	5.00	1.65	0.02	1.67
13.05	2.22	0.41	5.00	1.65	0.02	1.67
13.10	2.22	0.41	5.00	1.65	0.02	1.67
13.15	2.22	0.41	5.00	1.65	0.02	1.67
13.20	2.22	0.41	5.00	1.65	0.02	1.67
13.25	2.22	0.41	5.00	1.65	0.01	1.67
13.30	2.22	0.41	5.00	1.65	0.01	1.67
13.35	2.22	0.41	5.00	1.65	0.01	1.67
13.40	2.22	0.41	5.00	1.65	0.01	1.67
13.45	2.22	0.41	5.00	1.65	0.01	1.67
13.50	2.22	0.41	5.00	1.65	0.01	1.67
13.55	2.22	0.41	5.00	1.65	0.01	1.67
13.60	2.22	0.41	5.00	1.65	0.01	1.67
13.65	2.22	0.41	5.00	1.65	0.01	1.67
13.70	2.22	0.41	5.00	1.65	0.01	1.67
13.75	2.22	0.41	5.00	1.65	0.01	1.67
13.80	2.22	0.41	5.00	1.65	0.01	1.66
13.85	2.22	0.41	5.00	1.65	0.01	1.66
13.90	2.22	0.41	5.00	1.65	0.01	1.66
13.95	2.22	0.41	5.00	1.65	0.01	1.66
14.00	2.22	0.41	5.00	1.65	0.01	1.66
14.05	2.22	0.41	5.00	1.65	0.01	1.66
14.10	2.22	0.41	5.00	1.65	0.01	1.66
14.15	2.22	0.41	5.00	1.65	0.01	1.66
14.20	2.22	0.41	5.00	1.65	0.01	1.66
14.25	2.22	0.41	5.00	1.65	0.01	1.66
14.30	2.22	0.41	5.00	1.65	0.01	1.66
14.35	2.22	0.41	5.00	1.65	0.01	1.66
14.40	2.22	0.41	5.00	1.65	0.01	1.66
14.45	2.22	0.41	5.00	1.65	0.00	1.66
14.50	2.22	0.41	5.00	1.65	0.00	1.66
14.55	2.22	0.41	5.00	1.65	0.00	1.66
14.60	2.22	0.41	5.00	1.65	0.00	1.66
14.65	2.22	0.41	5.00	1.65	0.00	1.66
14.70	2.22	0.41	5.00	1.65	0.00	1.66
14.75	2.22	0.41	5.00	1.65	0.00	1.66
14.80	2.22	0.41	5.00	1.65	0.00	1.66
14.85	2.22	0.41	5.00	1.65	0.00	1.66
14.90	2.22	0.41	5.00	1.65	0.00	1.66
14.95	2.22	0.41	5.00	1.65	0.00	1.65
15.00	2.22	0.41	5.00	1.65	0.00	1.65
15.05	2.22	0.41	5.00	1.65	0.00	1.65
15.10	2.22	0.41	5.00	1.65	0.00	1.65
15.15	2.22	0.41	5.00	1.65	0.00	1.65
15.20	2.22	0.41	5.00	1.65	0.00	1.65

15.25	2.22	0.41	5.00	1.65	0.00	1.65
15.30	2.22	0.41	5.00	1.65	0.00	1.65
15.35	2.22	0.41	5.00	1.65	0.00	1.65
15.40	2.22	0.41	5.00	1.65	0.00	1.65
15.45	2.22	0.41	5.00	1.65	0.00	1.65
15.50	2.22	0.41	5.00	1.65	0.00	1.65
15.55	2.22	0.41	5.00	1.65	0.00	1.65
15.60	2.22	0.41	5.00	1.65	0.00	1.65
15.65	2.22	0.41	5.00	1.65	0.00	1.65
15.70	2.22	0.42	5.00	1.65	0.00	1.65
15.75	2.22	0.42	5.00	1.65	0.00	1.65
15.80	2.22	0.42	5.00	1.65	0.00	1.65
15.85	2.22	0.42	5.00	1.65	0.00	1.65
15.90	2.22	0.42	5.00	1.65	0.00	1.65
15.95	2.22	0.42	5.00	1.65	0.00	1.65
16.00	2.22	0.42	5.00	1.65	0.00	1.65
16.05	2.22	0.42	5.00	1.65	0.00	1.65
16.10	2.22	0.42	5.00	1.65	0.00	1.65
16.15	2.22	0.42	5.00	1.65	0.00	1.65
16.20	2.22	0.42	5.00	1.65	0.00	1.65
16.25	2.22	0.42	5.00	1.65	0.00	1.65
16.30	2.22	0.42	5.00	1.65	0.00	1.65
16.35	2.22	0.42	5.00	1.65	0.00	1.65
16.40	2.22	0.42	5.00	1.65	0.00	1.65
16.45	2.22	0.42	5.00	1.65	0.00	1.65
16.50	2.22	0.42	5.00	1.65	0.00	1.65
16.55	2.22	0.43	5.00	1.65	0.00	1.65
16.60	2.22	0.43	5.00	1.65	0.00	1.65
16.65	2.22	0.43	5.00	1.65	0.00	1.65
16.70	2.22	0.43	5.00	1.65	0.00	1.65
16.75	2.22	0.43	5.00	1.65	0.00	1.65
16.80	2.22	0.43	5.00	1.65	0.00	1.65
16.85	2.22	0.43	5.00	1.65	0.00	1.65
16.90	2.22	0.43	5.00	1.65	0.00	1.65
16.95	2.22	0.43	5.00	1.65	0.00	1.65
17.00	2.22	0.43	5.00	1.65	0.00	1.65
17.05	2.22	0.43	5.00	1.65	0.00	1.65
17.10	2.22	0.43	5.00	1.65	0.00	1.65
17.15	2.22	0.43	5.00	1.65	0.00	1.65
17.20	2.22	0.43	5.00	1.65	0.00	1.65
17.25	2.22	0.43	5.00	1.65	0.00	1.65
17.30	2.22	0.43	5.00	1.65	0.00	1.65
17.35	2.22	0.43	5.00	1.65	0.00	1.65
17.40	2.22	0.43	5.00	1.65	0.00	1.65
17.45	2.22	0.44	5.00	1.65	0.00	1.65
17.50	2.22	0.44	5.00	1.65	0.00	1.65
17.55	2.22	0.44	5.00	1.65	0.00	1.65
17.60	2.22	0.44	5.00	1.65	0.00	1.65
17.65	2.22	0.44	5.00	1.65	0.00	1.65
17.70	2.22	0.44	5.00	1.65	0.00	1.65
17.75	2.22	0.44	5.00	1.65	0.00	1.65
17.80	2.22	0.44	5.00	1.65	0.00	1.65
17.85	2.22	0.44	5.00	1.65	0.00	1.65
17.90	2.22	0.44	5.00	1.65	0.00	1.65
17.95	2.22	0.44	5.00	1.65	0.00	1.65
18.00	2.22	0.44	5.00	1.65	0.00	1.65
18.05	2.22	0.44	5.00	1.65	0.00	1.65
18.10	2.22	0.44	5.00	1.65	0.00	1.65
18.15	2.22	0.44	5.00	1.65	0.00	1.65
18.20	2.22	0.44	5.00	1.65	0.00	1.65
18.25	2.22	0.44	5.00	1.65	0.00	1.65
18.30	2.22	0.44	5.00	1.65	0.00	1.65
18.35	2.22	0.44	4.99	1.65	0.00	1.65

18.40	2.22	0.45	4.99	1.65	0.00	1.65
18.45	2.22	0.45	4.98	1.65	0.00	1.65
18.50	2.22	0.45	4.98	1.65	0.00	1.65
18.55	2.22	0.45	4.97	1.65	0.00	1.65
18.60	2.22	0.45	4.97	1.65	0.00	1.65
18.65	2.22	0.45	4.96	1.65	0.00	1.65
18.70	2.22	0.45	4.95	1.65	0.00	1.65
18.75	2.22	0.45	4.95	1.65	0.00	1.65
18.80	2.22	0.45	4.94	1.65	0.00	1.65
18.85	2.22	0.45	4.94	1.65	0.00	1.65
18.90	2.22	0.45	4.93	1.65	0.00	1.65
18.95	2.22	0.45	4.93	1.65	0.00	1.65
19.00	2.22	0.45	4.92	1.65	0.00	1.65
19.05	2.22	0.45	4.92	1.65	0.00	1.65
19.10	2.22	0.45	4.91	1.65	0.00	1.65
19.15	2.22	0.45	4.91	1.65	0.00	1.65
19.20	2.22	0.45	4.90	1.65	0.00	1.65
19.25	2.22	0.45	4.90	1.65	0.00	1.65
19.30	2.22	0.45	4.89	1.65	0.00	1.65
19.35	2.22	0.45	4.89	1.65	0.00	1.65
19.40	2.22	0.45	4.88	1.65	0.00	1.65
19.45	2.22	0.46	4.88	1.65	0.00	1.65
19.50	2.22	0.46	4.87	1.65	0.00	1.65
19.55	2.22	0.46	4.87	1.65	0.00	1.65
19.60	2.22	0.46	4.86	1.65	0.00	1.65
19.65	2.22	0.46	4.86	1.65	0.00	1.65
19.70	2.22	0.46	4.85	1.65	0.00	1.65
19.75	2.22	0.46	4.85	1.65	0.00	1.65
19.80	2.22	0.46	4.84	1.65	0.00	1.65
19.85	2.22	0.46	4.84	1.65	0.00	1.65
19.90	2.22	0.46	4.83	1.65	0.00	1.65
19.95	2.22	0.46	4.83	1.65	0.00	1.65
20.00	2.22	0.46	4.83	1.65	0.00	1.65
20.05	2.22	0.46	4.82	1.65	0.00	1.65
20.10	2.22	0.46	4.82	1.65	0.00	1.65
20.15	2.22	0.46	4.81	1.65	0.00	1.65
20.20	2.22	0.46	4.81	1.65	0.00	1.65
20.25	2.22	0.46	4.80	1.65	0.00	1.65
20.30	2.22	0.46	4.80	1.65	0.00	1.65
20.35	2.22	0.46	4.79	1.65	0.00	1.65
20.40	2.22	0.46	4.79	1.65	0.00	1.65
20.45	2.22	0.46	4.78	1.65	0.00	1.65
20.50	2.22	0.46	4.78	1.65	0.00	1.65
20.55	2.22	0.46	4.78	1.65	0.00	1.65
20.60	2.22	0.47	4.77	1.65	0.00	1.65
20.65	2.22	0.47	4.77	1.65	0.00	1.65
20.70	2.22	0.47	4.76	1.65	0.00	1.65
20.75	2.22	0.47	4.76	1.65	0.00	1.65
20.80	2.22	0.47	4.75	1.65	0.00	1.65
20.85	2.22	0.47	4.75	1.65	0.00	1.65
20.90	2.22	0.47	4.75	1.65	0.00	1.65
20.95	2.22	0.47	4.74	1.65	0.00	1.65
21.00	2.22	0.47	4.74	1.65	0.00	1.65
21.05	2.22	0.47	4.73	1.65	0.00	1.65
21.10	2.22	0.47	4.73	1.65	0.00	1.65
21.15	2.22	0.47	4.73	1.65	0.00	1.65
21.20	2.22	0.47	4.72	1.65	0.00	1.65
21.25	2.22	0.47	4.72	1.65	0.00	1.65
21.30	2.22	0.47	4.71	1.65	0.00	1.65
21.35	2.22	0.47	4.71	1.65	0.00	1.65
21.40	2.22	0.47	4.71	1.65	0.00	1.65
21.45	2.22	0.47	4.70	1.65	0.00	1.65
21.50	2.22	0.47	4.70	1.65	0.00	1.65

21.55	2.22	0.47	4.69	1.65	0.00	1.65
21.60	2.22	0.47	4.69	1.65	0.00	1.65
21.65	2.22	0.47	4.69	1.65	0.00	1.65
21.70	2.22	0.47	4.68	1.65	0.00	1.65
21.75	2.22	0.47	4.68	1.65	0.00	1.65
21.80	2.22	0.47	4.67	1.65	0.00	1.65
21.85	2.22	0.48	4.67	1.65	0.00	1.65
21.90	2.22	0.48	4.67	1.65	0.00	1.65
21.95	2.22	0.48	4.66	1.65	0.00	1.65
22.00	2.22	0.48	4.66	1.65	0.00	1.65
22.05	2.22	0.48	4.66	1.65	0.00	1.65
22.10	2.22	0.48	4.65	1.65	0.00	1.65
22.15	2.22	0.48	4.65	1.65	0.00	1.65
22.20	2.22	0.48	4.64	1.65	0.00	1.65
22.25	2.22	0.48	4.64	1.65	0.00	1.65
22.30	2.22	0.48	4.64	1.65	0.00	1.65
22.35	2.22	0.48	4.63	1.65	0.00	1.65
22.40	2.22	0.48	4.63	1.65	0.00	1.65
22.45	2.22	0.48	4.63	1.65	0.00	1.65
22.50	2.22	0.48	4.62	1.65	0.00	1.65
22.55	2.22	0.48	4.62	1.65	0.00	1.65
22.60	2.22	0.48	4.62	1.65	0.00	1.65
22.65	2.22	0.48	4.61	1.65	0.00	1.65
22.70	2.22	0.48	4.61	1.65	0.00	1.65
22.75	2.22	0.48	4.61	1.65	0.00	1.65
22.80	2.22	0.48	4.60	1.65	0.00	1.65
22.85	2.22	0.48	4.60	1.65	0.00	1.65
22.90	2.22	0.48	4.59	1.65	0.00	1.65
22.95	2.22	0.48	4.59	1.65	0.00	1.65
23.00	2.22	0.48	4.59	1.65	0.00	1.65
23.05	2.22	0.48	4.58	1.65	0.00	1.65
23.10	2.22	0.48	4.58	1.65	0.00	1.65
23.15	2.22	0.48	4.58	1.65	0.00	1.65
23.20	2.22	0.49	4.57	1.65	0.00	1.65
23.25	2.22	0.49	4.57	1.65	0.00	1.65
23.30	2.22	0.49	4.57	1.65	0.00	1.65
23.35	2.22	0.49	4.56	1.65	0.00	1.65
23.40	2.22	0.49	4.56	1.65	0.00	1.65
23.45	2.22	0.49	4.56	1.65	0.00	1.65
23.50	2.22	0.49	4.55	1.65	0.00	1.65
23.55	2.22	0.49	4.55	1.65	0.00	1.65
23.60	2.22	0.49	4.55	1.65	0.00	1.65
23.65	2.22	0.49	4.55	1.65	0.00	1.65
23.70	2.22	0.49	4.54	1.65	0.00	1.65
23.75	2.22	0.49	4.54	1.65	0.00	1.65
23.80	2.22	0.49	4.54	1.65	0.00	1.65
23.85	2.22	0.49	4.53	1.65	0.00	1.65
23.90	2.22	0.49	4.53	1.65	0.00	1.65
23.95	2.22	0.49	4.53	1.65	0.00	1.65
24.00	2.22	0.49	4.52	1.65	0.00	1.65
24.05	2.22	0.49	4.52	1.65	0.00	1.65
24.10	2.22	0.49	4.52	1.65	0.00	1.65
24.15	2.22	0.49	4.51	1.65	0.00	1.65
24.20	2.22	0.49	4.51	1.65	0.00	1.65
24.25	2.22	0.49	4.51	1.65	0.00	1.65
24.30	2.22	0.49	4.51	1.65	0.00	1.65
24.35	2.22	0.49	4.50	1.65	0.00	1.65
24.40	2.22	0.49	4.50	1.65	0.00	1.65
24.45	2.22	0.49	4.50	1.65	0.00	1.65
24.50	2.22	0.49	4.49	1.65	0.00	1.65
24.55	2.22	0.49	4.49	1.65	0.00	1.65
24.60	2.22	0.49	4.49	1.65	0.00	1.65
24.65	2.22	0.49	4.48	1.65	0.00	1.65

24.70	2.22	0.50	4.48	1.65	0.00	1.65
24.75	2.22	0.50	4.48	1.65	0.00	1.65
24.80	2.22	0.50	4.48	1.65	0.00	1.65
24.85	2.22	0.50	4.47	1.65	0.00	1.65
24.90	2.22	0.50	4.47	1.65	0.00	1.65
24.95	2.22	0.50	4.47	1.65	0.00	1.65
25.00	2.22	0.50	4.46	1.65	0.00	1.65
25.05	2.22	0.50	4.46	1.65	0.00	1.65
25.10	2.22	0.50	4.46	1.65	0.00	1.65
25.15	2.22	0.50	4.46	1.65	0.00	1.65
25.20	2.22	0.50	4.45	1.65	0.00	1.65
25.25	2.22	0.50	4.45	1.65	0.00	1.65
25.30	2.22	0.50	4.45	1.65	0.00	1.65
25.35	2.22	0.50	4.45	1.65	0.00	1.65
25.40	2.22	0.50	4.44	1.65	0.00	1.65
25.45	2.22	0.50	4.44	1.65	0.00	1.65
25.50	2.22	0.50	4.44	1.65	0.00	1.65
25.55	2.22	0.50	4.43	1.65	0.00	1.65
25.60	2.22	0.50	4.43	1.65	0.00	1.65
25.65	2.22	0.50	4.43	1.65	0.00	1.65
25.70	2.22	0.50	4.43	1.65	0.00	1.65
25.75	2.22	0.50	4.42	1.65	0.00	1.65
25.80	2.22	0.50	4.42	1.65	0.00	1.65
25.85	2.22	0.50	4.42	1.65	0.00	1.65
25.90	2.22	0.50	4.42	1.65	0.00	1.65
25.95	2.22	0.50	4.41	1.65	0.00	1.65
26.00	2.22	0.50	4.41	1.65	0.00	1.65
26.05	2.22	0.50	4.41	1.65	0.00	1.65
26.10	2.22	0.50	4.41	1.65	0.00	1.65
26.15	2.22	0.50	4.40	1.65	0.00	1.65
26.20	2.22	0.50	4.40	1.65	0.00	1.65
26.25	2.22	0.50	4.40	1.65	0.00	1.65
26.30	2.22	0.50	4.40	1.65	0.00	1.65
26.35	2.22	0.51	4.39	1.65	0.00	1.65
26.40	2.22	0.51	4.39	1.65	0.00	1.65
26.45	2.22	0.51	4.39	1.65	0.00	1.65
26.50	2.22	0.51	4.39	1.65	0.00	1.65
26.55	2.22	0.51	4.38	1.65	0.00	1.65
26.60	0.49	0.51	0.96*	1.65	0.00	1.65
26.65	0.45	0.51	0.89*	1.65	0.00	1.65
26.70	0.43	0.51	0.84*	1.65	0.00	1.65
26.75	0.41	0.51	0.81*	1.64	0.00	1.64
26.80	0.40	0.51	0.79*	1.64	0.00	1.64
26.85	0.39	0.51	0.77*	1.63	0.00	1.63
26.90	0.38	0.51	0.75*	1.63	0.00	1.63
26.95	0.37	0.51	0.73*	1.62	0.00	1.62
27.00	0.36	0.51	0.71*	1.61	0.00	1.61
27.05	0.35	0.51	0.70*	1.61	0.00	1.61
27.10	0.35	0.51	0.68*	1.60	0.00	1.60
27.15	0.34	0.51	0.67*	1.59	0.00	1.59
27.20	0.33	0.51	0.65*	1.58	0.00	1.58
27.25	0.33	0.51	0.64*	1.57	0.00	1.57
27.30	0.32	0.51	0.63*	1.56	0.00	1.56
27.35	0.31	0.51	0.62*	1.55	0.00	1.55
27.40	0.31	0.51	0.60*	1.54	0.00	1.54
27.45	0.30	0.51	0.59*	1.53	0.00	1.53
27.50	0.30	0.51	0.58*	1.52	0.00	1.52
27.55	0.29	0.51	0.57*	1.51	0.00	1.51
27.60	0.29	0.51	0.56*	1.50	0.00	1.50
27.65	0.28	0.51	0.55*	1.49	0.00	1.49
27.70	0.28	0.51	0.54*	1.48	0.00	1.48
27.75	0.27	0.51	0.53*	1.47	0.00	1.47
27.80	0.27	0.51	0.52*	1.46	0.00	1.46

27.85	0.26	0.51	0.52*	1.44	0.00	1.44
27.90	0.28	0.51	0.54*	1.43	0.00	1.43
27.95	0.27	0.51	0.53*	1.42	0.00	1.42
28.00	0.27	0.51	0.52*	1.41	0.00	1.41
28.05	0.26	0.51	0.51*	1.40	0.00	1.40
28.10	0.26	0.51	0.50*	1.38	0.00	1.38
28.15	0.25	0.51	0.49*	1.37	0.00	1.37
28.20	0.25	0.52	0.48*	1.36	0.00	1.36
28.25	0.24	0.52	0.47*	1.35	0.00	1.35
28.30	0.24	0.52	0.46*	1.33	0.00	1.33
28.35	0.24	0.52	0.46*	1.32	0.00	1.32
28.40	0.23	0.52	0.45*	1.31	0.00	1.31
28.45	0.23	0.52	0.44*	1.29	0.00	1.29
28.50	0.22	0.52	0.43*	1.28	0.00	1.28
28.55	0.22	0.52	0.42*	1.27	0.00	1.27
28.60	0.22	0.52	0.42*	1.25	0.00	1.25
28.65	0.21	0.52	0.41*	1.24	0.00	1.24
28.70	0.21	0.52	0.40*	1.22	0.00	1.22
28.75	0.20	0.52	0.39*	1.21	0.00	1.21
28.80	0.20	0.52	0.39*	1.19	0.00	1.19
28.85	0.20	0.52	0.38*	1.18	0.00	1.18
28.90	0.19	0.52	0.37*	1.16	0.00	1.16
28.95	0.19	0.52	0.36*	1.15	0.00	1.15
29.00	0.18	0.52	0.36*	1.13	0.00	1.13
29.05	0.18	0.52	0.35*	1.12	0.00	1.12
29.10	0.18	0.52	0.34*	1.10	0.00	1.10
29.15	0.17	0.52	0.33*	1.08	0.00	1.08
29.20	0.17	0.52	0.33*	1.07	0.00	1.07
29.25	0.17	0.52	0.32*	1.05	0.00	1.05
29.30	0.16	0.52	0.31*	1.03	0.00	1.03
29.35	0.16	0.52	0.30*	1.01	0.00	1.01
29.40	0.15	0.52	0.30*	1.00	0.00	1.00
29.45	0.15	0.52	0.29*	0.98	0.00	0.98
29.50	0.15	0.52	0.28*	0.96	0.00	0.96
29.55	0.14	0.52	0.27*	0.94	0.00	0.94
29.60	0.14	0.52	0.27*	0.92	0.00	0.92
29.65	0.14	0.52	0.26*	0.90	0.00	0.90
29.70	0.13	0.52	0.25*	0.88	0.00	0.88
29.75	0.13	0.52	0.24*	0.86	0.00	0.86
29.80	0.12	0.52	0.24*	0.84	0.00	0.84
29.85	0.12	0.52	0.23*	0.82	0.00	0.82
29.90	0.12	0.52	0.22*	0.80	0.00	0.80
29.95	0.11	0.52	0.22*	0.78	0.00	0.78
30.00	0.11	0.52	0.21*	0.76	0.00	0.76
30.05	0.11	0.52	0.22*	0.74	0.00	0.74
30.10	0.12	0.52	0.22*	0.71	0.00	0.71
30.15	0.12	0.52	0.23*	0.69	0.00	0.69
30.20	0.13	0.52	0.24*	0.67	0.00	0.67
30.25	0.13	0.52	0.25*	0.65	0.00	0.65
30.30	0.14	0.52	0.26*	0.63	0.00	0.63
30.35	0.14	0.52	0.27*	0.61	0.00	0.61
30.40	0.14	0.52	0.28*	0.59	0.00	0.59
30.45	0.15	0.52	0.29*	0.58	0.00	0.58
30.50	0.15	0.52	0.29*	0.56	0.00	0.56
30.55	0.16	0.52	0.30*	0.54	0.00	0.54
30.60	0.16	0.52	0.31*	0.52	0.00	0.52
30.65	0.17	0.52	0.32*	0.50	0.00	0.50
30.70	0.17	0.52	0.33*	0.49	0.00	0.49
30.75	0.18	0.52	0.34*	0.47	0.00	0.47
30.80	0.18	0.52	0.35*	0.45	0.00	0.45
30.85	0.19	0.52	0.35*	0.44	0.00	0.44
30.90	0.19	0.52	0.36*	0.42	0.00	0.42
30.95	0.19	0.52	0.37*	0.40	0.00	0.40

31.00	0.20	0.52	0.38*	0.39	0.00	0.39
31.05	0.20	0.52	0.39*	0.37	0.00	0.37
31.10	0.21	0.52	0.40*	0.36	0.00	0.36
31.15	0.21	0.52	0.40*	0.34	0.00	0.34
31.20	0.22	0.52	0.41*	0.33	0.00	0.33
31.25	0.22	0.52	0.42*	0.32	0.00	0.32
31.30	0.23	0.52	0.43*	0.30	0.00	0.30
31.35	0.23	0.53	0.44*	0.29	0.00	0.29
31.40	0.24	0.53	0.45*	0.27	0.00	0.27
31.45	0.24	0.53	0.46*	0.26	0.00	0.26
31.50	0.24	0.53	0.47*	0.25	0.00	0.25
31.55	0.25	0.53	0.48*	0.24	0.00	0.24
31.60	0.25	0.53	0.48*	0.22	0.00	0.22
31.65	0.26	0.53	0.49*	0.21	0.00	0.21
31.70	0.26	0.53	0.50*	0.20	0.00	0.20
31.75	0.27	0.53	0.51*	0.19	0.00	0.19
31.80	0.28	0.53	0.52*	0.17	0.00	0.17
31.85	0.28	0.53	0.53*	0.16	0.00	0.16
31.90	0.29	0.53	0.55*	0.15	0.00	0.15
31.95	0.29	0.53	0.56*	0.14	0.00	0.14
32.00	0.30	0.53	0.57*	0.13	0.00	0.13
32.05	0.30	0.53	0.58*	0.12	0.00	0.12
32.10	0.31	0.53	0.59*	0.11	0.00	0.11
32.15	0.32	0.53	0.60*	0.10	0.00	0.10
32.20	0.32	0.53	0.62*	0.09	0.00	0.09
32.25	0.33	0.53	0.63*	0.08	0.00	0.08
32.30	0.34	0.53	0.65*	0.07	0.00	0.07
32.35	0.35	0.53	0.66*	0.06	0.00	0.06
32.40	0.36	0.53	0.68*	0.05	0.00	0.05
32.45	0.37	0.53	0.69*	0.04	0.00	0.04
32.50	0.37	0.53	0.71*	0.04	0.00	0.04
32.55	0.39	0.53	0.73*	0.03	0.00	0.03
32.60	0.40	0.53	0.76*	0.02	0.00	0.02
32.65	0.41	0.53	0.79*	0.02	0.00	0.02
32.70	0.43	0.53	0.82*	0.01	0.00	0.01
32.75	0.46	0.53	0.87*	0.01	0.00	0.01
32.80	0.51	0.53	0.98*	0.00	0.00	0.00
32.85	2.23	0.53	4.24	0.00	0.00	0.00
32.90	2.23	0.53	4.24	0.00	0.00	0.00
32.95	2.23	0.53	4.24	0.00	0.00	0.00
33.00	2.23	0.53	4.24	0.00	0.00	0.00
33.05	2.23	0.53	4.24	0.00	0.00	0.00
33.10	2.23	0.53	4.24	0.00	0.00	0.00
33.15	2.23	0.53	4.24	0.00	0.00	0.00
33.20	2.23	0.53	4.24	0.00	0.00	0.00
33.25	2.23	0.53	4.24	0.00	0.00	0.00
33.30	2.23	0.53	4.24	0.00	0.00	0.00
33.35	2.23	0.53	4.24	0.00	0.00	0.00
33.40	2.23	0.53	4.24	0.00	0.00	0.00
33.45	2.23	0.53	4.23	0.00	0.00	0.00
33.50	2.23	0.53	4.23	0.00	0.00	0.00
33.55	2.23	0.53	4.23	0.00	0.00	0.00
33.60	2.23	0.53	4.23	0.00	0.00	0.00
33.65	2.23	0.53	4.23	0.00	0.00	0.00
33.70	2.23	0.53	4.23	0.00	0.00	0.00
33.75	2.23	0.53	4.23	0.00	0.00	0.00
33.80	2.22	0.53	4.23	0.00	0.00	0.00
33.85	2.22	0.53	4.23	0.00	0.00	0.00
33.90	2.22	0.53	4.23	0.00	0.00	0.00
33.95	2.22	0.53	4.23	0.00	0.00	0.00
34.00	2.22	0.53	4.23	0.00	0.00	0.00
34.05	2.22	0.53	4.23	0.00	0.00	0.00
34.10	2.22	0.53	4.23	0.00	0.00	0.00

34.15	2.22	0.53	4.23	0.00	0.00	0.00
34.20	2.22	0.53	4.22	0.00	0.00	0.00
34.25	2.22	0.53	4.22	0.00	0.00	0.00
34.30	2.22	0.53	4.22	0.00	0.00	0.00
34.35	2.22	0.53	4.22	0.00	0.00	0.00
34.40	2.22	0.53	4.22	0.00	0.00	0.00
34.45	2.22	0.53	4.22	0.00	0.00	0.00
34.50	2.22	0.53	4.22	0.00	0.00	0.00
34.55	2.22	0.53	4.22	0.00	0.00	0.00
34.60	2.22	0.53	4.22	0.00	0.00	0.00
34.65	2.22	0.53	4.22	0.00	0.00	0.00
34.70	2.22	0.53	4.22	0.00	0.00	0.00
34.75	2.22	0.53	4.22	0.00	0.00	0.00
34.80	2.22	0.53	4.22	0.00	0.00	0.00
34.85	2.22	0.53	4.22	0.00	0.00	0.00
34.90	2.22	0.53	4.22	0.00	0.00	0.00
34.95	2.22	0.53	4.22	0.00	0.00	0.00
35.00	2.22	0.53	4.22	0.00	0.00	0.00
35.05	2.22	0.53	4.21	0.00	0.00	0.00
35.10	2.22	0.53	4.21	0.00	0.00	0.00
35.15	2.22	0.53	4.21	0.00	0.00	0.00
35.20	2.21	0.53	4.21	0.00	0.00	0.00
35.25	2.21	0.53	4.21	0.00	0.00	0.00
35.30	2.21	0.53	4.21	0.00	0.00	0.00
35.35	2.21	0.53	4.21	0.00	0.00	0.00
35.40	2.21	0.53	4.21	0.00	0.00	0.00
35.45	2.21	0.53	4.21	0.00	0.00	0.00
35.50	2.21	0.53	4.21	0.00	0.00	0.00
35.55	2.21	0.53	4.21	0.00	0.00	0.00
35.60	2.21	0.53	4.21	0.00	0.00	0.00
35.65	2.21	0.53	4.21	0.00	0.00	0.00
35.70	2.21	0.53	4.21	0.00	0.00	0.00
35.75	2.21	0.53	4.21	0.00	0.00	0.00
35.80	2.21	0.53	4.21	0.00	0.00	0.00
35.85	2.21	0.53	4.21	0.00	0.00	0.00
35.90	2.21	0.53	4.21	0.00	0.00	0.00
35.95	2.21	0.53	4.21	0.00	0.00	0.00
36.00	2.21	0.53	4.21	0.00	0.00	0.00
36.05	2.21	0.53	4.20	0.00	0.00	0.00
36.10	2.21	0.53	4.20	0.00	0.00	0.00
36.15	2.21	0.53	4.20	0.00	0.00	0.00
36.20	2.21	0.53	4.20	0.00	0.00	0.00
36.25	2.21	0.53	4.20	0.00	0.00	0.00
36.30	2.21	0.53	4.20	0.00	0.00	0.00
36.35	2.21	0.53	4.20	0.00	0.00	0.00
36.40	2.21	0.53	4.20	0.00	0.00	0.00
36.45	2.21	0.52	4.20	0.00	0.00	0.00
36.50	2.21	0.52	4.20	0.00	0.00	0.00
36.55	2.21	0.52	4.20	0.00	0.00	0.00
36.60	2.20	0.52	4.20	0.00	0.00	0.00
36.65	2.20	0.52	4.20	0.00	0.00	0.00
36.70	2.20	0.52	4.20	0.00	0.00	0.00
36.75	2.20	0.52	4.20	0.00	0.00	0.00
36.80	2.20	0.52	4.20	0.00	0.00	0.00
36.85	2.20	0.52	4.20	0.00	0.00	0.00
36.90	2.20	0.52	4.20	0.00	0.00	0.00
36.95	2.20	0.52	4.20	0.00	0.00	0.00
37.00	2.20	0.52	4.20	0.00	0.00	0.00
37.05	2.20	0.52	4.20	0.00	0.00	0.00
37.10	2.20	0.52	4.20	0.00	0.00	0.00
37.15	2.20	0.52	4.20	0.00	0.00	0.00
37.20	2.20	0.52	4.20	0.00	0.00	0.00
37.25	2.20	0.52	4.20	0.00	0.00	0.00

37.30	2.20	0.52	4.20	0.00	0.00	0.00
37.35	2.20	0.52	4.20	0.00	0.00	0.00
37.40	2.20	0.52	4.20	0.00	0.00	0.00
37.45	2.20	0.52	4.19	0.00	0.00	0.00
37.50	2.20	0.52	4.19	0.00	0.00	0.00
37.55	2.20	0.52	4.19	0.00	0.00	0.00
37.60	2.20	0.52	4.19	0.00	0.00	0.00
37.65	2.20	0.52	4.19	0.00	0.00	0.00
37.70	2.20	0.52	4.19	0.00	0.00	0.00
37.75	2.20	0.52	4.19	0.00	0.00	0.00
37.80	2.20	0.52	4.19	0.00	0.00	0.00
37.85	2.20	0.52	4.19	0.00	0.00	0.00
37.90	2.20	0.52	4.19	0.00	0.00	0.00
37.95	2.19	0.52	4.19	0.00	0.00	0.00
38.00	2.19	0.52	4.19	0.00	0.00	0.00
38.05	2.19	0.52	4.19	0.00	0.00	0.00
38.10	2.19	0.52	4.19	0.00	0.00	0.00
38.15	2.19	0.52	4.19	0.00	0.00	0.00
38.20	2.19	0.52	4.19	0.00	0.00	0.00
38.25	2.19	0.52	4.19	0.00	0.00	0.00
38.30	2.19	0.52	4.19	0.00	0.00	0.00
38.35	2.19	0.52	4.19	0.00	0.00	0.00
38.40	2.19	0.52	4.19	0.00	0.00	0.00
38.45	2.19	0.52	4.19	0.00	0.00	0.00
38.50	2.19	0.52	4.19	0.00	0.00	0.00
38.55	2.19	0.52	4.19	0.00	0.00	0.00
38.60	2.19	0.52	4.19	0.00	0.00	0.00
38.65	2.19	0.52	4.19	0.00	0.00	0.00
38.70	2.19	0.52	4.19	0.00	0.00	0.00
38.75	2.19	0.52	4.19	0.00	0.00	0.00
38.80	2.19	0.52	4.19	0.00	0.00	0.00
38.85	2.19	0.52	4.19	0.00	0.00	0.00
38.90	2.19	0.52	4.19	0.00	0.00	0.00
38.95	2.19	0.52	4.19	0.00	0.00	0.00
39.00	2.19	0.52	4.19	0.00	0.00	0.00
39.05	2.19	0.52	4.19	0.00	0.00	0.00
39.10	2.19	0.52	4.19	0.00	0.00	0.00
39.15	2.19	0.52	4.19	0.00	0.00	0.00
39.20	2.19	0.52	4.19	0.00	0.00	0.00
39.25	2.19	0.52	4.19	0.00	0.00	0.00
39.30	2.19	0.52	4.19	0.00	0.00	0.00
39.35	2.18	0.52	4.19	0.00	0.00	0.00
39.40	2.18	0.52	4.19	0.00	0.00	0.00
39.45	2.18	0.52	4.19	0.00	0.00	0.00
39.50	2.18	0.52	4.19	0.00	0.00	0.00
39.55	2.18	0.52	4.19	0.00	0.00	0.00
39.60	2.18	0.52	4.19	0.00	0.00	0.00
39.65	2.18	0.52	4.19	0.00	0.00	0.00
39.70	2.18	0.52	4.19	0.00	0.00	0.00
39.75	2.18	0.52	4.19	0.00	0.00	0.00
39.80	2.18	0.52	4.19	0.00	0.00	0.00
39.85	2.18	0.52	4.19	0.00	0.00	0.00
39.90	2.18	0.52	4.19	0.00	0.00	0.00
39.95	2.18	0.52	4.19	0.00	0.00	0.00
40.00	2.18	0.52	4.19	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

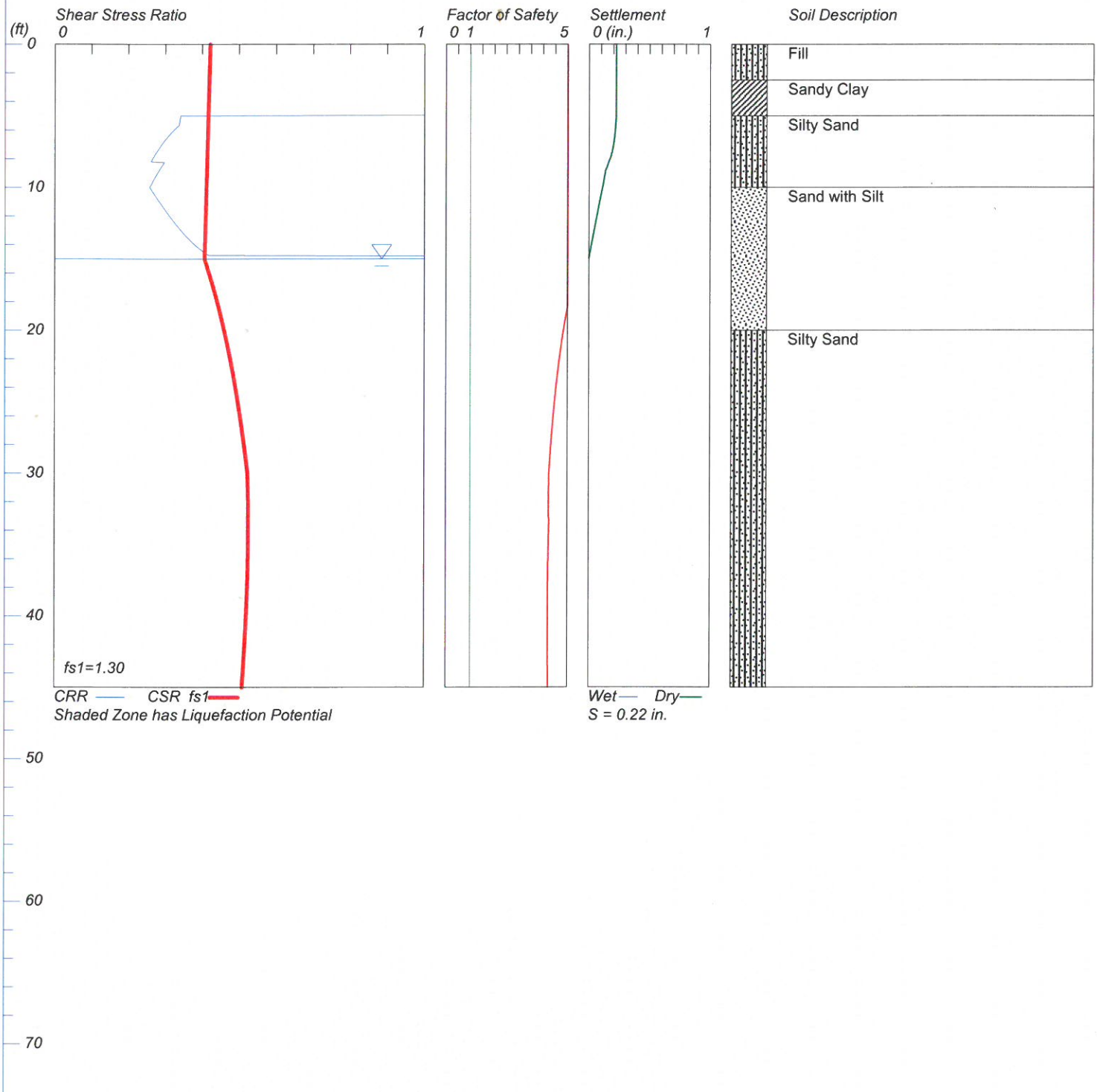
CRRm	Cyclic resistance ratio from soils
CSRfs	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRfs
S_sat	Settlement from saturated sands
S_dry	Settlement from dry sands
S_all	Total settlement from saturated and dry sands
NoLiq	No-Liquefy Soils

LIQUEFACTION ANALYSIS

Blue Wave Hotel & Residences

Hole No.=B-2 Water Depth=15 ft Surface Elev.=18

Magnitude=7.2
Acceleration=0.499g



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LIQUEFACTION ANALYSIS CALCULATION SHEET

****

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Input File Name: \\Server\projects\40-3618G Imperial Beach Hotel and Residential\B-2.liq
Title: Blue Wave Hotel & Residences
Subtitle: 40-3618G

Surface Elev.=18
Hole No.=B-2
Depth of Hole= 45.0 ft
Water Table during Earthquake= 15.0 ft
Water Table during In-Situ Testing= 16.5 ft
Max. Acceleration= 0.5 g
Earthquake Magnitude= 7.2

Input Data:
Surface Elev.=18
Hole No.=B-2
Depth of Hole=45.0 ft
Water Table during Earthquake= 15.0 ft
Water Table during In-Situ Testing= 16.5 ft
Max. Acceleration=0.5 g
Earthquake Magnitude=7.2

Earthquake Magnitude=7.2
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1
9. User request factor of safety (apply to CSR) , User= 1.3
Plot one CSR curve (fs1=User)
10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %
0.0	20.0	125.0	NoLiq
5.0	16.0	120.0	30.0
10.0	19.0	125.0	8.0
15.0	33.0	125.0	6.0
20.0	61.0	125.0	15.0
25.0	59.0	125.0	19.0
30.0	37.0	125.0	30.0
35.0	85.0	125.0	30.0
40.0	44.0	130.0	16.0
45.0	67.0	130.0	16.0

Output Results:

Settlement of saturated sands=0.00 in.
Settlement of dry sands=0.22 in.
Total settlement of saturated and dry sands=0.22 in.
Differential Settlement=0.111 to 0.147 in.

Depth ft	CRRm	CSRfs	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.00	0.42	5.00	0.00	0.22	0.22
0.05	2.00	0.42	5.00	0.00	0.22	0.22
0.10	2.00	0.42	5.00	0.00	0.22	0.22
0.15	2.00	0.42	5.00	0.00	0.22	0.22
0.20	2.00	0.42	5.00	0.00	0.22	0.22
0.25	2.00	0.42	5.00	0.00	0.22	0.22
0.30	2.00	0.42	5.00	0.00	0.22	0.22
0.35	2.00	0.42	5.00	0.00	0.22	0.22
0.40	2.00	0.42	5.00	0.00	0.22	0.22
0.45	2.00	0.42	5.00	0.00	0.22	0.22
0.50	2.00	0.42	5.00	0.00	0.22	0.22
0.55	2.00	0.42	5.00	0.00	0.22	0.22
0.60	2.00	0.42	5.00	0.00	0.22	0.22
0.65	2.00	0.42	5.00	0.00	0.22	0.22
0.70	2.00	0.42	5.00	0.00	0.22	0.22
0.75	2.00	0.42	5.00	0.00	0.22	0.22
0.80	2.00	0.42	5.00	0.00	0.22	0.22
0.85	2.00	0.42	5.00	0.00	0.22	0.22
0.90	2.00	0.42	5.00	0.00	0.22	0.22
0.95	2.00	0.42	5.00	0.00	0.22	0.22
1.00	2.00	0.42	5.00	0.00	0.22	0.22
1.05	2.00	0.42	5.00	0.00	0.22	0.22
1.10	2.00	0.42	5.00	0.00	0.22	0.22
1.15	2.00	0.42	5.00	0.00	0.22	0.22
1.20	2.00	0.42	5.00	0.00	0.22	0.22
1.25	2.00	0.42	5.00	0.00	0.22	0.22
1.30	2.00	0.42	5.00	0.00	0.22	0.22
1.35	2.00	0.42	5.00	0.00	0.22	0.22
1.40	2.00	0.42	5.00	0.00	0.22	0.22
1.45	2.00	0.42	5.00	0.00	0.22	0.22
1.50	2.00	0.42	5.00	0.00	0.22	0.22
1.55	2.00	0.42	5.00	0.00	0.22	0.22
1.60	2.00	0.42	5.00	0.00	0.22	0.22
1.65	2.00	0.42	5.00	0.00	0.22	0.22
1.70	2.00	0.42	5.00	0.00	0.22	0.22
1.75	2.00	0.42	5.00	0.00	0.22	0.22
1.80	2.00	0.42	5.00	0.00	0.22	0.22
1.85	2.00	0.42	5.00	0.00	0.22	0.22
1.90	2.00	0.42	5.00	0.00	0.22	0.22
1.95	2.00	0.42	5.00	0.00	0.22	0.22
2.00	2.00	0.42	5.00	0.00	0.22	0.22
2.05	2.00	0.42	5.00	0.00	0.22	0.22
2.10	2.00	0.42	5.00	0.00	0.22	0.22
2.15	2.00	0.42	5.00	0.00	0.22	0.22
2.20	2.00	0.42	5.00	0.00	0.22	0.22
2.25	2.00	0.42	5.00	0.00	0.22	0.22
2.30	2.00	0.42	5.00	0.00	0.22	0.22
2.35	2.00	0.42	5.00	0.00	0.22	0.22
2.40	2.00	0.42	5.00	0.00	0.22	0.22
2.45	2.00	0.42	5.00	0.00	0.22	0.22
2.50	2.00	0.42	5.00	0.00	0.22	0.22
2.55	2.00	0.42	5.00	0.00	0.22	0.22

2.60	2.00	0.42	5.00	0.00	0.22	0.22
2.65	2.00	0.42	5.00	0.00	0.22	0.22
2.70	2.00	0.42	5.00	0.00	0.22	0.22
2.75	2.00	0.42	5.00	0.00	0.22	0.22
2.80	2.00	0.42	5.00	0.00	0.22	0.22
2.85	2.00	0.42	5.00	0.00	0.22	0.22
2.90	2.00	0.42	5.00	0.00	0.22	0.22
2.95	2.00	0.42	5.00	0.00	0.22	0.22
3.00	2.00	0.42	5.00	0.00	0.22	0.22
3.05	2.00	0.42	5.00	0.00	0.22	0.22
3.10	2.00	0.42	5.00	0.00	0.22	0.22
3.15	2.00	0.42	5.00	0.00	0.22	0.22
3.20	2.00	0.42	5.00	0.00	0.22	0.22
3.25	2.00	0.42	5.00	0.00	0.22	0.22
3.30	2.00	0.42	5.00	0.00	0.22	0.22
3.35	2.00	0.42	5.00	0.00	0.22	0.22
3.40	2.00	0.42	5.00	0.00	0.22	0.22
3.45	2.00	0.42	5.00	0.00	0.22	0.22
3.50	2.00	0.42	5.00	0.00	0.22	0.22
3.55	2.00	0.42	5.00	0.00	0.22	0.22
3.60	2.00	0.42	5.00	0.00	0.22	0.22
3.65	2.00	0.42	5.00	0.00	0.22	0.22
3.70	2.00	0.42	5.00	0.00	0.22	0.22
3.75	2.00	0.42	5.00	0.00	0.22	0.22
3.80	2.00	0.42	5.00	0.00	0.22	0.22
3.85	2.00	0.42	5.00	0.00	0.22	0.22
3.90	2.00	0.42	5.00	0.00	0.22	0.22
3.95	2.00	0.42	5.00	0.00	0.22	0.22
4.00	2.00	0.42	5.00	0.00	0.22	0.22
4.05	2.00	0.42	5.00	0.00	0.22	0.22
4.10	2.00	0.42	5.00	0.00	0.22	0.22
4.15	2.00	0.42	5.00	0.00	0.22	0.22
4.20	2.00	0.42	5.00	0.00	0.22	0.22
4.25	2.00	0.42	5.00	0.00	0.22	0.22
4.30	2.00	0.42	5.00	0.00	0.22	0.22
4.35	2.00	0.42	5.00	0.00	0.22	0.22
4.40	2.00	0.42	5.00	0.00	0.22	0.22
4.45	2.00	0.42	5.00	0.00	0.22	0.22
4.50	2.00	0.42	5.00	0.00	0.22	0.22
4.55	2.00	0.42	5.00	0.00	0.22	0.22
4.60	2.00	0.42	5.00	0.00	0.22	0.22
4.65	2.00	0.42	5.00	0.00	0.22	0.22
4.70	2.00	0.42	5.00	0.00	0.22	0.22
4.75	2.00	0.42	5.00	0.00	0.22	0.22
4.80	2.00	0.42	5.00	0.00	0.22	0.22
4.85	2.00	0.42	5.00	0.00	0.22	0.22
4.90	2.00	0.42	5.00	0.00	0.22	0.22
4.95	2.00	0.42	5.00	0.00	0.22	0.22
5.00	0.34	0.42	5.00	0.00	0.22	0.22
5.05	0.34	0.42	5.00	0.00	0.22	0.22
5.10	0.34	0.42	5.00	0.00	0.22	0.22
5.15	0.34	0.42	5.00	0.00	0.22	0.22
5.20	0.34	0.42	5.00	0.00	0.22	0.22
5.25	0.34	0.42	5.00	0.00	0.22	0.22
5.30	0.34	0.42	5.00	0.00	0.22	0.22
5.35	0.34	0.42	5.00	0.00	0.22	0.22
5.40	0.34	0.42	5.00	0.00	0.22	0.22
5.45	0.34	0.42	5.00	0.00	0.22	0.22
5.50	0.34	0.42	5.00	0.00	0.22	0.22
5.55	0.34	0.42	5.00	0.00	0.22	0.22
5.60	0.34	0.42	5.00	0.00	0.22	0.22
5.65	0.34	0.42	5.00	0.00	0.22	0.22
5.70	0.34	0.42	5.00	0.00	0.22	0.22

5.75	0.33	0.42	5.00	0.00	0.22	0.22
5.80	0.33	0.42	5.00	0.00	0.22	0.22
5.85	0.33	0.42	5.00	0.00	0.22	0.22
5.90	0.33	0.42	5.00	0.00	0.21	0.21
5.95	0.33	0.42	5.00	0.00	0.21	0.21
6.00	0.32	0.42	5.00	0.00	0.21	0.21
6.05	0.32	0.42	5.00	0.00	0.21	0.21
6.10	0.32	0.42	5.00	0.00	0.21	0.21
6.15	0.32	0.42	5.00	0.00	0.21	0.21
6.20	0.32	0.42	5.00	0.00	0.21	0.21
6.25	0.31	0.42	5.00	0.00	0.21	0.21
6.30	0.31	0.42	5.00	0.00	0.21	0.21
6.35	0.31	0.42	5.00	0.00	0.21	0.21
6.40	0.31	0.42	5.00	0.00	0.21	0.21
6.45	0.31	0.42	5.00	0.00	0.21	0.21
6.50	0.31	0.42	5.00	0.00	0.21	0.21
6.55	0.30	0.42	5.00	0.00	0.21	0.21
6.60	0.30	0.42	5.00	0.00	0.21	0.21
6.65	0.30	0.42	5.00	0.00	0.21	0.21
6.70	0.30	0.42	5.00	0.00	0.21	0.21
6.75	0.30	0.42	5.00	0.00	0.20	0.20
6.80	0.30	0.41	5.00	0.00	0.20	0.20
6.85	0.29	0.41	5.00	0.00	0.20	0.20
6.90	0.29	0.41	5.00	0.00	0.20	0.20
6.95	0.29	0.41	5.00	0.00	0.20	0.20
7.00	0.29	0.41	5.00	0.00	0.20	0.20
7.05	0.29	0.41	5.00	0.00	0.20	0.20
7.10	0.29	0.41	5.00	0.00	0.20	0.20
7.15	0.29	0.41	5.00	0.00	0.20	0.20
7.20	0.29	0.41	5.00	0.00	0.20	0.20
7.25	0.28	0.41	5.00	0.00	0.20	0.20
7.30	0.28	0.41	5.00	0.00	0.19	0.19
7.35	0.28	0.41	5.00	0.00	0.19	0.19
7.40	0.28	0.41	5.00	0.00	0.19	0.19
7.45	0.28	0.41	5.00	0.00	0.19	0.19
7.50	0.28	0.41	5.00	0.00	0.19	0.19
7.55	0.28	0.41	5.00	0.00	0.19	0.19
7.60	0.27	0.41	5.00	0.00	0.19	0.19
7.65	0.27	0.41	5.00	0.00	0.18	0.18
7.70	0.27	0.41	5.00	0.00	0.18	0.18
7.75	0.27	0.41	5.00	0.00	0.18	0.18
7.80	0.27	0.41	5.00	0.00	0.18	0.18
7.85	0.27	0.41	5.00	0.00	0.18	0.18
7.90	0.27	0.41	5.00	0.00	0.18	0.18
7.95	0.27	0.41	5.00	0.00	0.17	0.17
8.00	0.27	0.41	5.00	0.00	0.17	0.17
8.05	0.26	0.41	5.00	0.00	0.17	0.17
8.10	0.26	0.41	5.00	0.00	0.17	0.17
8.15	0.26	0.41	5.00	0.00	0.17	0.17
8.20	0.26	0.41	5.00	0.00	0.16	0.16
8.25	0.30	0.41	5.00	0.00	0.16	0.16
8.30	0.30	0.41	5.00	0.00	0.16	0.16
8.35	0.29	0.41	5.00	0.00	0.16	0.16
8.40	0.29	0.41	5.00	0.00	0.15	0.15
8.45	0.29	0.41	5.00	0.00	0.15	0.15
8.50	0.29	0.41	5.00	0.00	0.15	0.15
8.55	0.29	0.41	5.00	0.00	0.15	0.15
8.60	0.29	0.41	5.00	0.00	0.15	0.15
8.65	0.29	0.41	5.00	0.00	0.14	0.14
8.70	0.29	0.41	5.00	0.00	0.14	0.14
8.75	0.28	0.41	5.00	0.00	0.14	0.14
8.80	0.28	0.41	5.00	0.00	0.14	0.14
8.85	0.28	0.41	5.00	0.00	0.13	0.13

8.90	0.28	0.41	5.00	0.00	0.13	0.13
8.95	0.28	0.41	5.00	0.00	0.13	0.13
9.00	0.28	0.41	5.00	0.00	0.13	0.13
9.05	0.28	0.41	5.00	0.00	0.13	0.13
9.10	0.28	0.41	5.00	0.00	0.13	0.13
9.15	0.28	0.41	5.00	0.00	0.13	0.13
9.20	0.27	0.41	5.00	0.00	0.13	0.13
9.25	0.27	0.41	5.00	0.00	0.13	0.13
9.30	0.27	0.41	5.00	0.00	0.13	0.13
9.35	0.27	0.41	5.00	0.00	0.13	0.13
9.40	0.27	0.41	5.00	0.00	0.12	0.12
9.45	0.27	0.41	5.00	0.00	0.12	0.12
9.50	0.27	0.41	5.00	0.00	0.12	0.12
9.55	0.27	0.41	5.00	0.00	0.12	0.12
9.60	0.27	0.41	5.00	0.00	0.12	0.12
9.65	0.26	0.41	5.00	0.00	0.12	0.12
9.70	0.26	0.41	5.00	0.00	0.12	0.12
9.75	0.26	0.41	5.00	0.00	0.12	0.12
9.80	0.26	0.41	5.00	0.00	0.12	0.12
9.85	0.26	0.41	5.00	0.00	0.12	0.12
9.90	0.26	0.41	5.00	0.00	0.11	0.11
9.95	0.26	0.41	5.00	0.00	0.11	0.11
10.00	0.26	0.41	5.00	0.00	0.11	0.11
10.05	0.26	0.41	5.00	0.00	0.11	0.11
10.10	0.26	0.41	5.00	0.00	0.11	0.11
10.15	0.26	0.41	5.00	0.00	0.11	0.11
10.20	0.26	0.41	5.00	0.00	0.11	0.11
10.25	0.26	0.41	5.00	0.00	0.11	0.11
10.30	0.27	0.41	5.00	0.00	0.10	0.10
10.35	0.27	0.41	5.00	0.00	0.10	0.10
10.40	0.27	0.41	5.00	0.00	0.10	0.10
10.45	0.27	0.41	5.00	0.00	0.10	0.10
10.50	0.27	0.41	5.00	0.00	0.10	0.10
10.55	0.27	0.41	5.00	0.00	0.10	0.10
10.60	0.27	0.41	5.00	0.00	0.10	0.10
10.65	0.27	0.41	5.00	0.00	0.10	0.10
10.70	0.28	0.41	5.00	0.00	0.09	0.09
10.75	0.28	0.41	5.00	0.00	0.09	0.09
10.80	0.28	0.41	5.00	0.00	0.09	0.09
10.85	0.28	0.41	5.00	0.00	0.09	0.09
10.90	0.28	0.41	5.00	0.00	0.09	0.09
10.95	0.28	0.41	5.00	0.00	0.09	0.09
11.00	0.28	0.41	5.00	0.00	0.09	0.09
11.05	0.28	0.41	5.00	0.00	0.09	0.09
11.10	0.29	0.41	5.00	0.00	0.09	0.09
11.15	0.29	0.41	5.00	0.00	0.08	0.08
11.20	0.29	0.41	5.00	0.00	0.08	0.08
11.25	0.29	0.41	5.00	0.00	0.08	0.08
11.30	0.29	0.41	5.00	0.00	0.08	0.08
11.35	0.29	0.41	5.00	0.00	0.08	0.08
11.40	0.29	0.41	5.00	0.00	0.08	0.08
11.45	0.30	0.41	5.00	0.00	0.08	0.08
11.50	0.30	0.41	5.00	0.00	0.08	0.08
11.55	0.30	0.41	5.00	0.00	0.08	0.08
11.60	0.30	0.41	5.00	0.00	0.07	0.07
11.65	0.30	0.41	5.00	0.00	0.07	0.07
11.70	0.30	0.41	5.00	0.00	0.07	0.07
11.75	0.30	0.41	5.00	0.00	0.07	0.07
11.80	0.31	0.41	5.00	0.00	0.07	0.07
11.85	0.31	0.41	5.00	0.00	0.07	0.07
11.90	0.31	0.41	5.00	0.00	0.07	0.07
11.95	0.31	0.41	5.00	0.00	0.07	0.07
12.00	0.31	0.41	5.00	0.00	0.07	0.07

12.05	0.31	0.41	5.00	0.00	0.06	0.06
12.10	0.31	0.41	5.00	0.00	0.06	0.06
12.15	0.32	0.41	5.00	0.00	0.06	0.06
12.20	0.32	0.41	5.00	0.00	0.06	0.06
12.25	0.32	0.41	5.00	0.00	0.06	0.06
12.30	0.32	0.41	5.00	0.00	0.06	0.06
12.35	0.32	0.41	5.00	0.00	0.06	0.06
12.40	0.32	0.41	5.00	0.00	0.06	0.06
12.45	0.32	0.41	5.00	0.00	0.06	0.06
12.50	0.33	0.41	5.00	0.00	0.05	0.05
12.55	0.33	0.41	5.00	0.00	0.05	0.05
12.60	0.33	0.41	5.00	0.00	0.05	0.05
12.65	0.33	0.41	5.00	0.00	0.05	0.05
12.70	0.33	0.41	5.00	0.00	0.05	0.05
12.75	0.33	0.41	5.00	0.00	0.05	0.05
12.80	0.34	0.41	5.00	0.00	0.05	0.05
12.85	0.34	0.41	5.00	0.00	0.05	0.05
12.90	0.34	0.41	5.00	0.00	0.05	0.05
12.95	0.34	0.41	5.00	0.00	0.04	0.04
13.00	0.34	0.41	5.00	0.00	0.04	0.04
13.05	0.34	0.41	5.00	0.00	0.04	0.04
13.10	0.35	0.41	5.00	0.00	0.04	0.04
13.15	0.35	0.41	5.00	0.00	0.04	0.04
13.20	0.35	0.41	5.00	0.00	0.04	0.04
13.25	0.35	0.41	5.00	0.00	0.04	0.04
13.30	0.35	0.41	5.00	0.00	0.04	0.04
13.35	0.35	0.41	5.00	0.00	0.04	0.04
13.40	0.36	0.41	5.00	0.00	0.03	0.03
13.45	0.36	0.41	5.00	0.00	0.03	0.03
13.50	0.36	0.41	5.00	0.00	0.03	0.03
13.55	0.36	0.41	5.00	0.00	0.03	0.03
13.60	0.36	0.41	5.00	0.00	0.03	0.03
13.65	0.37	0.41	5.00	0.00	0.03	0.03
13.70	0.37	0.41	5.00	0.00	0.03	0.03
13.75	0.37	0.41	5.00	0.00	0.03	0.03
13.80	0.37	0.41	5.00	0.00	0.03	0.03
13.85	0.37	0.41	5.00	0.00	0.02	0.02
13.90	0.38	0.41	5.00	0.00	0.02	0.02
13.95	0.38	0.41	5.00	0.00	0.02	0.02
14.00	0.38	0.41	5.00	0.00	0.02	0.02
14.05	0.38	0.41	5.00	0.00	0.02	0.02
14.10	0.38	0.41	5.00	0.00	0.02	0.02
14.15	0.39	0.41	5.00	0.00	0.02	0.02
14.20	0.39	0.41	5.00	0.00	0.02	0.02
14.25	0.39	0.41	5.00	0.00	0.02	0.02
14.30	0.39	0.41	5.00	0.00	0.01	0.01
14.35	0.40	0.41	5.00	0.00	0.01	0.01
14.40	0.40	0.41	5.00	0.00	0.01	0.01
14.45	0.40	0.41	5.00	0.00	0.01	0.01
14.50	0.40	0.41	5.00	0.00	0.01	0.01
14.55	0.41	0.41	5.00	0.00	0.01	0.01
14.60	0.41	0.41	5.00	0.00	0.01	0.01
14.65	0.41	0.41	5.00	0.00	0.01	0.01
14.70	0.42	0.41	5.00	0.00	0.01	0.01
14.75	0.42	0.41	5.00	0.00	0.00	0.00
14.80	2.22	0.41	5.00	0.00	0.00	0.00
14.85	2.22	0.41	5.00	0.00	0.00	0.00
14.90	2.22	0.41	5.00	0.00	0.00	0.00
14.95	2.22	0.41	5.00	0.00	0.00	0.00
15.00	2.22	0.41	5.00	0.00	0.00	0.00
15.05	2.22	0.41	5.00	0.00	0.00	0.00
15.10	2.22	0.41	5.00	0.00	0.00	0.00
15.15	2.22	0.41	5.00	0.00	0.00	0.00

15.20	2.22	0.41	5.00	0.00	0.00	0.00
15.25	2.22	0.41	5.00	0.00	0.00	0.00
15.30	2.22	0.41	5.00	0.00	0.00	0.00
15.35	2.22	0.41	5.00	0.00	0.00	0.00
15.40	2.22	0.41	5.00	0.00	0.00	0.00
15.45	2.22	0.41	5.00	0.00	0.00	0.00
15.50	2.22	0.41	5.00	0.00	0.00	0.00
15.55	2.22	0.41	5.00	0.00	0.00	0.00
15.60	2.22	0.41	5.00	0.00	0.00	0.00
15.65	2.22	0.41	5.00	0.00	0.00	0.00
15.70	2.22	0.42	5.00	0.00	0.00	0.00
15.75	2.22	0.42	5.00	0.00	0.00	0.00
15.80	2.22	0.42	5.00	0.00	0.00	0.00
15.85	2.22	0.42	5.00	0.00	0.00	0.00
15.90	2.22	0.42	5.00	0.00	0.00	0.00
15.95	2.22	0.42	5.00	0.00	0.00	0.00
16.00	2.22	0.42	5.00	0.00	0.00	0.00
16.05	2.22	0.42	5.00	0.00	0.00	0.00
16.10	2.22	0.42	5.00	0.00	0.00	0.00
16.15	2.22	0.42	5.00	0.00	0.00	0.00
16.20	2.22	0.42	5.00	0.00	0.00	0.00
16.25	2.22	0.42	5.00	0.00	0.00	0.00
16.30	2.22	0.42	5.00	0.00	0.00	0.00
16.35	2.22	0.42	5.00	0.00	0.00	0.00
16.40	2.22	0.42	5.00	0.00	0.00	0.00
16.45	2.22	0.42	5.00	0.00	0.00	0.00
16.50	2.22	0.42	5.00	0.00	0.00	0.00
16.55	2.22	0.43	5.00	0.00	0.00	0.00
16.60	2.22	0.43	5.00	0.00	0.00	0.00
16.65	2.22	0.43	5.00	0.00	0.00	0.00
16.70	2.22	0.43	5.00	0.00	0.00	0.00
16.75	2.22	0.43	5.00	0.00	0.00	0.00
16.80	2.22	0.43	5.00	0.00	0.00	0.00
16.85	2.22	0.43	5.00	0.00	0.00	0.00
16.90	2.22	0.43	5.00	0.00	0.00	0.00
16.95	2.22	0.43	5.00	0.00	0.00	0.00
17.00	2.22	0.43	5.00	0.00	0.00	0.00
17.05	2.22	0.43	5.00	0.00	0.00	0.00
17.10	2.22	0.43	5.00	0.00	0.00	0.00
17.15	2.22	0.43	5.00	0.00	0.00	0.00
17.20	2.22	0.43	5.00	0.00	0.00	0.00
17.25	2.22	0.43	5.00	0.00	0.00	0.00
17.30	2.22	0.43	5.00	0.00	0.00	0.00
17.35	2.22	0.43	5.00	0.00	0.00	0.00
17.40	2.22	0.43	5.00	0.00	0.00	0.00
17.45	2.22	0.44	5.00	0.00	0.00	0.00
17.50	2.22	0.44	5.00	0.00	0.00	0.00
17.55	2.22	0.44	5.00	0.00	0.00	0.00
17.60	2.22	0.44	5.00	0.00	0.00	0.00
17.65	2.22	0.44	5.00	0.00	0.00	0.00
17.70	2.22	0.44	5.00	0.00	0.00	0.00
17.75	2.22	0.44	5.00	0.00	0.00	0.00
17.80	2.22	0.44	5.00	0.00	0.00	0.00
17.85	2.22	0.44	5.00	0.00	0.00	0.00
17.90	2.22	0.44	5.00	0.00	0.00	0.00
17.95	2.22	0.44	5.00	0.00	0.00	0.00
18.00	2.22	0.44	5.00	0.00	0.00	0.00
18.05	2.22	0.44	5.00	0.00	0.00	0.00
18.10	2.22	0.44	5.00	0.00	0.00	0.00
18.15	2.22	0.44	5.00	0.00	0.00	0.00
18.20	2.22	0.44	5.00	0.00	0.00	0.00
18.25	2.22	0.44	5.00	0.00	0.00	0.00
18.30	2.22	0.44	5.00	0.00	0.00	0.00

18.35	2.22	0.44	4.99	0.00	0.00	0.00
18.40	2.22	0.45	4.99	0.00	0.00	0.00
18.45	2.22	0.45	4.98	0.00	0.00	0.00
18.50	2.22	0.45	4.98	0.00	0.00	0.00
18.55	2.22	0.45	4.97	0.00	0.00	0.00
18.60	2.22	0.45	4.97	0.00	0.00	0.00
18.65	2.22	0.45	4.96	0.00	0.00	0.00
18.70	2.22	0.45	4.95	0.00	0.00	0.00
18.75	2.22	0.45	4.95	0.00	0.00	0.00
18.80	2.22	0.45	4.94	0.00	0.00	0.00
18.85	2.22	0.45	4.94	0.00	0.00	0.00
18.90	2.22	0.45	4.93	0.00	0.00	0.00
18.95	2.22	0.45	4.93	0.00	0.00	0.00
19.00	2.22	0.45	4.92	0.00	0.00	0.00
19.05	2.22	0.45	4.92	0.00	0.00	0.00
19.10	2.22	0.45	4.91	0.00	0.00	0.00
19.15	2.22	0.45	4.91	0.00	0.00	0.00
19.20	2.22	0.45	4.90	0.00	0.00	0.00
19.25	2.22	0.45	4.90	0.00	0.00	0.00
19.30	2.22	0.45	4.89	0.00	0.00	0.00
19.35	2.22	0.45	4.89	0.00	0.00	0.00
19.40	2.22	0.45	4.88	0.00	0.00	0.00
19.45	2.22	0.46	4.88	0.00	0.00	0.00
19.50	2.22	0.46	4.87	0.00	0.00	0.00
19.55	2.22	0.46	4.87	0.00	0.00	0.00
19.60	2.22	0.46	4.86	0.00	0.00	0.00
19.65	2.22	0.46	4.86	0.00	0.00	0.00
19.70	2.22	0.46	4.85	0.00	0.00	0.00
19.75	2.22	0.46	4.85	0.00	0.00	0.00
19.80	2.22	0.46	4.84	0.00	0.00	0.00
19.85	2.22	0.46	4.84	0.00	0.00	0.00
19.90	2.22	0.46	4.83	0.00	0.00	0.00
19.95	2.22	0.46	4.83	0.00	0.00	0.00
20.00	2.22	0.46	4.83	0.00	0.00	0.00
20.05	2.22	0.46	4.82	0.00	0.00	0.00
20.10	2.22	0.46	4.82	0.00	0.00	0.00
20.15	2.22	0.46	4.81	0.00	0.00	0.00
20.20	2.22	0.46	4.81	0.00	0.00	0.00
20.25	2.22	0.46	4.80	0.00	0.00	0.00
20.30	2.22	0.46	4.80	0.00	0.00	0.00
20.35	2.22	0.46	4.79	0.00	0.00	0.00
20.40	2.22	0.46	4.79	0.00	0.00	0.00
20.45	2.22	0.46	4.78	0.00	0.00	0.00
20.50	2.22	0.46	4.78	0.00	0.00	0.00
20.55	2.22	0.46	4.78	0.00	0.00	0.00
20.60	2.22	0.47	4.77	0.00	0.00	0.00
20.65	2.22	0.47	4.77	0.00	0.00	0.00
20.70	2.22	0.47	4.76	0.00	0.00	0.00
20.75	2.22	0.47	4.76	0.00	0.00	0.00
20.80	2.22	0.47	4.75	0.00	0.00	0.00
20.85	2.22	0.47	4.75	0.00	0.00	0.00
20.90	2.22	0.47	4.75	0.00	0.00	0.00
20.95	2.22	0.47	4.74	0.00	0.00	0.00
21.00	2.22	0.47	4.74	0.00	0.00	0.00
21.05	2.22	0.47	4.73	0.00	0.00	0.00
21.10	2.22	0.47	4.73	0.00	0.00	0.00
21.15	2.22	0.47	4.73	0.00	0.00	0.00
21.20	2.22	0.47	4.72	0.00	0.00	0.00
21.25	2.22	0.47	4.72	0.00	0.00	0.00
21.30	2.22	0.47	4.71	0.00	0.00	0.00
21.35	2.22	0.47	4.71	0.00	0.00	0.00
21.40	2.22	0.47	4.71	0.00	0.00	0.00
21.45	2.22	0.47	4.70	0.00	0.00	0.00

21.50	2.22	0.47	4.70	0.00	0.00	0.00
21.55	2.22	0.47	4.69	0.00	0.00	0.00
21.60	2.22	0.47	4.69	0.00	0.00	0.00
21.65	2.22	0.47	4.69	0.00	0.00	0.00
21.70	2.22	0.47	4.68	0.00	0.00	0.00
21.75	2.22	0.47	4.68	0.00	0.00	0.00
21.80	2.22	0.47	4.67	0.00	0.00	0.00
21.85	2.22	0.48	4.67	0.00	0.00	0.00
21.90	2.22	0.48	4.67	0.00	0.00	0.00
21.95	2.22	0.48	4.66	0.00	0.00	0.00
22.00	2.22	0.48	4.66	0.00	0.00	0.00
22.05	2.22	0.48	4.66	0.00	0.00	0.00
22.10	2.22	0.48	4.65	0.00	0.00	0.00
22.15	2.22	0.48	4.65	0.00	0.00	0.00
22.20	2.22	0.48	4.64	0.00	0.00	0.00
22.25	2.22	0.48	4.64	0.00	0.00	0.00
22.30	2.22	0.48	4.64	0.00	0.00	0.00
22.35	2.22	0.48	4.63	0.00	0.00	0.00
22.40	2.22	0.48	4.63	0.00	0.00	0.00
22.45	2.22	0.48	4.63	0.00	0.00	0.00
22.50	2.22	0.48	4.62	0.00	0.00	0.00
22.55	2.22	0.48	4.62	0.00	0.00	0.00
22.60	2.22	0.48	4.62	0.00	0.00	0.00
22.65	2.22	0.48	4.61	0.00	0.00	0.00
22.70	2.22	0.48	4.61	0.00	0.00	0.00
22.75	2.22	0.48	4.61	0.00	0.00	0.00
22.80	2.22	0.48	4.60	0.00	0.00	0.00
22.85	2.22	0.48	4.60	0.00	0.00	0.00
22.90	2.22	0.48	4.59	0.00	0.00	0.00
22.95	2.22	0.48	4.59	0.00	0.00	0.00
23.00	2.22	0.48	4.59	0.00	0.00	0.00
23.05	2.22	0.48	4.58	0.00	0.00	0.00
23.10	2.22	0.48	4.58	0.00	0.00	0.00
23.15	2.22	0.48	4.58	0.00	0.00	0.00
23.20	2.22	0.49	4.57	0.00	0.00	0.00
23.25	2.22	0.49	4.57	0.00	0.00	0.00
23.30	2.22	0.49	4.57	0.00	0.00	0.00
23.35	2.22	0.49	4.56	0.00	0.00	0.00
23.40	2.22	0.49	4.56	0.00	0.00	0.00
23.45	2.22	0.49	4.56	0.00	0.00	0.00
23.50	2.22	0.49	4.55	0.00	0.00	0.00
23.55	2.22	0.49	4.55	0.00	0.00	0.00
23.60	2.22	0.49	4.55	0.00	0.00	0.00
23.65	2.22	0.49	4.55	0.00	0.00	0.00
23.70	2.22	0.49	4.54	0.00	0.00	0.00
23.75	2.22	0.49	4.54	0.00	0.00	0.00
23.80	2.22	0.49	4.54	0.00	0.00	0.00
23.85	2.22	0.49	4.53	0.00	0.00	0.00
23.90	2.22	0.49	4.53	0.00	0.00	0.00
23.95	2.22	0.49	4.53	0.00	0.00	0.00
24.00	2.22	0.49	4.52	0.00	0.00	0.00
24.05	2.22	0.49	4.52	0.00	0.00	0.00
24.10	2.22	0.49	4.52	0.00	0.00	0.00
24.15	2.22	0.49	4.51	0.00	0.00	0.00
24.20	2.22	0.49	4.51	0.00	0.00	0.00
24.25	2.22	0.49	4.51	0.00	0.00	0.00
24.30	2.22	0.49	4.51	0.00	0.00	0.00
24.35	2.22	0.49	4.50	0.00	0.00	0.00
24.40	2.22	0.49	4.50	0.00	0.00	0.00
24.45	2.22	0.49	4.50	0.00	0.00	0.00
24.50	2.22	0.49	4.49	0.00	0.00	0.00
24.55	2.22	0.49	4.49	0.00	0.00	0.00
24.60	2.22	0.49	4.49	0.00	0.00	0.00

24.65	2.22	0.49	4.48	0.00	0.00	0.00
24.70	2.22	0.50	4.48	0.00	0.00	0.00
24.75	2.22	0.50	4.48	0.00	0.00	0.00
24.80	2.22	0.50	4.48	0.00	0.00	0.00
24.85	2.22	0.50	4.47	0.00	0.00	0.00
24.90	2.22	0.50	4.47	0.00	0.00	0.00
24.95	2.22	0.50	4.47	0.00	0.00	0.00
25.00	2.22	0.50	4.46	0.00	0.00	0.00
25.05	2.22	0.50	4.46	0.00	0.00	0.00
25.10	2.22	0.50	4.46	0.00	0.00	0.00
25.15	2.22	0.50	4.46	0.00	0.00	0.00
25.20	2.22	0.50	4.45	0.00	0.00	0.00
25.25	2.22	0.50	4.45	0.00	0.00	0.00
25.30	2.22	0.50	4.45	0.00	0.00	0.00
25.35	2.22	0.50	4.45	0.00	0.00	0.00
25.40	2.22	0.50	4.44	0.00	0.00	0.00
25.45	2.22	0.50	4.44	0.00	0.00	0.00
25.50	2.22	0.50	4.44	0.00	0.00	0.00
25.55	2.22	0.50	4.43	0.00	0.00	0.00
25.60	2.22	0.50	4.43	0.00	0.00	0.00
25.65	2.22	0.50	4.43	0.00	0.00	0.00
25.70	2.22	0.50	4.43	0.00	0.00	0.00
25.75	2.22	0.50	4.42	0.00	0.00	0.00
25.80	2.22	0.50	4.42	0.00	0.00	0.00
25.85	2.22	0.50	4.42	0.00	0.00	0.00
25.90	2.22	0.50	4.42	0.00	0.00	0.00
25.95	2.22	0.50	4.41	0.00	0.00	0.00
26.00	2.22	0.50	4.41	0.00	0.00	0.00
26.05	2.22	0.50	4.41	0.00	0.00	0.00
26.10	2.22	0.50	4.41	0.00	0.00	0.00
26.15	2.22	0.50	4.40	0.00	0.00	0.00
26.20	2.22	0.50	4.40	0.00	0.00	0.00
26.25	2.22	0.50	4.40	0.00	0.00	0.00
26.30	2.22	0.50	4.40	0.00	0.00	0.00
26.35	2.22	0.51	4.39	0.00	0.00	0.00
26.40	2.22	0.51	4.39	0.00	0.00	0.00
26.45	2.22	0.51	4.39	0.00	0.00	0.00
26.50	2.22	0.51	4.39	0.00	0.00	0.00
26.55	2.22	0.51	4.38	0.00	0.00	0.00
26.60	2.22	0.51	4.38	0.00	0.00	0.00
26.65	2.22	0.51	4.38	0.00	0.00	0.00
26.70	2.22	0.51	4.38	0.00	0.00	0.00
26.75	2.22	0.51	4.37	0.00	0.00	0.00
26.80	2.22	0.51	4.37	0.00	0.00	0.00
26.85	2.22	0.51	4.37	0.00	0.00	0.00
26.90	2.22	0.51	4.37	0.00	0.00	0.00
26.95	2.22	0.51	4.36	0.00	0.00	0.00
27.00	2.22	0.51	4.36	0.00	0.00	0.00
27.05	2.22	0.51	4.36	0.00	0.00	0.00
27.10	2.22	0.51	4.36	0.00	0.00	0.00
27.15	2.22	0.51	4.35	0.00	0.00	0.00
27.20	2.22	0.51	4.35	0.00	0.00	0.00
27.25	2.22	0.51	4.35	0.00	0.00	0.00
27.30	2.22	0.51	4.35	0.00	0.00	0.00
27.35	2.22	0.51	4.35	0.00	0.00	0.00
27.40	2.22	0.51	4.34	0.00	0.00	0.00
27.45	2.22	0.51	4.34	0.00	0.00	0.00
27.50	2.22	0.51	4.34	0.00	0.00	0.00
27.55	2.22	0.51	4.34	0.00	0.00	0.00
27.60	2.22	0.51	4.33	0.00	0.00	0.00
27.65	2.22	0.51	4.33	0.00	0.00	0.00
27.70	2.22	0.51	4.33	0.00	0.00	0.00
27.75	2.22	0.51	4.33	0.00	0.00	0.00

27.80	2.22	0.51	4.33	0.00	0.00	0.00
27.85	2.22	0.51	4.32	0.00	0.00	0.00
27.90	2.22	0.51	4.32	0.00	0.00	0.00
27.95	2.22	0.51	4.32	0.00	0.00	0.00
28.00	2.22	0.51	4.32	0.00	0.00	0.00
28.05	2.22	0.51	4.31	0.00	0.00	0.00
28.10	2.22	0.51	4.31	0.00	0.00	0.00
28.15	2.22	0.51	4.31	0.00	0.00	0.00
28.20	2.22	0.52	4.31	0.00	0.00	0.00
28.25	2.22	0.52	4.31	0.00	0.00	0.00
28.30	2.22	0.52	4.30	0.00	0.00	0.00
28.35	2.22	0.52	4.30	0.00	0.00	0.00
28.40	2.22	0.52	4.30	0.00	0.00	0.00
28.45	2.22	0.52	4.30	0.00	0.00	0.00
28.50	2.22	0.52	4.30	0.00	0.00	0.00
28.55	2.22	0.52	4.29	0.00	0.00	0.00
28.60	2.22	0.52	4.29	0.00	0.00	0.00
28.65	2.22	0.52	4.29	0.00	0.00	0.00
28.70	2.22	0.52	4.29	0.00	0.00	0.00
28.75	2.22	0.52	4.29	0.00	0.00	0.00
28.80	2.22	0.52	4.28	0.00	0.00	0.00
28.85	2.22	0.52	4.28	0.00	0.00	0.00
28.90	2.22	0.52	4.28	0.00	0.00	0.00
28.95	2.22	0.52	4.28	0.00	0.00	0.00
29.00	2.22	0.52	4.28	0.00	0.00	0.00
29.05	2.22	0.52	4.27	0.00	0.00	0.00
29.10	2.22	0.52	4.27	0.00	0.00	0.00
29.15	2.22	0.52	4.27	0.00	0.00	0.00
29.20	2.22	0.52	4.27	0.00	0.00	0.00
29.25	2.22	0.52	4.27	0.00	0.00	0.00
29.30	2.22	0.52	4.26	0.00	0.00	0.00
29.35	2.22	0.52	4.26	0.00	0.00	0.00
29.40	2.22	0.52	4.26	0.00	0.00	0.00
29.45	2.22	0.52	4.26	0.00	0.00	0.00
29.50	2.22	0.52	4.26	0.00	0.00	0.00
29.55	2.22	0.52	4.25	0.00	0.00	0.00
29.60	2.22	0.52	4.25	0.00	0.00	0.00
29.65	2.22	0.52	4.25	0.00	0.00	0.00
29.70	2.22	0.52	4.25	0.00	0.00	0.00
29.75	2.22	0.52	4.25	0.00	0.00	0.00
29.80	2.22	0.52	4.24	0.00	0.00	0.00
29.85	2.22	0.52	4.24	0.00	0.00	0.00
29.90	2.22	0.52	4.24	0.00	0.00	0.00
29.95	2.22	0.52	4.24	0.00	0.00	0.00
30.00	2.22	0.52	4.24	0.00	0.00	0.00
30.05	2.22	0.52	4.24	0.00	0.00	0.00
30.10	2.22	0.52	4.24	0.00	0.00	0.00
30.15	2.22	0.52	4.24	0.00	0.00	0.00
30.20	2.22	0.52	4.24	0.00	0.00	0.00
30.25	2.22	0.52	4.24	0.00	0.00	0.00
30.30	2.22	0.52	4.24	0.00	0.00	0.00
30.35	2.22	0.52	4.24	0.00	0.00	0.00
30.40	2.22	0.52	4.23	0.00	0.00	0.00
30.45	2.22	0.52	4.23	0.00	0.00	0.00
30.50	2.22	0.52	4.23	0.00	0.00	0.00
30.55	2.22	0.52	4.23	0.00	0.00	0.00
30.60	2.22	0.52	4.23	0.00	0.00	0.00
30.65	2.22	0.52	4.23	0.00	0.00	0.00
30.70	2.22	0.52	4.23	0.00	0.00	0.00
30.75	2.22	0.52	4.23	0.00	0.00	0.00
30.80	2.22	0.52	4.23	0.00	0.00	0.00
30.85	2.22	0.52	4.23	0.00	0.00	0.00
30.90	2.22	0.52	4.23	0.00	0.00	0.00

30.95	2.22	0.52	4.23	0.00	0.00	0.00
31.00	2.22	0.52	4.23	0.00	0.00	0.00
31.05	2.22	0.52	4.23	0.00	0.00	0.00
31.10	2.22	0.52	4.23	0.00	0.00	0.00
31.15	2.22	0.52	4.23	0.00	0.00	0.00
31.20	2.22	0.52	4.23	0.00	0.00	0.00
31.25	2.22	0.52	4.23	0.00	0.00	0.00
31.30	2.22	0.52	4.23	0.00	0.00	0.00
31.35	2.22	0.53	4.23	0.00	0.00	0.00
31.40	2.22	0.53	4.23	0.00	0.00	0.00
31.45	2.22	0.53	4.23	0.00	0.00	0.00
31.50	2.22	0.53	4.23	0.00	0.00	0.00
31.55	2.22	0.53	4.23	0.00	0.00	0.00
31.60	2.22	0.53	4.23	0.00	0.00	0.00
31.65	2.22	0.53	4.23	0.00	0.00	0.00
31.70	2.22	0.53	4.23	0.00	0.00	0.00
31.75	2.22	0.53	4.23	0.00	0.00	0.00
31.80	2.22	0.53	4.23	0.00	0.00	0.00
31.85	2.22	0.53	4.22	0.00	0.00	0.00
31.90	2.22	0.53	4.22	0.00	0.00	0.00
31.95	2.22	0.53	4.22	0.00	0.00	0.00
32.00	2.22	0.53	4.22	0.00	0.00	0.00
32.05	2.22	0.53	4.22	0.00	0.00	0.00
32.10	2.22	0.53	4.22	0.00	0.00	0.00
32.15	2.22	0.53	4.22	0.00	0.00	0.00
32.20	2.22	0.53	4.22	0.00	0.00	0.00
32.25	2.22	0.53	4.22	0.00	0.00	0.00
32.30	2.22	0.53	4.22	0.00	0.00	0.00
32.35	2.22	0.53	4.22	0.00	0.00	0.00
32.40	2.22	0.53	4.22	0.00	0.00	0.00
32.45	2.22	0.53	4.22	0.00	0.00	0.00
32.50	2.22	0.53	4.22	0.00	0.00	0.00
32.55	2.22	0.53	4.22	0.00	0.00	0.00
32.60	2.22	0.53	4.22	0.00	0.00	0.00
32.65	2.22	0.53	4.22	0.00	0.00	0.00
32.70	2.22	0.53	4.22	0.00	0.00	0.00
32.75	2.22	0.53	4.22	0.00	0.00	0.00
32.80	2.22	0.53	4.22	0.00	0.00	0.00
32.85	2.22	0.53	4.22	0.00	0.00	0.00
32.90	2.22	0.53	4.22	0.00	0.00	0.00
32.95	2.22	0.53	4.22	0.00	0.00	0.00
33.00	2.22	0.53	4.22	0.00	0.00	0.00
33.05	2.22	0.53	4.22	0.00	0.00	0.00
33.10	2.22	0.53	4.22	0.00	0.00	0.00
33.15	2.23	0.53	4.25	0.00	0.00	0.00
33.20	2.23	0.53	4.25	0.00	0.00	0.00
33.25	2.23	0.53	4.24	0.00	0.00	0.00
33.30	2.23	0.53	4.24	0.00	0.00	0.00
33.35	2.23	0.53	4.24	0.00	0.00	0.00
33.40	2.23	0.53	4.24	0.00	0.00	0.00
33.45	2.23	0.53	4.24	0.00	0.00	0.00
33.50	2.23	0.53	4.24	0.00	0.00	0.00
33.55	2.23	0.53	4.24	0.00	0.00	0.00
33.60	2.23	0.53	4.24	0.00	0.00	0.00
33.65	2.23	0.53	4.24	0.00	0.00	0.00
33.70	2.23	0.53	4.24	0.00	0.00	0.00
33.75	2.23	0.53	4.24	0.00	0.00	0.00
33.80	2.23	0.53	4.24	0.00	0.00	0.00
33.85	2.23	0.53	4.24	0.00	0.00	0.00
33.90	2.23	0.53	4.24	0.00	0.00	0.00
33.95	2.23	0.53	4.23	0.00	0.00	0.00
34.00	2.23	0.53	4.23	0.00	0.00	0.00
34.05	2.23	0.53	4.23	0.00	0.00	0.00

34.10	2.23	0.53	4.23	0.00	0.00	0.00
34.15	2.23	0.53	4.23	0.00	0.00	0.00
34.20	2.23	0.53	4.23	0.00	0.00	0.00
34.25	2.23	0.53	4.23	0.00	0.00	0.00
34.30	2.22	0.53	4.23	0.00	0.00	0.00
34.35	2.22	0.53	4.23	0.00	0.00	0.00
34.40	2.22	0.53	4.23	0.00	0.00	0.00
34.45	2.22	0.53	4.23	0.00	0.00	0.00
34.50	2.22	0.53	4.23	0.00	0.00	0.00
34.55	2.22	0.53	4.23	0.00	0.00	0.00
34.60	2.22	0.53	4.23	0.00	0.00	0.00
34.65	2.22	0.53	4.23	0.00	0.00	0.00
34.70	2.22	0.53	4.23	0.00	0.00	0.00
34.75	2.22	0.53	4.22	0.00	0.00	0.00
34.80	2.22	0.53	4.22	0.00	0.00	0.00
34.85	2.22	0.53	4.22	0.00	0.00	0.00
34.90	2.22	0.53	4.22	0.00	0.00	0.00
34.95	2.22	0.53	4.22	0.00	0.00	0.00
35.00	2.22	0.53	4.22	0.00	0.00	0.00
35.05	2.22	0.53	4.22	0.00	0.00	0.00
35.10	2.22	0.53	4.22	0.00	0.00	0.00
35.15	2.22	0.53	4.22	0.00	0.00	0.00
35.20	2.22	0.53	4.22	0.00	0.00	0.00
35.25	2.22	0.53	4.22	0.00	0.00	0.00
35.30	2.22	0.53	4.22	0.00	0.00	0.00
35.35	2.22	0.53	4.22	0.00	0.00	0.00
35.40	2.22	0.53	4.22	0.00	0.00	0.00
35.45	2.22	0.53	4.22	0.00	0.00	0.00
35.50	2.22	0.53	4.22	0.00	0.00	0.00
35.55	2.22	0.53	4.22	0.00	0.00	0.00
35.60	2.22	0.53	4.22	0.00	0.00	0.00
35.65	2.22	0.53	4.22	0.00	0.00	0.00
35.70	2.21	0.53	4.21	0.00	0.00	0.00
35.75	2.21	0.53	4.21	0.00	0.00	0.00
35.80	2.21	0.53	4.21	0.00	0.00	0.00
35.85	2.21	0.53	4.21	0.00	0.00	0.00
35.90	2.21	0.53	4.21	0.00	0.00	0.00
35.95	2.21	0.53	4.21	0.00	0.00	0.00
36.00	2.21	0.53	4.21	0.00	0.00	0.00
36.05	2.21	0.53	4.21	0.00	0.00	0.00
36.10	2.21	0.53	4.21	0.00	0.00	0.00
36.15	2.21	0.53	4.21	0.00	0.00	0.00
36.20	2.21	0.53	4.21	0.00	0.00	0.00
36.25	2.21	0.53	4.21	0.00	0.00	0.00
36.30	2.21	0.53	4.21	0.00	0.00	0.00
36.35	2.21	0.53	4.21	0.00	0.00	0.00
36.40	2.21	0.53	4.21	0.00	0.00	0.00
36.45	2.21	0.52	4.21	0.00	0.00	0.00
36.50	2.21	0.52	4.21	0.00	0.00	0.00
36.55	2.21	0.52	4.21	0.00	0.00	0.00
36.60	2.21	0.52	4.21	0.00	0.00	0.00
36.65	2.21	0.52	4.21	0.00	0.00	0.00
36.70	2.21	0.52	4.21	0.00	0.00	0.00
36.75	2.21	0.52	4.21	0.00	0.00	0.00
36.80	2.21	0.52	4.21	0.00	0.00	0.00
36.85	2.21	0.52	4.21	0.00	0.00	0.00
36.90	2.21	0.52	4.20	0.00	0.00	0.00
36.95	2.21	0.52	4.20	0.00	0.00	0.00
37.00	2.21	0.52	4.20	0.00	0.00	0.00
37.05	2.20	0.52	4.20	0.00	0.00	0.00
37.10	2.20	0.52	4.20	0.00	0.00	0.00
37.15	2.20	0.52	4.20	0.00	0.00	0.00
37.20	2.20	0.52	4.20	0.00	0.00	0.00

37.25	2.20	0.52	4.20	0.00	0.00	0.00
37.30	2.20	0.52	4.20	0.00	0.00	0.00
37.35	2.20	0.52	4.20	0.00	0.00	0.00
37.40	2.20	0.52	4.20	0.00	0.00	0.00
37.45	2.20	0.52	4.20	0.00	0.00	0.00
37.50	2.20	0.52	4.20	0.00	0.00	0.00
37.55	2.20	0.52	4.20	0.00	0.00	0.00
37.60	2.20	0.52	4.20	0.00	0.00	0.00
37.65	2.20	0.52	4.20	0.00	0.00	0.00
37.70	2.20	0.52	4.20	0.00	0.00	0.00
37.75	2.20	0.52	4.20	0.00	0.00	0.00
37.80	2.20	0.52	4.20	0.00	0.00	0.00
37.85	2.20	0.52	4.20	0.00	0.00	0.00
37.90	2.20	0.52	4.20	0.00	0.00	0.00
37.95	2.20	0.52	4.20	0.00	0.00	0.00
38.00	2.20	0.52	4.20	0.00	0.00	0.00
38.05	2.20	0.52	4.20	0.00	0.00	0.00
38.10	2.20	0.52	4.20	0.00	0.00	0.00
38.15	2.20	0.52	4.20	0.00	0.00	0.00
38.20	2.20	0.52	4.20	0.00	0.00	0.00
38.25	2.20	0.52	4.20	0.00	0.00	0.00
38.30	2.20	0.52	4.20	0.00	0.00	0.00
38.35	2.20	0.52	4.20	0.00	0.00	0.00
38.40	2.20	0.52	4.20	0.00	0.00	0.00
38.45	2.19	0.52	4.20	0.00	0.00	0.00
38.50	2.19	0.52	4.20	0.00	0.00	0.00
38.55	2.19	0.52	4.20	0.00	0.00	0.00
38.60	2.19	0.52	4.20	0.00	0.00	0.00
38.65	2.19	0.52	4.20	0.00	0.00	0.00
38.70	2.19	0.52	4.20	0.00	0.00	0.00
38.75	2.19	0.52	4.20	0.00	0.00	0.00
38.80	2.19	0.52	4.20	0.00	0.00	0.00
38.85	2.19	0.52	4.20	0.00	0.00	0.00
38.90	2.19	0.52	4.20	0.00	0.00	0.00
38.95	2.19	0.52	4.20	0.00	0.00	0.00
39.00	2.19	0.52	4.20	0.00	0.00	0.00
39.05	2.19	0.52	4.20	0.00	0.00	0.00
39.10	2.19	0.52	4.20	0.00	0.00	0.00
39.15	2.19	0.52	4.19	0.00	0.00	0.00
39.20	2.19	0.52	4.19	0.00	0.00	0.00
39.25	2.19	0.52	4.19	0.00	0.00	0.00
39.30	2.19	0.52	4.19	0.00	0.00	0.00
39.35	2.19	0.52	4.19	0.00	0.00	0.00
39.40	2.19	0.52	4.19	0.00	0.00	0.00
39.45	2.19	0.52	4.19	0.00	0.00	0.00
39.50	2.19	0.52	4.19	0.00	0.00	0.00
39.55	2.19	0.52	4.19	0.00	0.00	0.00
39.60	2.19	0.52	4.19	0.00	0.00	0.00
39.65	2.19	0.52	4.19	0.00	0.00	0.00
39.70	2.19	0.52	4.19	0.00	0.00	0.00
39.75	2.19	0.52	4.19	0.00	0.00	0.00
39.80	2.18	0.52	4.19	0.00	0.00	0.00
39.85	2.18	0.52	4.19	0.00	0.00	0.00
39.90	2.18	0.52	4.19	0.00	0.00	0.00
39.95	2.18	0.52	4.19	0.00	0.00	0.00
40.00	2.18	0.52	4.19	0.00	0.00	0.00
40.05	2.18	0.52	4.19	0.00	0.00	0.00
40.10	2.18	0.52	4.19	0.00	0.00	0.00
40.15	2.18	0.52	4.19	0.00	0.00	0.00
40.20	2.18	0.52	4.19	0.00	0.00	0.00
40.25	2.18	0.52	4.19	0.00	0.00	0.00
40.30	2.18	0.52	4.19	0.00	0.00	0.00
40.35	2.18	0.52	4.19	0.00	0.00	0.00

40.40	2.18	0.52	4.19	0.00	0.00	0.00
40.45	2.18	0.52	4.19	0.00	0.00	0.00
40.50	2.18	0.52	4.19	0.00	0.00	0.00
40.55	2.18	0.52	4.19	0.00	0.00	0.00
40.60	2.18	0.52	4.19	0.00	0.00	0.00
40.65	2.18	0.52	4.19	0.00	0.00	0.00
40.70	2.18	0.52	4.19	0.00	0.00	0.00
40.75	2.18	0.52	4.19	0.00	0.00	0.00
40.80	2.18	0.52	4.19	0.00	0.00	0.00
40.85	2.18	0.52	4.19	0.00	0.00	0.00
40.90	2.18	0.52	4.19	0.00	0.00	0.00
40.95	2.18	0.52	4.19	0.00	0.00	0.00
41.00	2.18	0.52	4.19	0.00	0.00	0.00
41.05	2.18	0.52	4.19	0.00	0.00	0.00
41.10	2.18	0.52	4.19	0.00	0.00	0.00
41.15	2.17	0.52	4.19	0.00	0.00	0.00
41.20	2.17	0.52	4.19	0.00	0.00	0.00
41.25	2.17	0.52	4.19	0.00	0.00	0.00
41.30	2.17	0.52	4.19	0.00	0.00	0.00
41.35	2.17	0.52	4.19	0.00	0.00	0.00
41.40	2.17	0.52	4.19	0.00	0.00	0.00
41.45	2.17	0.52	4.19	0.00	0.00	0.00
41.50	2.17	0.52	4.19	0.00	0.00	0.00
41.55	2.17	0.52	4.19	0.00	0.00	0.00
41.60	2.17	0.52	4.19	0.00	0.00	0.00
41.65	2.17	0.52	4.19	0.00	0.00	0.00
41.70	2.17	0.52	4.19	0.00	0.00	0.00
41.75	2.17	0.52	4.20	0.00	0.00	0.00
41.80	2.17	0.52	4.20	0.00	0.00	0.00
41.85	2.17	0.52	4.20	0.00	0.00	0.00
41.90	2.17	0.52	4.20	0.00	0.00	0.00
41.95	2.17	0.52	4.20	0.00	0.00	0.00
42.00	2.17	0.52	4.20	0.00	0.00	0.00
42.05	2.17	0.52	4.20	0.00	0.00	0.00
42.10	2.17	0.52	4.20	0.00	0.00	0.00
42.15	2.17	0.52	4.20	0.00	0.00	0.00
42.20	2.17	0.52	4.20	0.00	0.00	0.00
42.25	2.17	0.52	4.20	0.00	0.00	0.00
42.30	2.17	0.52	4.20	0.00	0.00	0.00
42.35	2.17	0.52	4.20	0.00	0.00	0.00
42.40	2.17	0.52	4.20	0.00	0.00	0.00
42.45	2.17	0.52	4.20	0.00	0.00	0.00
42.50	2.16	0.52	4.20	0.00	0.00	0.00
42.55	2.16	0.52	4.20	0.00	0.00	0.00
42.60	2.16	0.52	4.20	0.00	0.00	0.00
42.65	2.16	0.52	4.20	0.00	0.00	0.00
42.70	2.16	0.52	4.20	0.00	0.00	0.00
42.75	2.16	0.52	4.20	0.00	0.00	0.00
42.80	2.16	0.52	4.20	0.00	0.00	0.00
42.85	2.16	0.52	4.20	0.00	0.00	0.00
42.90	2.16	0.51	4.20	0.00	0.00	0.00
42.95	2.16	0.51	4.20	0.00	0.00	0.00
43.00	2.16	0.51	4.20	0.00	0.00	0.00
43.05	2.16	0.51	4.20	0.00	0.00	0.00
43.10	2.16	0.51	4.20	0.00	0.00	0.00
43.15	2.16	0.51	4.20	0.00	0.00	0.00
43.20	2.16	0.51	4.20	0.00	0.00	0.00
43.25	2.16	0.51	4.20	0.00	0.00	0.00
43.30	2.16	0.51	4.20	0.00	0.00	0.00
43.35	2.16	0.51	4.20	0.00	0.00	0.00
43.40	2.16	0.51	4.20	0.00	0.00	0.00
43.45	2.16	0.51	4.20	0.00	0.00	0.00
43.50	2.16	0.51	4.20	0.00	0.00	0.00

43.55	2.16	0.51	4.20	0.00	0.00	0.00
43.60	2.16	0.51	4.20	0.00	0.00	0.00
43.65	2.16	0.51	4.20	0.00	0.00	0.00
43.70	2.16	0.51	4.20	0.00	0.00	0.00
43.75	2.16	0.51	4.20	0.00	0.00	0.00
43.80	2.16	0.51	4.20	0.00	0.00	0.00
43.85	2.16	0.51	4.20	0.00	0.00	0.00
43.90	2.15	0.51	4.20	0.00	0.00	0.00
43.95	2.15	0.51	4.20	0.00	0.00	0.00
44.00	2.15	0.51	4.20	0.00	0.00	0.00
44.05	2.15	0.51	4.20	0.00	0.00	0.00
44.10	2.15	0.51	4.20	0.00	0.00	0.00
44.15	2.15	0.51	4.20	0.00	0.00	0.00
44.20	2.15	0.51	4.20	0.00	0.00	0.00
44.25	2.15	0.51	4.21	0.00	0.00	0.00
44.30	2.15	0.51	4.21	0.00	0.00	0.00
44.35	2.15	0.51	4.21	0.00	0.00	0.00
44.40	2.15	0.51	4.21	0.00	0.00	0.00
44.45	2.15	0.51	4.21	0.00	0.00	0.00
44.50	2.15	0.51	4.21	0.00	0.00	0.00
44.55	2.15	0.51	4.21	0.00	0.00	0.00
44.60	2.15	0.51	4.21	0.00	0.00	0.00
44.65	2.15	0.51	4.21	0.00	0.00	0.00
44.70	2.15	0.51	4.21	0.00	0.00	0.00
44.75	2.15	0.51	4.21	0.00	0.00	0.00
44.80	2.15	0.51	4.21	0.00	0.00	0.00
44.85	2.15	0.51	4.21	0.00	0.00	0.00
44.90	2.15	0.51	4.21	0.00	0.00	0.00
44.95	2.15	0.51	4.21	0.00	0.00	0.00
45.00	2.15	0.51	4.21	0.00	0.00	0.00

* F.S.<1, Liquefaction Potential Zone
(F.S. is limited to 5, CRR is limited to 2, CSR is limited to 2)

Units Depth = ft, Stress or Pressure = tsf (atm), Unit Weight = pcf, Settlement = in.

CRRm Cyclic resistance ratio from soils
CSRfs Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S. Factor of Safety against liquefaction, F.S.=CRRm/CSRfs
S_sat Settlement from saturated sands
S_dry Settlement from dry sands
S_all Total settlement from saturated and dry sands
NoLiq No-Liquefy Soils