REPORT OF DUE-DILIGENCE GEOTECHNICAL EXPLORATION PROPOSED RESIDENTIAL DEVELOPMENT PROPERTY LOCATED AT THE NORTHEAST CORNER OF CENTRAL AVENUE AND VICTORIA STREET CARSON, CALIFORNIA

Prepared for:

Integral Communities

888 San Clemente Suite 100
Newport Beach, California 92660

Project No. 11738.001

November 29, 2017

Leighton and Associates, Inc.

A LEIGHTON GROUP COMPANY

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Integral Communities
888 San Clemente Suite 100
Newport Beach, California 92660

Attention: Mr. Spencer Oliver

Subject: Report of Due Diligence Geotechnical Exploration
Proposed Residential Development
Property Located at the Northeast Corner of
Central Avenue and Victoria Street
Carson, California

In accordance with our revised proposal dated August 21, 2017, authorized by you on August 22, 2017, Leighton and Associates, Inc. (Leighton) is pleased to present this due diligence geotechnical exploration report for the subject project. Based on review of the site plan (Urban Arena, 2017), the planned residential development consists of 26 attached, multi-family residential structures totaling 184 units, with associated private drive aisles, gated entry, clubhouse and pool area, tot lot, dog park and surface parking. We assumed the planned residential structures will be no more than three stories in height, wood frame construction and ancillary improvements will include associated backbone utility and infrastructure with landscaping. No subterranean structures are planned at this time. The planned development wraps around the existing commercial facility located at 17900 Central Avenue, which we understand is not part of the project.

The purpose of our study was to evaluate the geotechnical conditions at the site and to provide preliminary geotechnical information to support preparation of a grading and drainage plan by the civil engineer for the project as currently proposed. More specifically, our field exploration was intended to evaluate and quantify, to the extent possible through geotechnical exploration, the approximate depth of undocumented artificial fill materials and former foundation remnants across the site. This information

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will allow you to budget and plan for the remedial grading that will be required for site development as currently proposed.

Based on our exploration and analysis, the proposed project is considered feasible from a geotechnical standpoint. Conventional spread footings established on compacted engineered fill may be used to support the proposed residential structures and other site improvements. Preliminary geotechnical recommendations with respect to site grading and foundation design are presented in this report. It should be noted that this report is not suitable for submittal purposes in order to obtain a building permit for the project. Therefore, additional field exploration, laboratory testing and engineering analysis will be required during the design phase of the project and the geotechnical recommendations may change once actual plans are prepared and reviewed by the geotechnical engineer for the site.

We appreciate this opportunity to be of continued service and look forward to assisting you in successful completion of the project. If you have any questions regarding this report, please contact us at your convenience. The undersigned can be reached at **(866) *LEIGHTON***, specifically at the phone extension and e-mail address listed below.

Respectfully submitted,

LEIGHTON AND ASSOCIATES, INC.

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1.0 INTRODUCTION

1.1 Site Description

The project site is irregular in shape, approximately 8 acres in size and located at the northeast corner of Central Avenue and Victoria Street in the city of Carson, California (Figure 1, *Site Location Map*). The site is bordered by commercial properties to the north and east, by Central Avenue and existing commercial facilities (MCI and Southern California Gas Company) to the west, and by Victoria Street to the south. The site is currently a vacant dirt lot with a small paved parking area in the northwest corner of the site area. Review of the site plans *The City of Carson Vesting Tentative Tract Map No. 78226 for Condominium Purposes (6 Sheets,* Scale 1"=40'), prepared by Urban Resource Consulting Civil Engineers (dated September 11, 2017), indicates the site is relatively flat with sheet flow gently downward sloping toward the northwest from approximately Elevation (El.) ±151 feet mean sea level (msl) in the northwest to El. ±171 feet msl in the southeast.

Review of publicly available information from the Regional Water Quality Control Board Los Angeles Region (RWQCBLAR) indicate this former site is known as the Hellman Property, which encompasses approximately 8 acres and is part of the former 100-acre Dominguez Oil Field in Carson that was used for crude oil and natural gas production beginning in the 1920's. Brea Canon Oil Company purchased the subject property from Unocal in 1991, and subsequently transferred the property to Little Blackfoot, LLC. According to the RWQCBLAR; by June 1999, all oil wells on the 8-acre Hellman Property had been abandoned according to the requirements established by the California Division of Oil and Gas and Geothermal Resources (DOGGR). Based on review of the DOGGR Well Finder Website (DOGGR, 2017), eight oil production or injection wells listed by DOGGR as plugged and abandoned are located within the project site boundary. Four of the wells (API #'s 03707332, 03707335, 03707339 and 03707351) are located in the northeastern portion of the project site, and four of the wells (API #'s 03707309, 03707324, 03707348 and 03707353) are located in the western portion of the site immediately east of the existing MCI facility. The locations of the wells are shown on Plate 1, *Geotechnical Map*. In addition, based on review of the "No Further Action" determination letter prepared for the site by the RWQCBLAR dated August 13, 2008, we understand that no further soil or groundwater investigation or remediation action is necessary for the site, and no known petroleum hydrocarbon soil contamination has been left-in-place

that exceeds the Regional Board's soil cleanup criteria for protection of groundwater resources. However, this letter indicates that within the Hellman Parcel, approximately 12,800 cubic yards of hydrocarbon impacted soils were excavated from the site and placed within treatment cells for biological landfarming treatment. The exact lateral limits and depths of the areas impacted by the soil remediation are unknown; however, we assume that fill materials associated with these remediation activities have been placed across this site without engineering control (compaction testing).

1.2 Proposed Development

Based on review of the site plan (Urban Arena, 2017), the planned residential development consists of 26 attached multi-family residential structures totaling 184 units, with associated private drive aisles, gated entry, clubhouse and pool area, tot lot, dog park and surface parking. We assume the planned residential structures will be no more than three stories in height, wood frame construction and ancillary improvements will include associated backbone utility and infrastructure with landscaping. No subterranean structures are planned at this time. The planned development wraps around the existing commercial facility located at 17900 Central Avenue, which we understand is not part of the project.

1.3 Purpose and Scope of Exploration

The purpose of our due diligence geotechnical exploration was to evaluate the general geotechnical conditions at the site and to provide preliminary geotechnical information to support preparation of a grading and drainage plan for the project.

The scope of this geotechnical report included the following tasks:

- *Background Review* – A background review was performed of readily available, relevant geotechnical and geological literature and plans pertinent to the project site. References used in preparation of this report are listed in Section 7.0.

- *Field Exploration* – Our field exploration was performed on August 31, and September 1, 2017, and consisted of 17 geotechnical test pits (TP-1 through TP-15, TP-1A and TP-12A) excavated across the site with a conventional rubber tire backhoe to assess the depth and characteristics of near surface materials and to quantify to the extent possible the approximate depth of

undocumented artificial fill materials and former foundation remnants across the site. The test pits were excavated to depths between approximately 4 and 9.5 feet below existing ground surface (bgs). Test pits TP-1A and TP-12A were excavated specifically to perform percolation testing in the vicinity of the proposed stormwater infiltration areas. The approximate locations of the test pits performed by Leighton are shown on Plate 1, *Geotechnical Map*. Prior to the field exploration, the test pit locations were marked and Underground Service Alert (USA) was notified for utility clearance.

During excavation, bulk samples were obtained from the test pits for geotechnical laboratory testing. The test pits were logged in the field by a State of California certified engineering geologist from our staff. The exposed soils and collected samples were reviewed and described in general accordance with the Unified Soil Classification System (USCS). The samples were sealed and packaged for transportation to our laboratory. After completion of excavation, the test pits were backfilled with soils generated during the exploration. The test pit logs are presented in Appendix A, *Field Exploration Logs*.

On October 19, 2017, the environmental consultant for the project (Hayley & Aldrich, Inc.) performed 4 supplemental direct push borings (HA-50 through HA-53) in the western portion of the site to supplement their previous environmental study that included 49 direct push borings. A staff geologist from Leighton was onsite during the field exploration for the 4 supplemental direct push borings in order to co-log the soils encountered and determine the thickness of undocumented fills in the western portion of the site. The approximate locations of the supplemental direct push borings co-logged by Leighton (HA-50 through HA-53) are shown on Plate 1 and independent logs of these borings are included in Appendix A, *Field Exploration Logs*.

- *Laboratory Testing* – Laboratory tests were performed on representative soil samples to evaluate geotechnical engineering properties of subsurface materials. The following laboratory tests were performed:
  - Expansion Index (ASTM D4829);
  - Soluble sulfate, soluble chloride, pH and minimum resistivity (CTM 417 Part II, CTM 422, and CTM 643); and
  - Sieve Analysis (ASTM D 422).

The results of the laboratory tests are presented in Appendix B, *Laboratory Test Results.*

- *Percolation Testing* – In-situ percolation testing was performed on September 7, 2017 in test pits TP-1A and TP-12A in general accordance with the *Excavation Percolation Test Procedure* as outlined in the County of Los Angeles Department of Public Works *Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration* (LADPW, 2014). Refer to the discussion presented in Section 2.5 and the infiltration test data provided in Appendix C, *Percolation Test Results*.

- *Engineering Analysis* – Geotechnical analysis was performed on the collected data to develop conclusions and preliminary recommendations for design and earthwork construction presented in this report.

- *Report Preparation* - This geotechnical report presents our findings, conclusions, and preliminary recommendations.

It should be noted that the preliminary recommendations in this report are subject to the limitations presented in Section 6.0. An information sheet prepared by ASFE (the Association of Engineering Firms Practicing in the Geosciences) is also included at the rear of the text. We recommend that all individuals using this report read the limitations along with the attached document.

2.0 GEOTECHNICAL FINDINGS

2.1 Geologic Setting

The project site is located in the Dominguez Hills area at the southwestern edge of the Los Angeles basin. The basin is located at the northern end of the Peninsular Ranges geomorphic province which extends 900 miles southward from the Santa Monica Mountains to the tip of Baja California (Yerkes, et al., 1965). The province is characterized by northwest-trending mountain ridges separated by sediment-floored valleys. However, the most dominant structural features of the province are the northwest trending fault zones, most of which either die out, merge with, or are terminated by the steep reverse faults at the southern margin of the Transverse Ranges province. The northwest trending fault zones include the Newport-Inglewood, San Jacinto, Whittier-Elsinore, and Palos Verdes. The Newport-Inglewood fault zone includes a series of northwest trending faults and folds marked at the surface by low eroded scarps and a chain of elongated low hills and mesas that extend from Newport Bay to Beverley Hills, which include the Dominguez Hills. Several of these fault segments, including the Avalon-Compton fault located to the north of the Dominguez Hills and the Cherry Hill fault located to the south, have been assigned Alquist-Priolo Earthquake Fault Hazard Zones by the California Geological Survey (CGS). However, CGS has not assigned an Alquist-Priolo Earthquake Fault Hazard Zone to the gap between the Avalon-Compton fault and the Cherry Hill fault.

Approximately 65 million years ago (at the end of the Cretaceous Period) a deep, structural trough existed off the coast of southern California (Yerkes, 1972). Overtime, sedimentation would slowly fill the trough with tremendous amounts of sediments. About 7 million years ago, as sedimentation continued, an eastward shift of the boundary between the Pacific and North American plates to its present position would begin shaping the Los Angeles basin from this deep trough. Today the Los Angeles basin refers to the area defined by the Santa Monica, Whittier and Palos Verdes faults, and the San Joaquin Hills, and its depth is limited to the sediments deposited in the last 7 million years (Wright, 1991). The deepest part of the Los Angeles basin is north and northwest of the site where approximately 24,000 feet of Tertiary to Quaternary-aged, marine and non-marine sedimentary rocks are deposited (Wright, 1991; Yerkes, et al., 1965). During the Pleistocene epoch (the last two million years) the region was inundated as sea level rose and warped gently upward until the present shoreline and

topography formed (Yerkes et al., 1965; Wright, 1991). The geologic map of the area is shown on Figure 2, *Regional Geology Map*.

2.2 Subsurface Soil Conditions

Our subsurface explorations indicate the site is generally underlain by undocumented artificial fill materials overlying Quaternary-age old alluvial valley or flood plain deposits (Saucedo et al., 2003; Roffers and Bedrossian, 2010). The stratigraphy of the subsurface soils encountered in each test pit is presented in the test pit logs (Appendix A), and a general description of the earth materials as encountered are described below.

Artificial Fill, Undocumented (Afu)

The existing undocumented artificial fill soils encountered in the test pits generally varied in depth across the site from approximately 1 to 7.5 feet bgs, with the exception of test pit location TP-9 (see Plate 1), located in the eastern portion of the site where the bottom of the artificial fill materials at test pit TP-9 was not encountered. The approximate depth of artificial fill as encountered in each test pit is shown on Plate 1, *Geotechnical Map*. Localized thicker accumulations of fill materials should be anticipated during future earthwork construction between explored locations. The existing artificial fill materials encountered at the site generally consist of variable proportions of clay, silt, sand and gravel with some concrete and asphalt and other miscellaneous debris intermixed and are likely associated with the previous improvements and former oil production/bioremediation activities performed at the site. Concrete debris up to approximately 12 inches in largest dimension was encountered, larger debris may be encountered during rough grading. Records documenting observation and testing for compaction during fill placement were not available for review.

Test pit TP-9 was terminated at 7 feet bgs prior to reaching the base of the artificial fill due to stained soil that was encountered between approximately 5.3 and 7 feet bgs. It was decided in the field at the time of excavation per discussions with the onsite environmental consultant for the project (Hayley & Aldrich, Inc.) to terminate the excavation at this location to avoid excavating large quantities of stained soil without having a clear understanding of the contaminates of concern (COC). The stained soils excavated from the test pit were sampled, tested for environmental classification and drummed for offsite disposal by Hayley & Aldrich, Inc. Several step-out direct push test borings were subsequently performed by Haley & Aldrich, Inc. in 4 directions from test pit TP-9

to further evaluate the depth and lateral extent of the stained soil encountered in the area. Based on interpretations of fill thickness provided by Hayley & Aldrich, Inc., undocumented artificial fill in this area is on the order of up to roughly 25 feet below existing grade, and appears to be generally isolated to an area (in map view) roughly 100 feet long by 60 to 70 feet wide. The approximate area where thicker accumulations of artificial fill are anticipated in this portion of the project site is shown on Plate 1. In addition, thicker accumulations of artificial fill should also be anticipated in the northeastern portion of the project site and in the western portion of the project site in the vicinity of the 8 wells that are reported to be plugged and abandoned.

Quaternary Old Alluvial Valley Deposits (Qoa)

The Quaternary age (Pleistocene age 11,700 to 1.8 million years) old alluvial valley deposits encountered below the fill consist of sediments deposited over a broad floodplain or valley primarily as sheet flow during regional flooding events. These sediments are characterized as slightly to moderately consolidated clay, silt, sand and gravel. As encountered in the test pits excavated at the site, the native alluvial soils are variable and generally consist of brown, reddish brown and yellow brown, slightly moist to moist, silty sand, sandy silt, clayey silt, sandy clay silty clay and clay with some calcium carbonate observed through reaction with diluted hydrochloric acid.

More detailed description of the subsurface soils encountered in the test pits are presented on the test pit logs included in Appendix A. Some of the engineering properties of these soils are described in the following subsections.

2.2.1 Expansive Soil

Expansive soils contain significant amounts of clay particles that swell considerably when wetted and shrink when dried. Foundations constructed on these soils are subject to uplifting forces caused by the swelling. Without proper mitigation measures, heaving and cracking of both building foundations and slabs-on-grade could result. Based on our field exploration and laboratory testing of representative near-surface soil samples, the onsite soils are generally considered to have a moderate potential for expansion (Expansion Index [EI] of 50 and 81).

It is our opinion that the proposed residential buildings will not be adversely impacted by soil expansion provided recommendations in this

report are included in design and followed during construction of the residential buildings. Additional testing is recommended upon completion of rough grading to confirm the assumptions made in this report.

2.2.2 Soil Corrosivity

For screening purposes, two representative near-surface bulk soil samples were tested for corrosivity to preliminarily evaluate corrosion potential to buried concrete (e.g., footings, retaining walls). The chemical analysis test results are included in Appendix B of this report and are summarized below.

Corrosivity Test Results

Test Parameter	Test Results	General Classification of Hazard
	TP-5 @ 0'-5' and TP-10 @ 2.5'-5'	
Water-Soluble Sulfate in Soil (ppm)	151 to 242	Negligible sulfate exposure to buried concrete
Water-Soluble Chloride in Soil (ppm)	61 to 305	Non-corrosive to buried concrete
pH	6.52 to 7.12	Mildly acidic to mildly alkaline
Minimum Resistivity (saturated, ohm-cm)	914 to 1145	Severely corrosive to buried ferrous pipes (per Caltrans)

The results of the resistivity test indicate that the underlying soil is severely corrosive to buried ferrous metals per ASTM STP 1013. Based on the measured water-soluble sulfate contents from the soil samples, concrete in contact with the soil is expected to have negligible exposure to sulfate attack per ACI 318-11. The samples tested for water-soluble chloride content indicate a low potential for corrosion of steel in concrete due to the chloride content of the soil.

2.3 Groundwater

Groundwater was not encountered during our field exploration. The historical high groundwater levels in the Dominguez Hills area were not extensively evaluated by the California Geological Survey (CGS, 1998) since groundwater is deep in this area (at least greater than 40 feet bgs). In addition, the Dominguez

Hills are generally composed of slightly elevated and older (Pleistocene age) alluvial soil that is generally not considered to be a significant water bearing geologic unit. Based on the currently proposed development scheme, groundwater is not expected to pose a constraint during and after construction.

Although groundwater is not considered a constraint for the project, localized zones of perched water or elevated moisture in near-surface soils may develop once site development is completed and stormwater infiltration and landscape irrigation commences.

2.4 Soil Infiltration Characteristics

In-situ percolation testing was performed at the site in general accordance with the *Excavation Percolation Test Procedure* as outlined in the County of Los Angeles Department of Public Works (LADPW) *Guidelines for Design, Investigation, and Reporting Low Impact Development Stormwater Infiltration* (LADPW, 2014). Test Pits TP-1A and TP-12A located in the western portion of the site were excavated to depths of approximately 3 feet and 3.5 feet bgs, respectively, for evaluation of the near-surface soil infiltration characteristics at the site (Plate 1, *Geotechnical Map*). A 1 foot wide by 1 foot long by 1 foot deep hole was hand dug at the bottom of each test pit for infiltration evaluation. The percolation test holes were pre-soaked prior to the testing. The testing was performed by filling each test hole with water and measuring the water level drop over each time interval. After the conclusion of the percolation test, the test pits were backfilled with excess soil cuttings.

The measured infiltration rates for the percolation tests were calculated by dividing the preadjusted percolation rate (average drop of the stabilized rate over the last three readings) by a reduction factor provided in the LADPW (2014) guidelines to account for the discharge of water from both the sides and bottom of the test holes. Detailed results of the field testing data and measured infiltration rates for the test holes are presented in Appendix C, *Percolation Test Results*. The test results are summarized below:

Measured (Unfactored) Infiltration Rate

Percolation Test Pit Designation	Approximate Depth of Test Zone Below Ground Surface (feet)	Measured Infiltration Rate (inch per hour)
TP-1A	3 to 4	0.41
TP-12A	3.5 to 4.5	0.18

The test results indicate very low infiltration rates at the tested locations and depths. Once a minimum recommended correction factor of 2 is applied to the measured infiltration rates at test locations TP-1A and TP-12A (Plate 1), these rates do not meet the minimum requirement for stormwater infiltration feasibility (0.3 inch per hour) per the LADPW (2014) guidelines.

Based on our current subsurface exploration, the near-surface native soils beneath the site are generally fine grained silty sand, sandy silt, clayey silt, sandy clay silty clay and clay silty clay, sandy clay and clayey silt and generally do not provide adequate infiltration potential as indicated by the very low infiltration rates.

3.0 GEOLOGIC/SEISMIC HAZARDS

Geologic and seismic hazards include surface faulting, strong seismic shaking, landslides, liquefaction, seismically-induced lateral ground displacements, seismically-induced landslides, flooding, seiches and tsunamis, and methane. The following sections discuss these hazards and their potential impact at the project site.

3.1 Surface Fault Rupture

Our review of available in-house literature indicates that no known active faults have been mapped across the site, and the site is not located within a designated Alquist-Priolo Earthquake Fault Zone (CGS, 1986; Bryant and Hart, 2007). Therefore, the potential for surface fault rupture at the site is expected to be low and a surface fault rupture hazard evaluation is not mandated for this site.

The location of the closest active faults to the site was evaluated using the United States Geological Survey (USGS) Earthquake Hazards Program National Seismic Hazard Maps (USGS, 2008c). The closest active faults to the site are the Newport-Inglewood Fault Zone, Puente Hills fault, Palos Verdes fault, and Elysian Park fault, located approximately 0.1 miles, 6.7 miles, 7.2 miles and 13.3 miles from the site, respectively. The Puente Hills and Elysian Park faults are blind thrust faults that are concealed at depth, without the potential for surface fault rupture. The San Andreas fault, which is the largest active fault in California, is approximately 45 miles northeast of the site. Major regional faults with surface expression in proximity to the site are shown on Figure 3, *Regional Fault and Historic Seismicity Map*.

3.2 Strong Ground Shaking

The site is located within a seismically active region, as is Southern California in general. The intensity of ground shaking at a given location depends primarily upon the earthquake magnitude, the distance from the source, and the site response characteristics. For the purpose of this report, the ground motion at the site due to earthquake shaking will be characterized by the code-based Peak Ground Acceleration (PGA_M) and the design response spectrum.

The code-based Peak Ground Acceleration (PGA_M) for the site was calculated at 0.624g using the United States Geological Survey (USGS) web-based Seismic Design Maps application (USGS, 2008a). The PGA_M corresponds to a modal

earthquake with a probability of exceedance of 2 percent in 50 years (i.e., 2475-year return period). The seismicity data are included in Appendix D.

The code-based site response spectra parameters for the design earthquake are as follows:

2016 CBC Code-Based Seismic Design Parameters

Categorization/Coefficients	Code-Based
Site Longitude (decimal degrees) West	-118.2474
Site Latitude (decimal degrees) North	33.8685
Site Class	D
Risk Category	II
Mapped Peak Ground Acceleration adjusted for Site Class Effects PGA_M	0.624g
Mapped Spectral Response Acceleration at 0.2s Period, S_s	1.660g
Mapped Spectral Response Acceleration at 1s Period, S_1	0.615g
Seismic Design Category (S_1<0.75g)	D
Short Period Site Coefficient at 0.2s Period, F_a	1.0
Long Period Site Coefficient at 1s Period, F_v	1.5
Adjusted Spectral Response Acceleration at 0.2s Period, S_{MS}	1.660g
Adjusted Spectral Response Acceleration at 1s Period, S_{M1}	0.922g
Design Spectral Response Acceleration at 0.2s Period, S_{DS}	1.107g
Design Spectral Response Acceleration at 1s Period, S_{D1}	0.615g

Seismic response spectra parameters were computed per Chapter 11 of ASCE 7-10 using the Seismic Design Map Tool, Version 3.1.0, last updated on June 23, 2014 by the United States Geological Survey (USGS).

No site-specific ground motion analysis is required because structures at the site will be assigned to Seismic Design Category D based on S_1 is less than 0.75g.

3.3 Liquefaction Potential

The term liquefaction is generally referenced to loss of strength and stiffness in soils due to build-up of pore water pressure when subject to cyclic or monotonic loading. Both sandy and clayey soils are susceptible to loss of strength and stiffness. Because of the difference in strength characteristic and methods for evaluating strength loss potential for granular and clayey soils, the term

liquefaction is used for granular soils while cyclic softening is used for fine-grained soils (i.e. clays and plastic silts). In general, adverse effects of liquefaction or cyclic softening include excessive ground settlement, loss of bearing support for structural foundations, and seismically induced lateral ground deformations.

As shown on the State of California Seismic Hazard Zones Map for the Long Beach Quadrangle (CGS, 1999), this site is not located within an area that has been identified by the State of California as being potentially susceptible to liquefaction (Figure 4, *Seismic Hazard Map*). Furthermore, the groundwater level at the site is sufficiently deep to preclude the occurrence of soil liquefaction. Therefore, it is our opinion that the potential for liquefaction to occur at the site is low.

3.4 Seismically-Induced Lateral Ground Displacements

Seismically-induced lateral ground displacement is a phenomenon in which large blocks of intact, non-liquefied soil move downslope on a liquefied soil layer. Depending on the site topography, modes of seismically-induced lateral ground displacement associated with soil liquefaction consist of, ground oscillation (ground slope less than 0.3 percent), lateral spread (0.3 to 5 percent ground slope), or flow failure (ground slope greater than 5 percent). Lateral spreading is often a regional event. Due to the low susceptibility for liquefaction, the potential for lateral spreading is considered very low.

3.5 Seismically Induced Landslides

Significant slopes are not located on or near the site. Based on the State of California Seismic Hazard Zones Map for the Long Beach Quadrangle (CGS, 1999), the site is not located within an area that has been identified by the State of California as being potentially susceptible to seismically induced landslides (Figure 4, *Seismic Hazard Map*).

3.6 Flooding Hazards

According to a Federal Emergency Management Agency (FEMA) flood insurance rate map (FEMA, 2008), the site is not located within a 100-year or 500-year flood hazard area as shown on Figure 5, *Flood Hazard Zone Map*.

Earthquake-induced flooding can be caused by failure of dams or other water-retaining structures as a result of earthquakes. Based on our understanding, the project site is not located within a flood impact zone from a dam. In addition, catastrophic failure of dams in the region is expected to be a very unlikely event in that dam safety regulations exist and are enforced by the Division of Safety of Dams, Army Corp of Engineers and Department of Water Resources. Inspectors may require dam owners to perform work, maintenance or implement controls if issues are found with the safety of the dams.

3.7 Seiches and Tsunamis

Seiches are large waves generated in very large enclosed bodies of water or partially enclosed arms of the sea in response to ground shaking. Tsunamis are waves generated in large bodies of water by fault displacement or major ground movement. The project site is situated sufficiently inland, therefore the risk of tsunami inundation is negligible. Additionally, based on the lack of large enclosed water bodies nearby, seiche risks are considered very low.

3.8 Methane Hazards

Based on review of DOGGR records, the project site is located in the Dominguez Oil Field. As previously indicated, a total of eight oil production or injection wells listed by DOGGR as plugged and abandoned are located within the project site boundary. Four of the wells (API #'s 03707332, 03707335, 03707339 and 03707351) are located in the northeastern portion of the project site, and four of the wells (API #'s 03707309, 03707324, 03707348 and 03707353) are located in the western portion of the site immediately east of the existing MCI facility. Since the site contains several abandoned oil wells, the project site may require methane mitigation. It is our understanding that this is currently being evaluated by the environmental consultant for the project (Hayley & Aldrich, Inc.).

4.0 FINDINGS AND CONCLUSIONS

No evidence of adverse geological or geotechnical hazards was noted at the site that will preclude the development of the project. Presented below is a summary of findings based upon the results of our geotechnical evaluation of the site:

- The site is not located in a designated Alquist-Priolo Earthquake Fault Zone. The nearest fault to the site with the potential for ground surface rupture is the Newport-Inglewood Fault Zone which is located approximately 0.1 miles from the site. The site is expect to experience moderate to strong ground shaking resulting from an earthquake from one of the major regional faults.

- The site is not located within an area shown as susceptible to liquefaction or seismically-induced landslides on the California Seismic Hazard Zones Map for the Long Beach Quadrangle; therefore, the potential for these hazards to occur at the site is negligible.

- Based on our field observations undocumented artificial fill is generally between approximately 1.5 to 7.5 feet bgs across the site. Based on interpretations provided by Hayley & Aldrich, Inc., an isolated area in the eastern portion of the site contains undocumented artificial fill on the order of up to roughly 25 feet bgs. Other areas containing concrete debris or foundation remnants along with thick accumulations of undocumented artificial fill soils similar to those encountered during our field exploration should be anticipated during future earthwork construction.

- Based on field observations and comparison of laboratory test results to California Building Code guidelines for expansive soils (CBC, 2016), the near surface onsite soils exhibit expansion potential when subjected to an increase in moisture.

- Concrete in contact with the near surface onsite soil is expected to have low exposure to water-soluble sulfates and low exposure to chloride in the soil. The onsite soil is considered severely corrosive to ferrous metal.

5.0 PRELIMINARY RECOMMENDATIONS

Preliminary geotechnical recommendations for the proposed development are presented in the following sections and are intended to provide sufficient geotechnical information to develop the project in general accordance with 2016 CBC requirements. The following recommendations are considered preliminary and should be considered minimal from a geotechnical viewpoint as there may be more restrictive requirements of the architect, structural engineer, County of Los Angeles and the City of Carson.

It should be noted, the recommendations contained in this report were developed based upon conceptually proposed development at grade and no subterranean levels were considered. These recommendations are preliminary in nature and may change after a future design level geotechnical investigation is performed and plans are prepared and reviewed.

5.1 Earthwork

We recommend all earthwork for the project be performed in accordance with the following recommendations, future grading plan review report(s), the City of Carson and County of Los Angeles grading requirements and the General Earthwork and Grading Specifications included in Appendix E. In case of conflict the following recommendations shall supersede those provided in Appendix E.

5.1.1 Site Preparation

Prior to construction, the areas proposed for residential development and improvements should be cleared of any existing improvements associated with the former land use (demolition of structures, foundation elements to a minimum of three feet below proposed footings, concrete pads and asphalt pavements) and properly disposed of offsite. Efforts should be made to locate any existing utility lines to be removed or rerouted where interfering with the proposed construction. Any resulting cavities should be properly backfilled and compacted. After the areas are cleared, the soils should be carefully observed for the removal of all potentially unsuitable deposits.

5.1.2 General Grading Recommendations

The existing undocumented artificial fill across the site should be removed to expose competent native deposits and replaced as engineered fill in

areas proposed for buildings, site walls, and other site improvements. The thickness of the undocumented fill across the site is generally anticipated to be approximately 1 to 7.5 feet thick with localized areas of fill up to approximately 25 feet deep below existing grade (see Plate 1 for location and approximate depth of existing undocumented artificial fill). The thicker accumulations of fill are generally located in the eastern and northeastern portions of the project site. Other areas containing thick accumulations of undocumented artificial fill soils similar to those encountered during our field exploration should be anticipated during future earthwork construction. In areas where remedial removals are less than 5 feet below proposed design finish pad grade, additional overexcavation should be performed. The structural elements for the proposed residential structures and improvements may be supported on conventional shallow footing foundation systems established on at least 3 feet of engineered fill soils established on competent native soils. All other incidental improvements (such as flatwork and hardscape) may be supported on at least 18 inches of engineered fill established on competent native soils. Overexcavation and recompaction should extend a minimum horizontal distance equal to the vertical distance between the proposed footing bottom and depth of overexcavation.

Excavation Adjacent to Existing Improvements

Care should be used to avoid undermining existing improvements surrounding the project site. Excavation adjacent to existing foundations or retaining walls that extend below bearing elevation may require slot-cutting techniques or shoring to perform the excavation and to protect the foundations.

The “ABC” slot cut method may be used for construction of the new foundations located immediately adjacent to existing foundations. The initial cut along the excavation should not be steeped more than 1H to 1V (horizontal to vertical) if possible when excavating in cohesive, fine grained soils. The width of the earth buttress on either side of the slot should be maintained at a minimum of 12 feet. The maximum width and height of the slots should not exceed eight feet.

Subgrade Preparation

After completion of the overexcavation and prior to fill placement or other improvements such as flatwork and hardscape, the exposed soils should be scarified to a minimum depth of six inches; moisture conditioned 2 to 4 percentage points above optimum moisture content and compacted to a minimum of 90 percent relative compaction (ASTM D1557). The subgrade in areas that will be overlain by more than 10 feet of fill should be compacted to a minimum of 95 percent relative compaction (ASTM D1557).

Fill Placement

The onsite soils, less any deleterious material (construction debris), large cobbles or organic matter, can be used in required fills. Oversized material greater than 6 inches in maximum dimension should not be placed in the fill.

Any required import material should consist of non-corrosive and relatively non-expansive soils with an Expansion Index (EI) less than 20. The imported materials should contain sufficient fines (binder material) so as to result in a stable subgrade when compacted. All proposed import materials should be approved by the geotechnical engineer of record prior to being placed at the site.

All fill soil should be placed in thin, loose lifts, with each lift properly moisture conditioned 2 to 4 percentage points above the optimum-moisture content and compacted to a minimum of 90 percent relative compaction (ASTM D1557). Fill soils placed below 10 feet of the planned finish grade should be compacted to a minimum of 95 percent relative compaction (ASTM D1557).

The optimum lift thickness to produce a uniformly compacted fill will depend on the type and size of compaction equipment used. In general, lift thickness for granular fill should not exceed 8 inches in compacted thickness. Proper moisture conditioning of the soils is vital in reducing expansion potential and reducing the potential for post-construction heave that may result in distortion and possibly damage to new improvements. Aggregate base should be compacted to a minimum of 95 percent relative compaction (ASTM D1557).

5.2 Preliminary Foundation Recommendations

Preliminarily, we recommend that the proposed buildings be supported on a shallow spread footing foundation system established over at least 3 feet of engineered fill. Foundations may be designed to impose an average bearing pressure of 3,000 pounds per square foot (psf). A one-third increase in the bearing value for short duration loading, such as wind or seismic forces, may be used.

The recommended bearing value is a net value, and the weight of concrete in the footings can be taken as 50 pounds per cubic foot (pcf); the weight of soil backfill can be neglected when determining the downward loads.

Footings should have a minimum width of 12 inches for continuous footings and 18 inches for isolated footings. Footings should have a minimum embedment of 12 inches below the lowest adjacent grade.

Lateral loads can be resisted by soil friction and by the passive resistance of the soils. A coefficient of friction of 0.25 can be used between the footings and the floor slab and the supporting soils.

The ultimate passive resistance of engineered fill or undisturbed natural soils can be assumed to be equal to the pressure developed by a fluid with a density of 250 pounds per cubic foot (pcf).

The friction resistance and the passive resistance of the soils can be combined without reduction in determining the total lateral resistance.

The estimated total settlement of the structures supported on spread footings as recommended above is less than 1 inch. The differential settlement is estimated to be less than ½ inch over a horizontal distance of 30 feet.

5.3 Design Level Geotechnical Investigation

Additional field exploration, laboratory testing and engineering analysis will be required during the design phase of the project for submittal purposed in order to obtain a building permit. The preliminary geotechnical recommendations presented in this report may change after further investigation and evaluation, and once actual plans are prepared and reviewed by the geotechnical engineer for the site.

5.4 Grading/Foundation Plan Review

When available, grading and foundation plans should be reviewed by Leighton in order to verify our preliminary geotechnical recommendations are properly implemented. Updated recommendations based on future design level geotechnical investigation to be performed at the site may be necessary.

5.5 Additional Geotechnical Services

The geotechnical recommendations presented in this report are preliminary, and based on subsurface conditions as interpreted from limited subsurface explorations, limited laboratory testing and information available at the time the report is prepared. An additional design level geotechnical investigation, laboratory testing and analysis will be required based on final improvement plans and additional geotechnical recommendations can be provided at that time. Leighton should review the site and grading plans when available and comment further on the geotechnical aspects of the project. Geotechnical observation and testing should be conducted during excavation and all phases of grading operations. Our conclusions and preliminary recommendations should be reviewed and verified by Leighton during additional subsurface investigation and earthwork construction and revised accordingly if geotechnical conditions encountered vary from our preliminary findings and interpretations.

For planning purposes, geotechnical observation and testing should be provided during the following activities:

- Grading and excavation of the site;
- During overexcavation of compressible soil;
- Subgrade preparation;
- Compaction of all fill materials;
- Utility trench backfilling and compaction;
- Footing excavation and slab-on-grade preparation;
- Pavement subgrade and base preparation;
- Placement of asphalt concrete and/or concrete; and
- When any unusual conditions are encountered.

6.0 LIMITATIONS

This report was based solely on data obtained from a limited number of geotechnical exploration, and soil samples and tests. Such information is, by necessity, incomplete. The nature of many sites is such that differing soil or geologic conditions can be present within small distances and under varying climatic conditions. Changes in subsurface conditions can and do occur over time. Therefore, the findings, conclusions, and recommendations presented in this report are only valid if Leighton and Associates, Inc. has the opportunity to perform a design level geotechnical investigation for the project and observe subsurface conditions during grading and construction, to confirm that our preliminary data are representative for the site. Leighton and Associates, Inc. should also review the construction plans and project specifications, when available, to comment on the geotechnical aspects.

This report was prepared using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. The findings, conclusion, and recommendations included in this report are considered preliminary and are subject to verification. We do not make any warranty, either expressed or implied.

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Important Information about This

Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative – interpret and apply this geotechnical-engineering report as effectively as possible. In that way, clients can benefit from a lowered exposure to the subsurface problems that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed below, contact your GBA-member geotechnical engineer. Active involvement in the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

Geotechnical-Engineering Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a given civil engineer will not likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. *Those who rely on a geotechnical-engineering report prepared for a different client can be seriously misled*. No one except authorized client representatives should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one – not even you – should apply this report for any purpose or project except the one originally contemplated.*

Read this Report in Full

Costly problems have occurred because those relying on a geotechnical-engineering report did not read it *in its entirety*. Do not rely on an executive summary. Do not read selected elements only. *Read this report in full.*

You Need to Inform Your Geotechnical Engineer about Change

Your geotechnical engineer considered unique, project-specific factors when designing the study behind this report and developing the confirmation-dependent recommendations the report conveys. A few typical factors include:

- the client's goals, objectives, budget, schedule, and risk-management preferences;
- the general nature of the structure involved, its size, configuration, and performance criteria;
- the structure's location and orientation on the site; and
- other planned or existing site improvements, such as retaining walls, access roads, parking lots, and underground utilities.

Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.*

This Report May Not Be Reliable

Do not rely on this report if your geotechnical engineer prepared it:

- for a different client;
- for a different project;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, that it could be unwise to rely on a geotechnical-engineering report whose reliability may have been affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If your geotechnical engineer has not indicated an "apply-by" date on the report, ask what it should be*, and, in general, *if you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying it. A minor amount of additional testing or analysis – if any is required at all – could prevent major problems.

Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface through various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing were performed*. The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgment to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team from project start to project finish, so the individual can provide informed guidance quickly, whenever needed.

This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, *they are not final*, because the geotechnical engineer who developed them relied heavily on judgment and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* revealed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.*

This Report Could Be Misinterpreted

Other design professionals' misinterpretation of geotechnical-engineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a full-time member of the design team, to:

- confer with other design-team members,
- help develop specifications,
- review pertinent elements of other design professionals' plans and specifications, and
- be on hand quickly whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction observation.

Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note conspicuously that you've included the material for informational purposes only*. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report, but they may rely on the factual data relative to the specific times, locations, and depths/elevations referenced. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, *only* from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and *be sure to allow enough time* to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

Read Responsibility Provisions Closely

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely*. Ask questions. Your geotechnical engineer should respond fully and frankly.

Geoenvironmental Concerns Are Not Covered

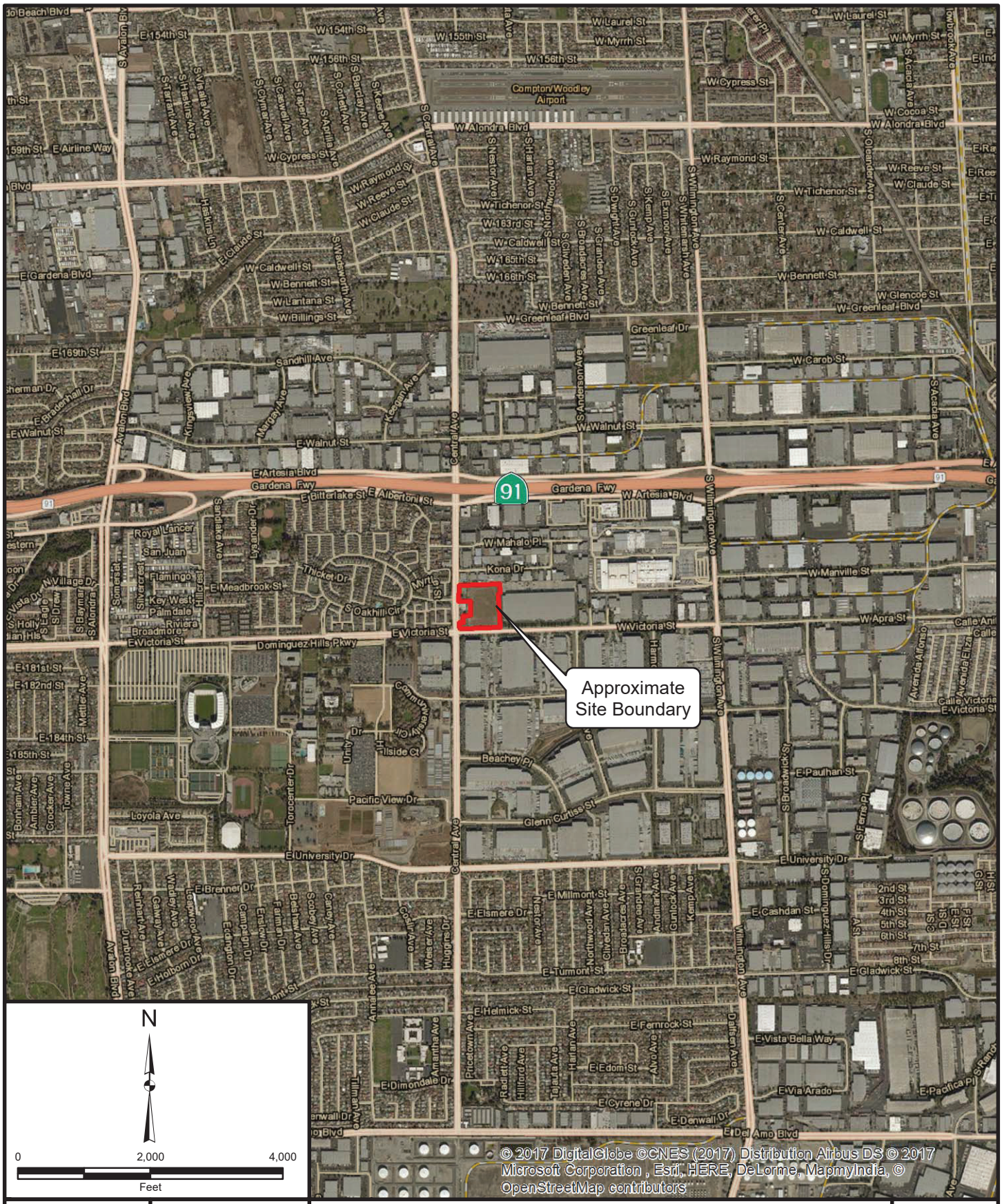
The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. As a general rule, *do not rely on an environmental report prepared for a different client, site, or project, or that is more than six months old.*

Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, none of the engineer's services were designed, conducted, or intended to prevent uncontrolled migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, ***proper implementation of the geotechnical engineer's recommendations will not of itself be sufficient to prevent moisture infiltration.*** Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. ***Geotechnical engineers are not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org



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Scale:1 " = 2,000 '	Date: September 2017

Base Map: ESRI ArcGIS Online 2017
Thematic Information: Leighton
Author: Leighton Geomatics (btran)

SITE LOCATION MAP

Proposed Residential Development
NE Corner of Central Avenue and Victoria Street
Carson, California

Figure 1

Leighton

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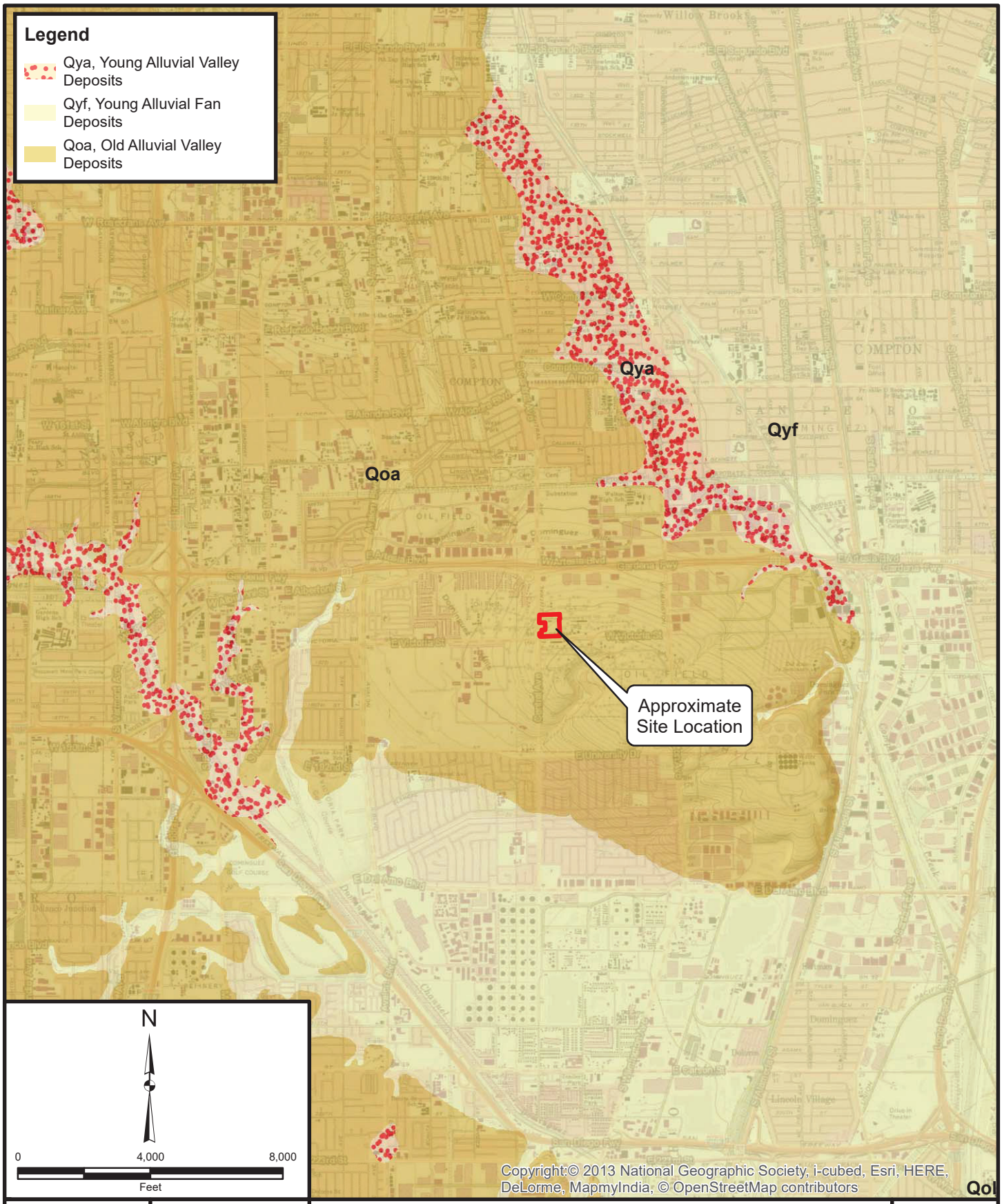

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Base Map: ESRI ArcGIS Online 2017
Thematic Information: Leighton, USGS
Author: Leighton Geomatics (btran)

REGIONAL GEOLOGY MAP

Proposed Residential Development
NE Corner of Central Avenue and Victoria Street
Carson, California

Figure 2

Leighton

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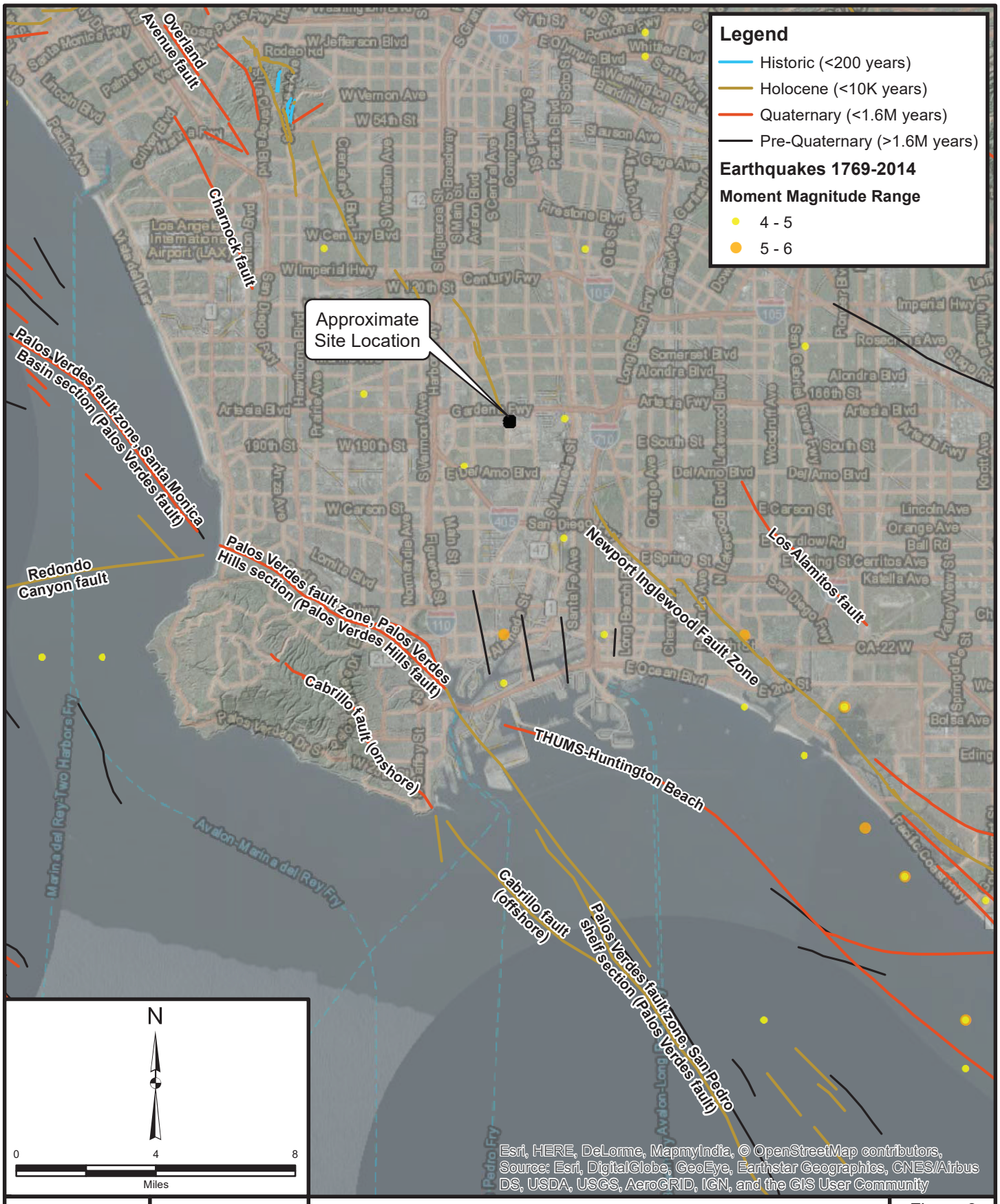

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Scale: 1 " = 4 miles	Date: September 2017

Base Map: ESRI ArcGIS Online 2017
Thematic Information: Leighton, CGS, Bryant 2010
Author: Leighton Geomatics (btran)

REGIONAL FAULT AND HISTORIC SEISMICITY MAP

Proposed Residential Development
NE Corner of Central Avenue and Victoria Street
Carson, California

Figure 3

Leighton

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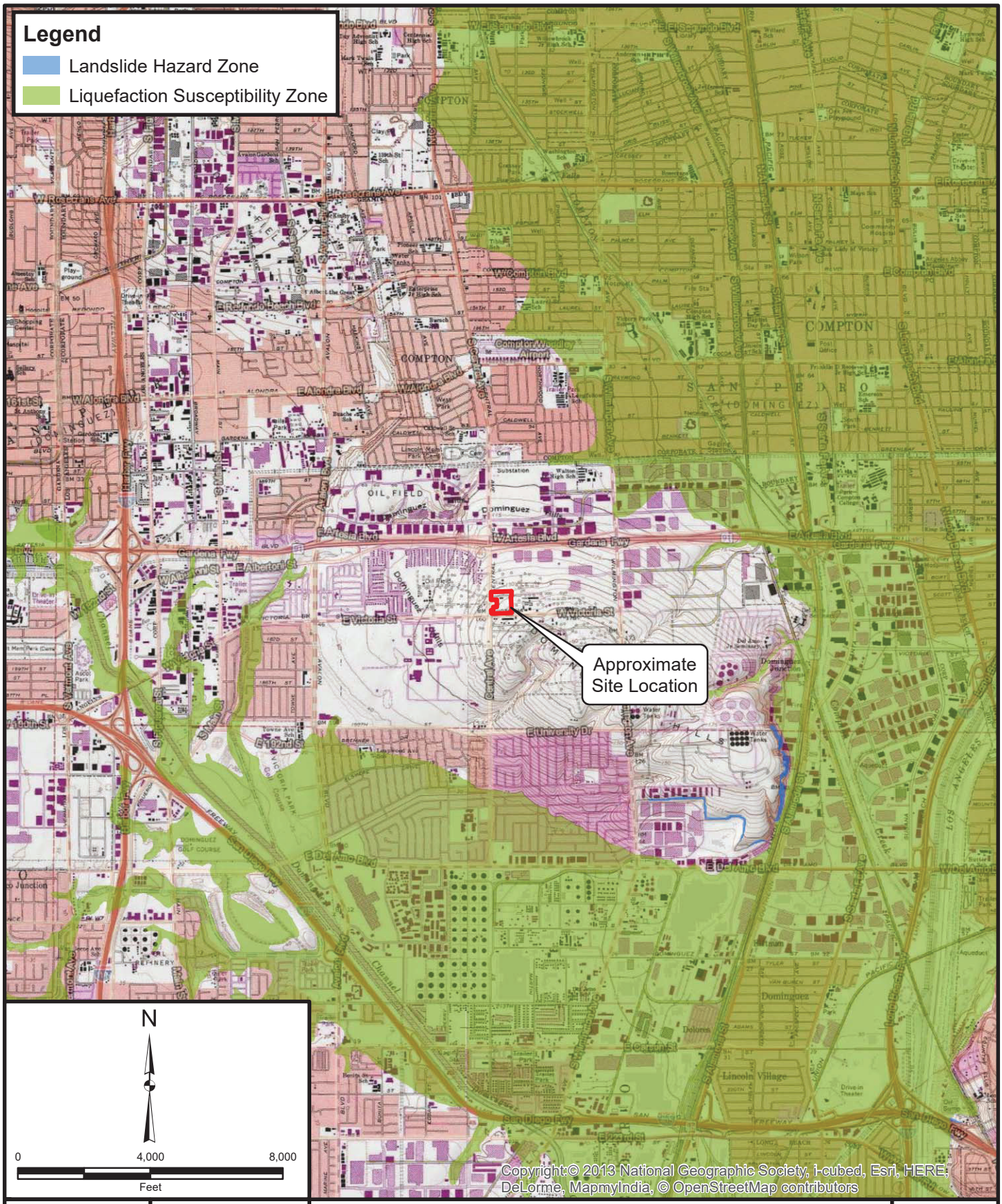

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Scale:1 " = 4,000 '	Date: September 2017

Base Map: ESRI ArcGIS Online 2017
Thematic Information: Leighton, CGS
Author: Leighton Geomatics (btran)

SEISMIC HAZARD MAP

Proposed Residential Development
NE Corner of Central Avenue and Victoria Street
Carson, California

Figure 4

Leighton

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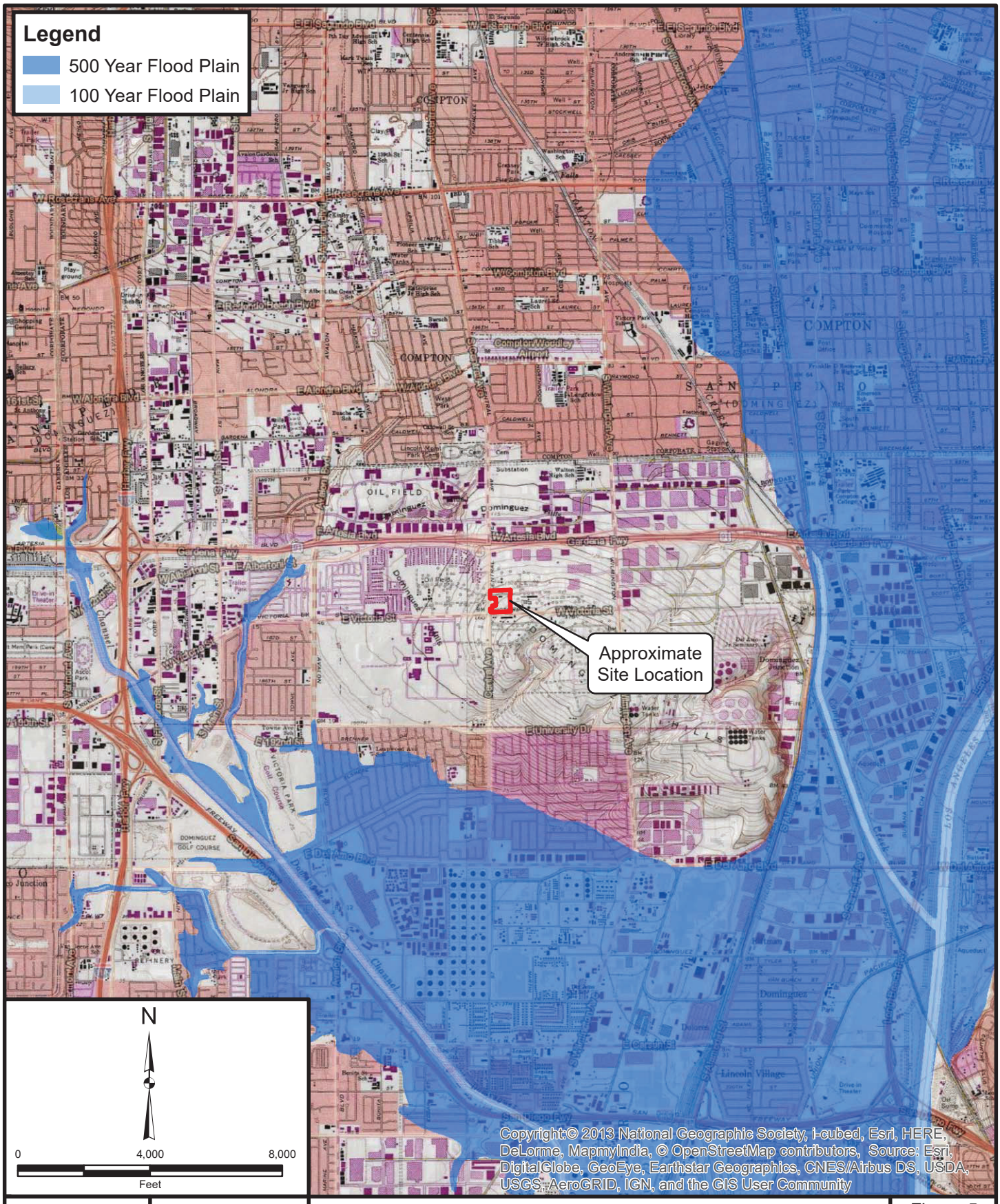

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Base Map: ESRI ArcGIS Online 2017
Thematic Information: Leighton, CA DWR, FEMA
Author: Leighton Geomatics (btran)

FLOOD HAZARD ZONE MAP

Proposed Residential Development
NE Corner of Central Avenue and Victoria Street
Carson, California

Figure 5

Leighton

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APPENDIX A

FIELD EXPLORATION LOGS

Leighton

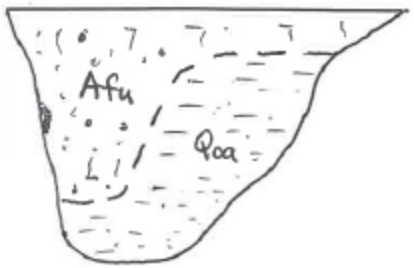
Log of Trench: TP-1

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	153.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy SILT (ML) to Silty Clay (CL), brown, slightly moist to moist, some gravel and debris (concrete, nails), few cobbles, irregular contact extends down to 6 feet deep at north end of test pit	Afu	ML/CL			
	@1.5’: **Quaternary Old Alluvium (Qoa):** Silty CLAY (CL), brown to medium brown, moist, stiff, trace sand, generally uniform	Qoa	CL	BB-1 @4’-5’		
	@5’-7.5’: transitions Clayey SILT (ML), light olive brown, slight to moderate blocky structure with waxy surfaces		ML			

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS



Total Depth = 7.5 feet

***** This log is a part of a report by Leighton and should not be used as a stand-alone document.*****

Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

Log of Trench: TP-1A

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	153.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy SILT (ML) to Silty Clay (CL), brown, slightly moist to moist, some gravel and debris (concrete, nails), few cobbles	Afu	ML/CL			
	@3.5’: **Quaternary Old Alluvium (Qoa):** Silty CLAY (CL), brown to medium brown, moist, stiff, trace sand, generally uniform Percolation test performed at 3.5’-4.5’ on 9/7/17	Qoa	CL	BB-1 @3.5’-4.5’		

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS

Total Depth = 4.5 feet

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Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

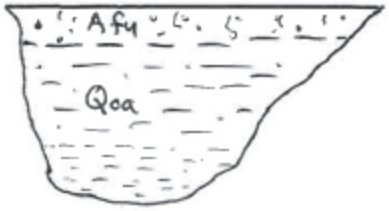
Log of Trench: TP-2

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	153.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy SILT (ML) with gravel, brown, dry to slightly moist, some rootlets, generally disturbed	Afu	ML			
	@1.2’: **Quaternary Old Alluvium (Qoa):** Sandy SILT with clay (CL), brown to olive brown, moist, stiff, slight soil development, trace sand	Qoa	CL			
	@4’-5’: transitions to SILT (ML), light olive brown, slightly moist to moist, slight blocky structure with moderate soil development		ML	BB-1 @4’-5’		
	@5’-6’ Clayey SILT (ML), olive brown, moist, well developed with waxy surfaces, few gravels					

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS



Total Depth = 6.0 feet

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Leighton and Associates, Inc.
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Log of Trench: TP-3

Project Name: Integral Carson
Project Number: 11738.001
Equipment: Backhoe
Logged by: JMP
Elevation: 154.5’
Location/Grid: See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy SILT (ML) with clay and gravel, brown, dry to slightly moist, some debris (concrete, brick) down to 2 feet deep at one location	Afu	ML			
	@1’: **Quaternary Old Alluvium (Qoa):** Sandy SILT (ML), brown, slightly moist to moist, stiff, fine sand, massive, trace oxidation, uniform	Qoa	ML			
	@4’-5’: Clayey SILT (ML), dark olive brown, moist, medium stiff, well developed blocky structure with waxy surfaces					
	@5’-6’: Silty SAND (SM), light yellow brown, slightly moist, medium dense, fine sand, slightly oxidized		SM	BB-1 @5’-6’		

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS

Total Depth = 6.0 feet

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Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

Log of Trench: TP-4

Project Name: Integral Carson
Project Number: 11738.001
Equipment: Backhoe
Logged by: JMP
Elevation: 154.5'
Location/Grid: See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0': **Artificial Fill, undocumented (Afu):** Sandy Clayey SILT (ML), brown, dry to slightly moist, some rootlets, fine sand, generally disturbed, blocky from shrink/swell	Afu	ML			
	@1': **Quaternary Old Alluvium (Qoa):** Clayey SILT (ML) to Silty CLAY (CL), brown, moist, stiff, slight soil development, trace carbonate deposits, massive, uniform	Qoa	ML/CL			
	@4'-5': Transitions to SILT (ML) with sand, yellow brown, slightly moist, medium stiff, fine sand		ML			
	@5'-6': Silty SAND (SM), yellow brown, slightly moist, medium dense, fine sand		SM			

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS

Total Depth = 6.0 feet

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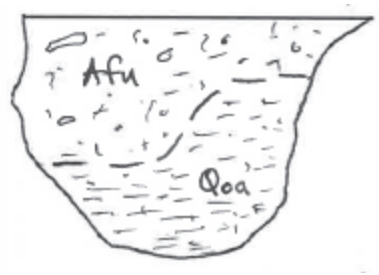
Log of Trench: TP-5

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	156’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy SILT (ML), brown, slightly moist to moist, some gravel and debris (wood, metal, nails, etc.), irregular contact extends down to 4.5 feet deep at west end of test pit	Afu	ML	BB-1 @0’-5’		
	@2’: **Quaternary Old Alluvium (Qoa):** Clayey SILT (ML) to Silty CLAY (CL), brown to medium brown, moist, stiff, some red brown mottling, uniform @5’-7’: Transitions to Silty CLAY (CL), olive brown, moist, medium stiff, blocky structure with waxy surfaces	Qoa	ML/CL CL			

Graphical Representation: North Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW



Total Depth = 7.0 feet

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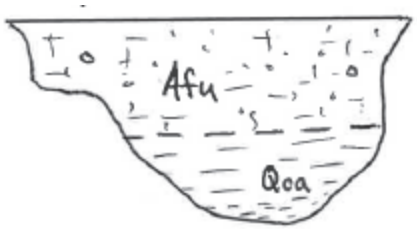
Log of Trench: TP-6

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	155’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty Sandy CLAY (CL), brown, mottled, moist, some pockets of silty sand, minor amounts of debris, fill is 2 feet deep in south wall	Afu	CL			
	@3.8’: **Quaternary Old Alluvium (Qoa):** Clayey SILT (ML) to Sandy Silty CLAY (CL), medium brown to olive brown, moist, stiff, some blocky waxy surfaces, slight porosity, uniform	Qoa	ML/CL			
	@5’-6’: SILT (ML), yellow brown, moist, slight oxidation, uniform		ML			

Graphical Representation: North Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW



Total Depth = 6.0 feet

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Log of Trench: TP-7

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	159.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy Clayey SILT (ML) with some debris (Brick, concrete, nail, metal), brown, dry to moist, loose, oxidation from metal (rust), fill is 2 feet deep in north wall	Afu	ML			
	@2’: **Quaternary Old Alluvium (Qoa):** Clayey SILT (ML), medium brown, moist, stiff, trace fine sand, uniform	Qoa	ML			
	@5’: Sandy SILT (ML) to Silty SAND (SM), yellow brown, moist, fine sand		SM			

Graphical Representation: South Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW

Total Depth = 6.5 feet

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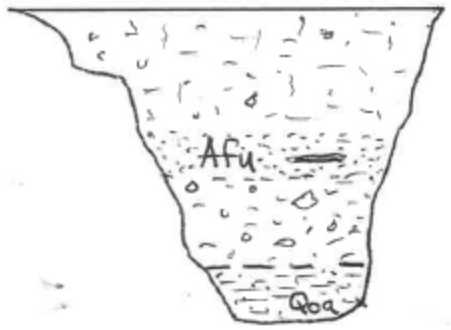
Log of Trench: TP-8

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	160.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy Clayey SILT with Gravel (ML), brown, moist, soft/loose, concrete and asphalt debris intermixed (concrete up to 12-inches)	Afu	ML			
	@3.7’: Silty SAND (SM), yellow brown, moist, fine sand, some debris (metal pipe), similar to silty sand layer observed in TP-9		SM			
	@5’: Sandy Silty CLAY (CL), brown, moist, some asphalt debris		CL			
	@7.5’: **Quaternary Old Alluvium (Qoa):** Clayey SAND (SC) to Sandy CLAY (CL), light yellow brown, slightly mottled with brown, moist, occasional laminations	Qoa	CL			

Graphical Representation: North Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW



Total Depth = 9.5 feet

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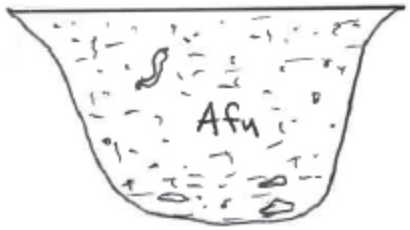
Log of Trench: TP-9

Project Name: Integral Carson
Project Number: 11738.001
Equipment: Backhoe
Logged by: JMP
Elevation: 162’
Location/Grid: See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy Gravelly SILT (ML), brown, dry to slightly moist, some debris (concrete, motor belt, etc.)	Afu	ML			
	@2.5’: Silty fine SAND (SM), medium yellow brown, moist, some occasional gravels and intermixed clasts, slight hydrocarbon odor on a few gravels, similar to silty sand layer observed in TP-8		SM			
	@5’: Silty Sandy CLAY (CL), brown, moist, abundant chunks of concrete		CL			
	@5.3’: Sandy Clayey SILT (ML), brown to dark brown, moist, some hydrocarbon odor and staining, large chunks of concrete up to 12-inches in long dimension,		ML			
	*soil excavated between 5.3 and 7 feet bgs drummed and disposed offsite per project environmental consultant (Hayley and Aldrich, Inc.) **test pit terminated at 7 feet bgs due to stained soil encountered					

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** FlaM Lt **Trend:** NS



Total Depth = 7.0 feet

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Log of Trench: TP-10

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	163’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty CLAY with Gravel (CL), brown, dry to slightly moist, some pockets of silty sand intermixed, appears disturbed	Afu	CL			
	@2.5’: **Quaternary Old Alluvium (Qoa):** CLAY (CL), brown to dark brown, medium stiff, very moist, trace fine sand, uniform, poor soil development	Qoa	CL	BB-1 @2.5’-5’		

Graphical Representation: North Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW

Total Depth = 6.0 feet

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Leighton and Associates, Inc.
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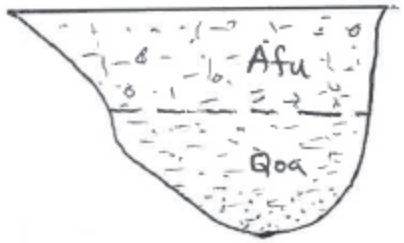
Log of Trench: TP-11

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	164.4’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 8-31-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Sandy SILT with Gravel (ML), brown, dry to slightly moist, fine sand, some fine to coarse gravels, trace debris (asphalt, concrete)	Afu	ML	BB-1 @0-3'		
	@3.3’: **Quaternary Old Alluvium (Qoa):** Sandy SILT (ML), medium brown to reddish brown, slightly moist, stiff, uniform	Qoa	ML			
	@5’: Grades to Silty SAND (SM), olive brown, slightly moist, medium dense, fine sand, some porosity possible from remnant rootlets		SM			

Graphical Representation: West Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS



Total Depth = 7.0 feet

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Leighton and Associates, Inc.
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Log of Trench: TP-12

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	163’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty CLAY with Sand (CL), brown and dark brown, dry to slightly moist, fractured due to shrink/swell, some gravels, generally disturbed zone	Afu	CL			
	@1.3’:**Quaternary Old Alluvium (Qoa):** CLAY to Silty CLAY (CL), brown to reddish brown, moist, medium stiff, uniform, slight soil development	Qoa	CL			
	@4.5’: Color transitions gradually to olive brown					
	@5’: SILT (ML), light yellow brown, stiff, moist		ML			

Graphical Representation: **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS

Total Depth = 6.0 feet

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Leighton and Associates, Inc.
A LEIGHTON GROUP COMPANY

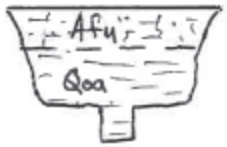
Log of Trench: TP-12A

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	163’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty CLAY with Sand (CL), brown and dark brown, dry to slightly moist, fractured due to shrink/swell, some gravels, generally disturbed zone	Afu	CL			
	@1.3’:**Quaternary Old Alluvium (Qoa):** CLAY to Silty CLAY (CL), brown to reddish brown, moist, medium stiff, uniform, slight soil development	Qoa	CL			
	Percolation test performed at 3’-4’ on 9/7/17			BB-1 @3’-4’		

Graphical Representation: **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS



Total Depth = 4.0 feet

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Leighton Consulting, Inc.
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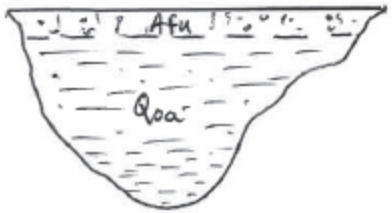
Log of Trench: TP-13

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	161.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty GRAVEL (GM), gray brown, dry, loose, ¾-inch gravel (aggregate base material)	Afu	GM			
	@1’: **Quaternary Old Alluvium (Qoa):** Silty CLAY to CLAY (CL), dark brown to reddish brown, moist, medium stiff, color lightens up with depth, uniform	Qoa	CL			
	@4’: Transitions to SILT (ML), yellow brown, slightly moist to moist, very stiff/hard @5.5’-6’		ML			

Graphical Representation: North Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW



Total Depth = 6.0 feet

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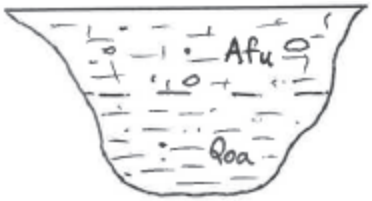
Log of Trench: TP-14

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	166.2’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty CLAY (CL) to Clayey SILT with Gravel (ML), brown, dry to slightly moist, fine to coarse gravels, some concrete debris up to 8-inches in long dimension	Afu	CL/ML			
	@2.5’: **Quaternary Old Alluvium (Qoa):** Silty Sandy CLAY (CL), medium brown to reddish brown, increase in reddish hue with depth, moist, stiff, fine sand, uniform	Qoa	CL	BB-1 @2.5’-5’		

Graphical Representation: North Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** EW



Total Depth = 6.0 feet

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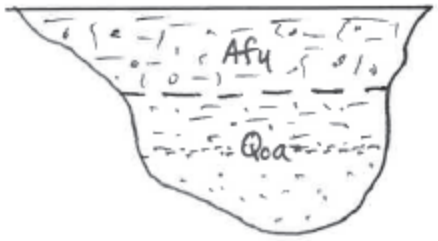
Log of Trench: TP-15

Project Name:	Integral Carson	**Logged by:**	JMP
Project Number:	11738.001	**Elevation:**	166.5’
Equipment:	Backhoe	**Location/Grid:**	See Plate 1, Geotechnical Map

Earth Material Description: This soil and/or rock description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

Geologic Attitudes	Earth Materials Exposed On: 9-1-17	Geologic Unit	Engineering Properties: Unified Soil Classification	Sample Number	Moisture (%)	Density (pcf)
	@0’: **Artificial Fill, undocumented (Afu):** Silty CLAY with Gravel (CL), brown, dry to slightly moist, fine to coarse gravel, some debris	Afu	CL			
	@2.5’: **Quaternary Old Alluvium (Qoa):** Sandy SILT (ML), brown to orange brown, moist, medium stiff, fine sand, uniform	Qoa	ML			
	@4.5’: Carbonate rich zone, layer across trench					
	@4.8’: Silty SAND (SM), light yellow brown, moist, medium dense, fine sand		SM			

Graphical Representation: East Wall **Scale:** 1 inch = 5 feet **Surface Slope:** Flat **Trend:** NS



Total Depth = 7.0 feet

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GEOTECHNICAL BORING LOG HA-50

Project No.	11738.001	**Date Drilled**	10-19-17
Project	Integral Carson	**Logged By**	SAM
Drilling Co.	Strongarm Environmental	**Hole Diameter**	3"
Drilling Method	Direct Push - Acetate Sleeve	**Ground Elevation**	159'
Location	See Plate 1, Geotechnical Map	**Sampled By**	SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
	0							ML	**Artificial Fill, undocumented (Afu):** @0': Sandy SILT, light brown, dry, fine to medium sand, fine to coarse gravel-sized fragments of concrete	
								ML	**Quaternary Old Alluvium (Qoa):** @2': SILT, light to medium brown, dry, some fine sand, trace fine subangular gravel	
155	5								@4.5': No gravel, trace sand	
								SM	@8': Silty SAND, medium brown, slightly moist, fine sand	
150	10								@9': SAND with Silt, medium brown, slightly moist, fine sand	
									@12': Grades to yellow brown, increase in sand with depth	
								SM	@13': Interbedded Silty SAND and SILT, layers are 3-inches thick; SILT is dark brown, slightly moist, some fine sand; Silty SAND is medium brown, slightly moist, fine sand	
145	15							ML	@14.5': SILT with Clay, grayish olive brown, firm to stiff, slightly moist, some fine sand, some patches of moderate to heavy oxidation	
									Total Depth of Boring: 15.5 feet bgs No groundwater encountered during drilling Dual-nested soil vapor probes set at 5 feet and 14 feet bgs with sand filter pack and bentonite seal	
140	20									
135	25									
130	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG HA-51

Project No.	11738.001	**Date Drilled**	10-19-17
Project	Integral Carson	**Logged By**	SAM
Drilling Co.	Strongarm Environmental	**Hole Diameter**	3"
Drilling Method	Direct Push - Acetate Sleeve	**Ground Elevation**	158'
Location	See Plate 1, Geotechnical Map	**Sampled By**	SAM

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
									This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.	
158	0							ML	**Artificial Fill, undocumented (Afu):** @0': Sandy SILT, light brown, dry, some fine to coarse subangular gravel, some manmade debris	
								ML	**Quaternary Old Alluvium (Qoa):** @2': SILT, medium to dark brown, dry to slightly moist, some fine sand, trace fine gravel, trace $CaCO_3$ stringers	
155	5								@4': Sandy SILT, yellow brown, dry, fine sand, occasional fine gravel	
								CL	@6': Silty CLAY, medium to dark brown, slightly moist, some fine sand, low plasticity	
150								SM ML	@8': Silty SAND, medium brown, dry, fine to medium sand, trace roots @8.5': SILT, light brown, dry, some fine sand	
	10							SM	@10': Silty SAND, medium brown, dry, fine to medium sand	
									@11': Grades to SAND with Silt, medium brown, slightly moist, fine to medium sand	
145								CL ML SP	@12': 2-inch lyer of Silty CLAY, dark brown, slightly moist, low plasticity @12.2': SILT, light brown, dry, some fine sand @13': SAND, medium brown, dense, dry, fine to medium sand	
	15								Total Depth of Boring: 15.5 feet bgs No groundwater encountered during drilling Dual-nested soil vapor probes set at 5 feet and 14 feet bgs with sand filter pack and bentonite seal	
140										
	20									
135										
	25									
130										
	30									

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG HA-52

Project No.	11738.001	**Date Drilled**	10-19-17
Project	Integral Carson	**Logged By**	SAM
Drilling Co.	Strongarm Environmental	**Hole Diameter**	3"
Drilling Method	Direct Push - Acetate Sleeve	**Ground Elevation**	156'
Location	See Plate 1, Geotechnical Map	**Sampled By**	SAM

Elevation Feet	Depth Feet	Graphic Log	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
		N S							*This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.*	
155	0							ML	**Artificial Fill, undocumented (Afu):** @0': Sandy SILT, light brown, dry, fine sand, some concrete, few subangular to subrounded fine gravels approximately one inch in long dimension	
								ML-CL	**Quaternary Old Alluvium (Qoa):** @2': SILT with Clay and Sand, medium brown, firm to stiff, dry, fine sand, trace mica, some coarse sand, trace fine roots @4': Trace fine subangular to subrounded gravels less than 0.25-inches in long dimension	
150	5								Total Depth of Boring: 6 feet bgs No groundwater encountered during drilling Boring backfilled with soil cuttings upon completion of drilling	
145	10									
140	15									
135	20									
130	25									
	30									

SAMPLE TYPES:

B	BULK SAMPLE
C	CORE SAMPLE
G	GRAB SAMPLE
R	RING SAMPLE
S	SPLIT SPOON SAMPLE
T	TUBE SAMPLE

TYPE OF TESTS:

-200	% FINES PASSING	DS	DIRECT SHEAR	SA	SIEVE ANALYSIS
AL	ATTERBERG LIMITS	EI	EXPANSION INDEX	SE	SAND EQUIVALENT
CN	CONSOLIDATION	H	HYDROMETER	SG	SPECIFIC GRAVITY
CO	COLLAPSE	MD	MAXIMUM DENSITY	UC	UNCONFINED COMPRESSIVE STRENGTH
CR	CORROSION	PP	POCKET PENETROMETER		
CU	UNDRAINED TRIAXIAL	RV	R VALUE		

*** This log is a part of a report by Leighton and should not be used as a stand-alone document. ***

GEOTECHNICAL BORING LOG HA-53

Project No.	11738.001	**Date Drilled**	10-19-17
Project	Integral Carson	**Logged By**	SAM
Drilling Co.	Strongarm Environmental	**Hole Diameter**	3"
Drilling Method	Direct Push - Acetate Sleeve	**Ground Elevation**	162'
Location	See Plate 1, Geotechnical Map	**Sampled By**	SAM

Elevation Feet	Depth Feet	Graphic Log (N / S)	Attitudes	Sample No.	Blows Per 6 Inches	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	SOIL DESCRIPTION	Type of Tests
160	0							ML	**Artificial Fill, undocumented (Afu):** @0': Sandy SILT, light brown, dry, fine sand, some concrete debris	
								ML-CL	@1.75': SILT, medium brown, dry to slightly moist, some fine sand	
155	5							ML	**Quaternary Old Alluvium (Qoa):** @4.25': SILT, light brown, dry, some fine sand, pinhole porosity observed	
150	10								Total Depth of Boring: 6.5 feet bgs No groundwater encountered during drilling Boring backfilled with soil cuttings upon completion of drilling	
145	15									
140	20									
135	25									
	30									

This Soil Description applies only to a location of the exploration at the time of sampling. Subsurface conditions may differ at other locations and may change with time. The description is a simplification of the actual conditions encountered. Transitions between soil types may be gradual.

SAMPLE TYPES:
- B BULK SAMPLE
- C CORE SAMPLE
- G GRAB SAMPLE
- R RING SAMPLE
- S SPLIT SPOON SAMPLE
- T TUBE SAMPLE

TYPE OF TESTS:
- -200 % FINES PASSING
- AL ATTERBERG LIMITS
- CN CONSOLIDATION
- CO COLLAPSE
- CR CORROSION
- CU UNDRAINED TRIAXIAL
- DS DIRECT SHEAR
- EI EXPANSION INDEX
- H HYDROMETER
- MD MAXIMUM DENSITY
- PP POCKET PENETROMETER
- RV R VALUE
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- SG SPECIFIC GRAVITY
- UC UNCONFINED COMPRESSIVE STRENGTH

APPENDIX B

LABORATORY TEST RESULTS

Leighton

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Integral/Carson	Tested By:	S. Felter	Date:	09/06/17
Project No.:	11738.001	Checked By:	J. Ward	Date:	09/11/17
Boring No.:	TP-10	Depth (ft.):	2.5-5		
Sample No.:	BB-1				
Soil Identification:	Dark brown lean clay with sand (CL)s				

Dry Wt. of Soil + Cont. (g)	1000.00
Wt. of Container No. (g)	0.00
Dry Wt. of Soil (g)	1000.00
Weight Soil Retained on #4 Sieve	0.00
Percent Passing # 4	100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0810
Wt. Comp. Soil + Mold (g)	576.80	434.73
Wt. of Mold (g)	190.10	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	O	O
Wet Wt. of Soil + Cont. (g)	764.90	624.83
Dry Wt. of Soil + Cont. (g)	684.80	536.30
Wt. of Container (g)	0.00	190.10
Moisture Content (%)	11.70	25.57
Wet Density (pcf)	116.6	121.3
Dry Density (pcf)	104.4	96.6
Void Ratio	0.614	0.745
Total Porosity	0.381	0.427
Pore Volume (cc)	78.8	95.5
Degree of Saturation (%) [S_{meas}]	**51.4**	92.7

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
09/06/17	8:46	1.0	0	0.1400
09/06/17	8:56	1.0	10	0.1400
Add Distilled Water to the Specimen				
09/06/17	15:02	1.0	366	0.2180
09/07/17	6:32	1.0	1296	0.2210
09/07/17	8:02	1.0	1386	0.2210

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**81**

Leighton

EXPANSION INDEX of SOILS

ASTM D 4829

Project Name:	Integral/Carson	Tested By:	S. Felter	Date:	09/06/17
Project No.:	11738.001	Checked By:	J. Ward	Date:	09/11/17
Boring No.:	TP-5	Depth (ft.):	0-5		
Sample No.:	BB-1				
Soil Identification:	Dark brown sandy lean clay s(CL)				

Dry Wt. of Soil + Cont.	(g)	1000.00
Wt. of Container No.	(g)	0.00
Dry Wt. of Soil	(g)	1000.00
Weight Soil Retained on #4 Sieve		0.00
Percent Passing # 4		100.00

MOLDED SPECIMEN	Before Test	After Test
Specimen Diameter (in.)	4.01	4.01
Specimen Height (in.)	1.0000	1.0500
Wt. Comp. Soil + Mold (g)	570.80	426.37
Wt. of Mold (g)	181.00	0.00
Specific Gravity (Assumed)	2.70	2.70
Container No.	O	O
Wet Wt. of Soil + Cont. (g)	774.30	607.37
Dry Wt. of Soil + Cont. (g)	696.30	531.52
Wt. of Container (g)	0.00	181.00
Moisture Content (%)	11.20	21.64
Wet Density (pcf)	117.6	122.5
Dry Density (pcf)	105.7	100.7
Void Ratio	0.594	0.674
Total Porosity	0.373	0.403
Pore Volume (cc)	77.2	87.5
Degree of Saturation (%) [S_{meas}]	**50.9**	86.7

SPECIMEN INUNDATION in distilled water for the period of 24 h or expansion rate < 0.0002 in./h

Date	Time	Pressure (psi)	Elapsed Time (min.)	Dial Readings (in.)
09/06/17	8:17	1.0	0	0.1760
09/06/17	8:27	1.0	10	0.1760
Add Distilled Water to the Specimen				
09/06/17	15:01	1.0	394	0.2240
09/07/17	6:31	1.0	1324	0.2260
09/07/17	8:00	1.0	1413	0.2260

Expansion Index (EI_{meas}) = ((Final Rdg - Initial Rdg) / Initial Thick.) x 1000	**50**

Leighton

TESTS for SULFATE CONTENT
CHLORIDE CONTENT and pH of SOILS

Project Name: Integral/Carson Tested By : G. Berdy Date: 09/04/17

Project No. : 11738.001 Data Input By: J. Ward Date: 09/11/17

Boring No.	TP-5	TP-10		
Sample No.	BB-1	BB-1		
Sample Depth (ft)	0-5	2.5-5		
Soil Identification:	Dark brown s(CL)	Dark brown (CL)s		
Wet Weight of Soil + Container (g)	200.98	208.92		
Dry Weight of Soil + Container (g)	190.24	205.99		
Weight of Container (g)	59.92	66.79		
Moisture Content (%)	8.24	2.10		
Weight of Soaked Soil (g)	100.20	100.40		

SULFATE CONTENT, DOT California Test 417, Part II

Beaker No.	60	15		
Crucible No.	24	17		
Furnace Temperature (°C)	860	860		
Time In / Time Out	8:00/8:45	8:00/8:45		
Duration of Combustion (min)	45	45		
Wt. of Crucible + Residue (g)	17.0874	22.2099		
Wt. of Crucible (g)	17.0820	22.2063		
Wt. of Residue (g) (A)	0.0054	0.0036		
PPM of Sulfate (A) x 41150	222.21	148.14		
PPM of Sulfate, Dry Weight Basis	**242**	**151**		

CHLORIDE CONTENT, DOT California Test 422

ml of Extract For Titration (B)	15	15		
ml of AgNO3 Soln. Used in Titration (C)	1.6	0.5		
PPM of Chloride (C -0.2) * 100 * 30 / B	280	60		
PPM of Chloride, Dry Wt. Basis	**305**	**61**		

pH TEST, DOT California Test 643

pH Value	**7.12**	**6.52**		
Temperature °C	20.6	20.6		

Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name: Integral/Carson

Project No. : 11738.001

Boring No.: TP-5

Sample No. : BB-1

Soil Identification:* Dark brown s(CL)

Tested By : O. Figueroa Date: 09/06/17

Data Input By: J. Ward Date: 09/11/17

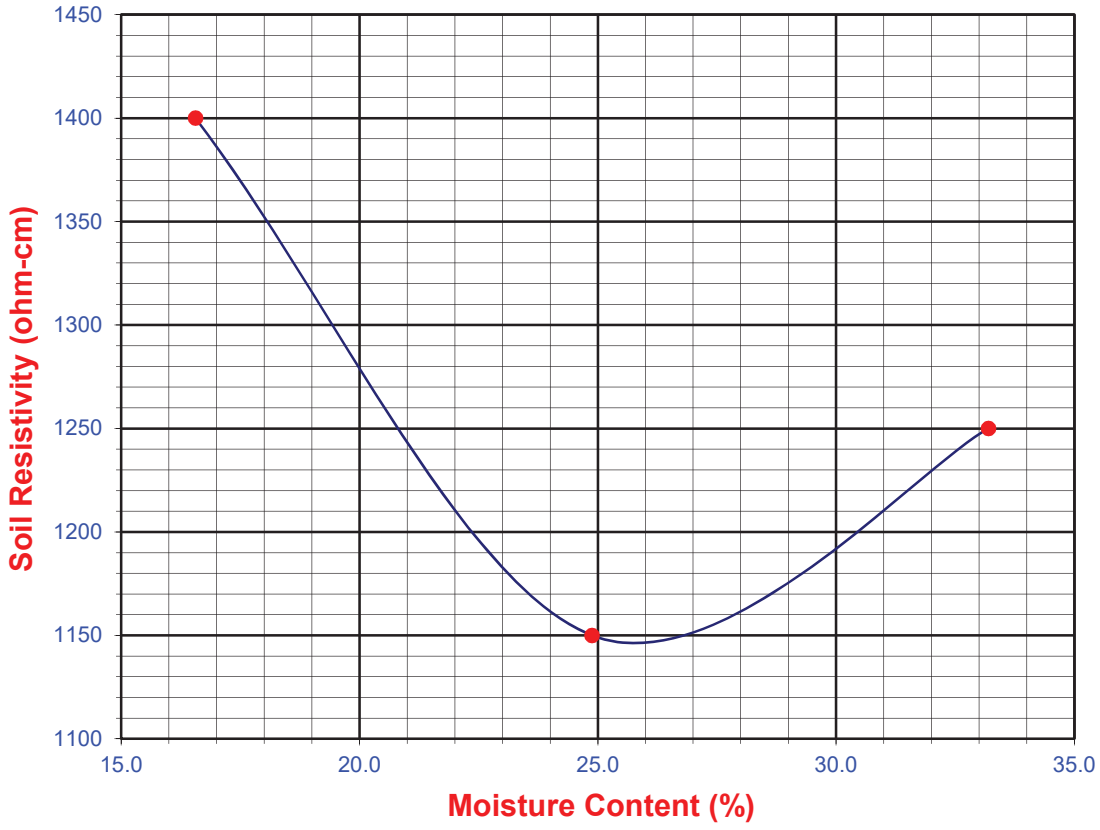
Depth (ft.) : 0-5

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	10	16.56	1400	1400
2	20	24.88	1150	1150
3	30	33.20	1250	1250
4				
5				

Moisture Content (%) (MCi)	8.24
Wet Wt. of Soil + Cont. (g)	200.98
Dry Wt. of Soil + Cont. (g)	190.24
Wt. of Container (g)	59.92
Container No.	
Initial Soil Wt. (g) (Wt)	130.12
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
1145	**25.7**	**242**	**305**	**7.12**	**20.6**



Leighton

SOIL RESISTIVITY TEST

DOT CA TEST 643

Project Name:	Integral/Carson		Tested By :	O. Figueroa	Date: 09/06/17
Project No. :	11738.001		Data Input By:	J. Ward	Date: 09/11/17
Boring No.:	TP-10		Depth (ft.) :	2.5-5	
Sample No. :	BB-1				

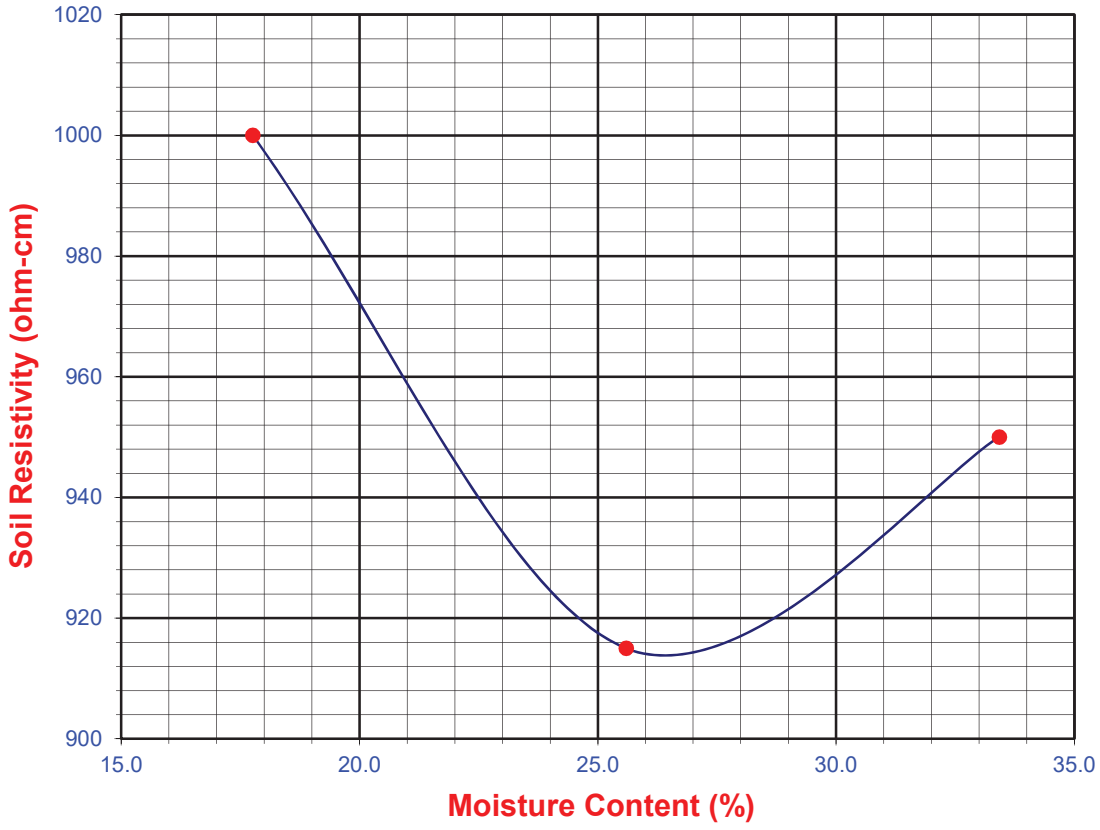
Soil Identification:* Dark brown (CL)s

*California Test 643 requires soil specimens to consist only of portions of samples passing through the No. 8 US Standard Sieve before resistivity testing. Therefore, this test method may not be representative for coarser materials.

Specimen No.	Water Added (ml) (Wa)	Adjusted Moisture Content (MC)	Resistance Reading (ohm)	Soil Resistivity (ohm-cm)
1	20	17.77	1000	1000
2	30	25.60	915	915
3	40	33.43	950	950
4				
5				

Moisture Content (%) (MCi)	2.10
Wet Wt. of Soil + Cont. (g)	208.92
Dry Wt. of Soil + Cont. (g)	205.99
Wt. of Container (g)	66.79
Container No.	
Initial Soil Wt. (g) (Wt)	130.40
Box Constant	1.000
MC =(((1+Mci/100)x(Wa/Wt+1))-1)x100	

Min. Resistivity (ohm-cm)	Moisture Content (%)	Sulfate Content (ppm)	Chloride Content (ppm)	Soil pH	
				pH	Temp. (°C)
DOT CA Test 643		DOT CA Test 417 Part II	DOT CA Test 422	DOT CA Test 643	
914	**26.4**	**151**	**61**	**6.52**	**20.6**



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PARTICLE-SIZE ANALYSIS OF SOILS

ASTM D 422

Project Name: Integral/Carson | Tested By: G. Berdy | Date: 09/11/17

Project No.: 11738.001 | Data Input By: J. Ward | Date: 09/15/17

Boring No.: TP-1A

Sample No.: BB1 | Depth (feet): 3.5-4.5

Soil Identification: Yellowish brown lean clay with sand (CL)s

% Gravel	**0**	**Soil Type**
% Sand	**23**	**(CL)s**
% Fines	**77**	

			Moisture Content of Total Air-Dry Soil	Moisture Content of Air-Dry Soil Passing #10	After Hydrometer & Wet Sieve ret. in #200 Sieve
Specific Gravity (Assumed)	2.70	Wt.of Air-Dry Soil + Cont.(g)	0.00	75.26	
Correction for Specific Gravity	0.99	Dry Wt. of Soil + Cont. (g)	0.00	75.22	86.48
Wt.of Air-Dry Soil + Cont. (g)	1965.40	Wt. of Container No.___ (g)	1.00	56.74	74.95
Wt. of Container	760.90	Moisture Content (%)	0.00	0.22	
Dry Wt. of Soil (g)	1204.50	Wt. of Dry Soil (g)			11.53

Coarse Sieve

U.S. Sieve	Cumulative Wt. Of Dry Soil Retained (g)	% Passing
3"	0.00	100.0
1½"	0.00	100.0
3/4"	0.00	100.0
3/8"	0.00	100.0
No. 4	4.91	99.6
No. 10	13.32	98.9
Pan		

Sieve after Hydrometer & Wet Sieve

U.S. Sieve Size	Cumulative Wt. Of Dry Soil Retained (g)	% Passing	% Total Sample
No. 10	0.00	100.0	98.9
No. 16	0.48	99.1	98.0
No. 30	1.25	97.6	96.5
No. 50	2.57	95.0	93.9
No. 100	6.12	88.0	87.0
No. 200	11.14	78.2	77.3
Pan			

Hydrometer Wt. of Air-Dry Soil (g): 51.14 Wt. of Dry Soil (g): 51.03

Deflocculant 125 cc of 4% Solution

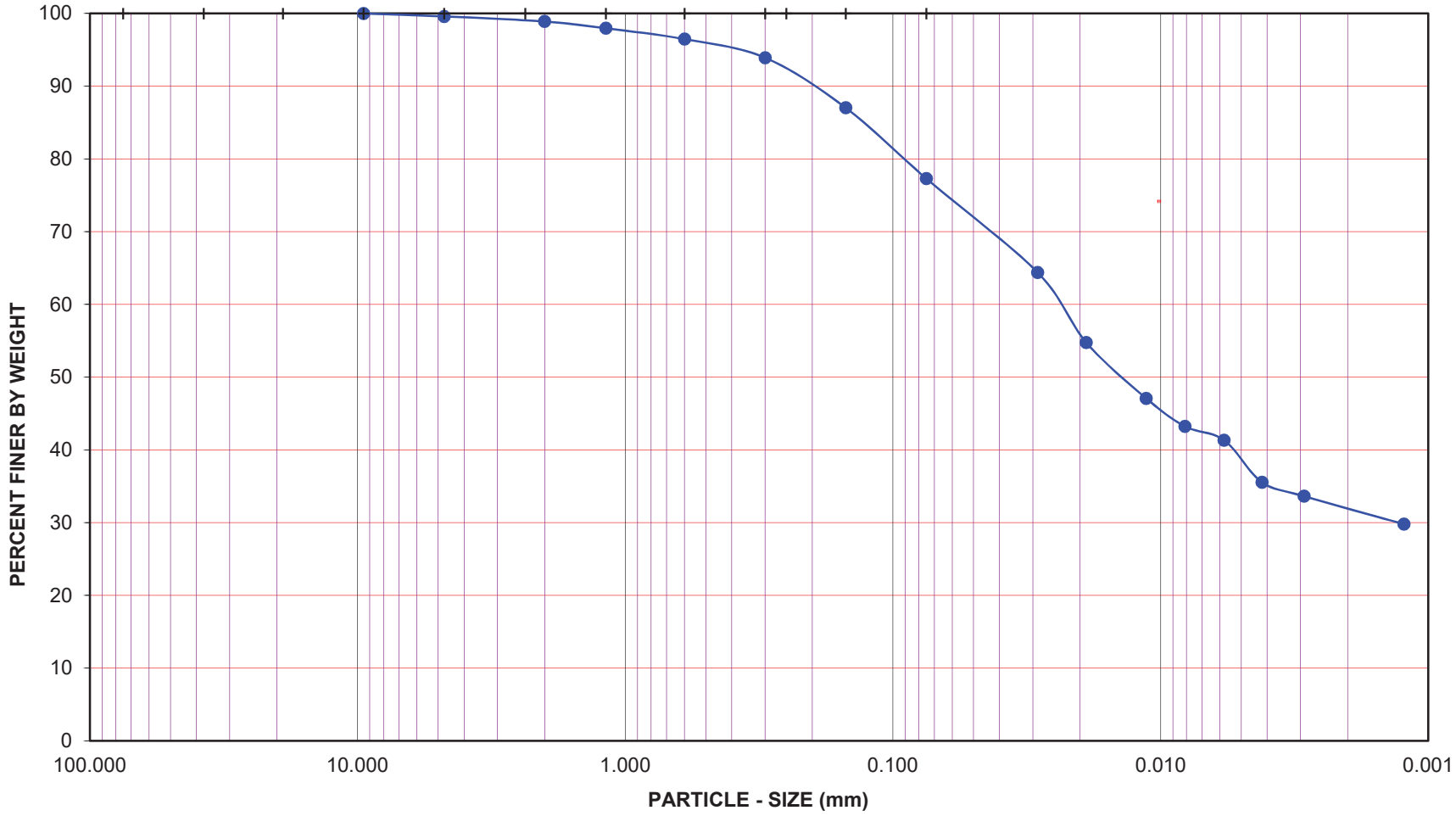
Date	Time	Elapsed Time (min)	Water Temperature (°C)	Composite Correction 152H	Actual Hydrometer Readings	% Total Sample (%)	Soil Particle Diameter (mm)
12-Sep-17	8:06	0		8.5			
	8:08	2	21.8	8.5	42.0	64.4	0.0288
	8:11	5	21.8	8.5	37.0	54.8	0.0190
	8:21	15	21.8	8.5	33.0	47.1	0.0113
	8:36	30	21.7	8.5	31.0	43.3	0.0081
	9:06	60	21.6	8.5	30.0	41.3	0.0058
	10:06	120	21.6	8.5	27.0	35.6	0.0042
	12:16	250	21.8	8.5	26.0	33.6	0.0029
13-Sep-17	8:06	1440	21.3	8.5	24.0	29.8	0.0012

GRAVEL		SAND			FINES	
COARSE	FINE	CRSE	MEDIUM	FINE	SILT	CLAY

U.S. STANDARD SIEVE OPENING: 3.0" 1 1/2" 3/4" 3/8"

U.S. STANDARD SIEVE NUMBER: #4 #8 #16 #30 #50 #100 #200

HYDROMETER



Project Name: Integral/Carson

Project No.: 11738.001

Boring No.: TP-1A Sample No.: BB1

Depth (feet): 3.5-4.5 Soil Type : (CL)s

Soil Identification: Yellowish brown lean clay with sand (CL)s

GR:SA:FI : (%) 0 : 23 : 77

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PARTICLE - SIZE DISTRIBUTION ASTM D 422

Sep-17

APPENDIX C

PERCOLATION TEST RESULTS

Leighton

Excavation Percolation Test Data Sheet

Project Number:	11738.001	**Test Hole Number:**	TP-1A
Project Name:	Integral Carson	**Date Excavated:**	9/1/2017
Earth Description:	Alluvium	**Date Tested:**	9/7/2017
Liquid Description:	Tap water	**Depth of test hole (in):**	12
Tested By:	JMP	**Length of test hole (in):**	12
Time Interval Standard		**Width of test hole (in):**	12
Standard Time Interval Between Readings, mins:	30	**Equivalent Boring Diameter, DIA (in):**	13.5

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (in.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Percolation Rate (in./hr.)
1	7:42	30	0.00	12.00	1.63	3.25
	8:12		1.63	10.38		
2	8:12	30	0.00	12.00	1.13	2.25
	8:42		1.13	10.88		
3	8:42	30	0.00	12.00	0.75	1.50
	9:12		0.75	11.25		
4	9:12	30	0.00	12.00	0.75	1.50
	9:42		0.75	11.25		
5	9:42	30	0.00	12.00	0.63	1.25
	10:12		0.63	11.38		
6	10:12	30	0.00	12.00	0.63	1.25
	10:42		0.63	11.38		
7	10:42	30	0.00	12.00	0.50	1.00
	11:12		0.50	11.50		
8	11:12	30	0.00	12.00	0.56	1.13
	11:42		0.56	11.44		

Preadjusted Percolation Rate = Average drop of the stabilized rate over last 3 readings

Reduction Factor (R_f) = $[(2H_o-\Delta d)/DIA]+1$

Infiltration Rate (I) = Preadjusted Percolation Rate / Reduction Factor

Reduction Factor, R_f = 2.73

Infiltration Rate, I = 0.41 in./hr.

Excavation Percolation Test Data Sheet

Project Number:	11738.001	**Test Hole Number:**	TP-12A
Project Name:	Integral Carson	**Date Excavated:**	9/1/2017
Earth Description:	Alluvium	**Date Tested:**	9/7/2017
Liquid Description:	Tap water	**Depth of test hole (in):**	12
Tested By:	JMP	**Length of test hole (in):**	12
Time Interval Standard		**Width of test hole (in):**	12
Standard Time Interval Between Readings, mins:	30	**Equivalent Boring Diameter, DIA (in):**	13.5

Percolation Data

Reading	Time	Time Interval, Δt (min.)	Initial/Final Depth to Water (in.)	Initial/Final Water Height, H_0/H_f (in.)	Total Water Drop, Δd (in.)	Percolation Rate (in./hr.)
1	6:51	30	0.00	12.00	1.75	3.50
	7:21		1.75	10.25		
2	7:21	30	0.00	12.00	1.13	2.25
	7:51		1.13	10.88		
3	7:51	30	0.00	12.00	0.75	1.50
	8:21		0.75	11.25		
4	8:21	30	0.00	12.00	0.25	0.50
	8:51		0.25	11.75		
5	8:51	30	0.00	12.00	0.38	0.75
	9:21		0.38	11.63		
6	9:21	30	0.00	12.00	0.25	0.50
	9:51		0.25	11.75		
7	9:51	30	0.00	12.00	0.25	0.50
	10:21		0.25	11.75		
8	10:21	30	0.00	12.00	0.25	0.50
	10:51		0.25	11.75		

Preadjusted Percolation Rate = Average drop of the stabilized rate over last 3 readings

Reduction Factor (R_f) = $[(2H_o-\Delta d)/DIA]+1$

Infiltration Rate (I) = Preadjusted Percolation Rate / Reduction Factor

Reduction Factor, R_f = 2.75

Infiltration Rate, I = 0.18 in./hr.

APPENDIX D

SEISMICITY DATA

Leighton

Design Maps Detailed Report

ASCE 7-10 Standard (33.8685°N, 118.24741°W)

Site Class D – "Stiff Soil", Risk Category I/II/III

Section 11.4.1 — Mapped Acceleration Parameters

Note: Ground motion values provided below are for the direction of maximum horizontal spectral response acceleration. They have been converted from corresponding geometric mean ground motions computed by the USGS by applying factors of 1.1 (to obtain S_S) and 1.3 (to obtain S_1). Maps in the 2010 ASCE-7 Standard are provided for Site Class B. Adjustments for other Site Classes are made, as needed, in Section 11.4.3.

From Figure 22-1 [1]	S_S = 1.660 g
From Figure 22-2 [2]	S_1 = 0.615 g

Section 11.4.2 — Site Class

The authority having jurisdiction (not the USGS), site-specific geotechnical data, and/or the default has classified the site as Site Class D, based on the site soil properties in accordance with Chapter 20.

Table 20.3–1 Site Classification

Site Class	$\overline{v}_s$	$\overline{N}$ or $\overline{N}_{ch}$	$\overline{s}_u$
A. Hard Rock	>5,000 ft/s	N/A	N/A
B. Rock	2,500 to 5,000 ft/s	N/A	N/A
C. Very dense soil and soft rock	1,200 to 2,500 ft/s	>50	>2,000 psf
D. Stiff Soil	600 to 1,200 ft/s	15 to 50	1,000 to 2,000 psf
E. Soft clay soil	<600 ft/s	<15	<1,000 psf
	Any profile with more than 10 ft of soil having the characteristics: • Plasticity index *PI* > 20, • Moisture content *w* ≥ 40%, and • Undrained shear strength $\overline{s}_u$ < 500 psf		
F. Soils requiring site response analysis in accordance with Section 21.1	See Section 20.3.1		

For SI: 1ft/s = 0.3048 m/s 1lb/ft² = 0.0479 kN/m²

Section 11.4.3 — Site Coefficients and Risk–Targeted Maximum Considered Earthquake (MCE_R) Spectral Response Acceleration Parameters

Table 11.4–1: Site Coefficient F_a

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at Short Period				
	$S_S \le 0.25$	$S_S = 0.50$	$S_S = 0.75$	$S_S = 1.00$	$S_S \ge 1.25$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_S

For Site Class = D and S_s = 1.660 g, F_a = 1.000

Table 11.4–2: Site Coefficient F_v

Site Class	Mapped MCE_R Spectral Response Acceleration Parameter at 1–s Period				
	$S_1 \le 0.10$	$S_1 = 0.20$	$S_1 = 0.30$	$S_1 = 0.40$	$S_1 \ge 0.50$
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.7	1.6	1.5	1.4	1.3
D	2.4	2.0	1.8	1.6	1.5
E	3.5	3.2	2.8	2.4	2.4
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of S_1

For Site Class = D and S_1 = 0.615 g, F_v = 1.500

Equation (11.4–1): $S_{MS} = F_a S_S = 1.000 \times 1.660 = 1.660$ g

Equation (11.4–2): $S_{M1} = F_v S_1 = 1.500 \times 0.615 = 0.922$ g

Section 11.4.4 — Design Spectral Acceleration Parameters

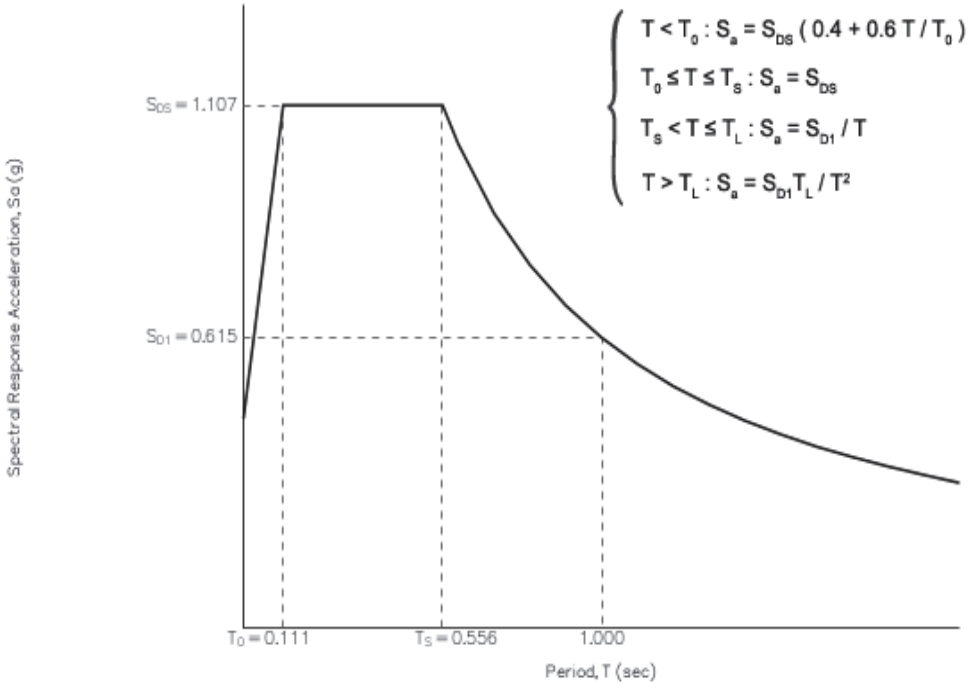
Equation (11.4–3): $S_{DS} = ⅔ S_{MS} = ⅔ \times 1.660 = 1.107$ g

Equation (11.4–4): $S_{D1} = ⅔ S_{M1} = ⅔ \times 0.922 = 0.615$ g

Section 11.4.5 — Design Response Spectrum

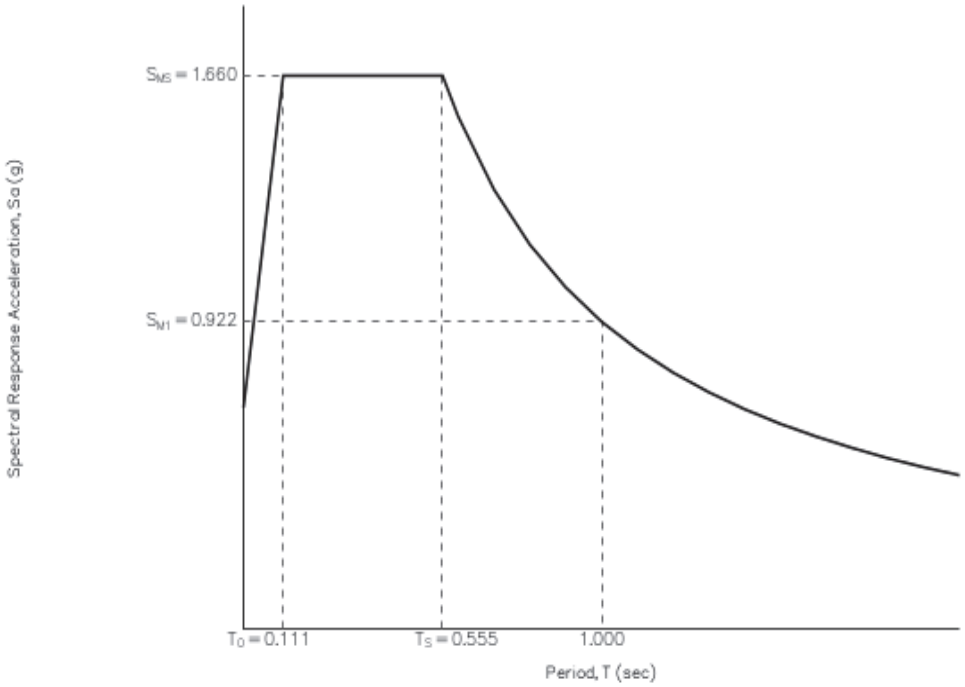
From Figure 22-12 [3] $T_L = 8$ seconds

Figure 11.4–1: Design Response Spectrum



Section 11.4.6 — Risk-Targeted Maximum Considered Earthquake (MCE_R) Response Spectrum

The MCE_R Response Spectrum is determined by multiplying the design response spectrum above by 1.5.



Section 11.8.3 — Additional Geotechnical Investigation Report Requirements for Seismic Design Categories D through F

From Figure 22-7 [4] PGA = 0.624

Equation (11.8–1): $PGA_M = F_{PGA}PGA = 1.000 \times 0.624 = 0.624$ g

Table 11.8–1: Site Coefficient F_{PGA}

Site Class	Mapped MCE Geometric Mean Peak Ground Acceleration, PGA				
	PGA ≤ 0.10	PGA = 0.20	PGA = 0.30	PGA = 0.40	PGA ≥ 0.50
A	0.8	0.8	0.8	0.8	0.8
B	1.0	1.0	1.0	1.0	1.0
C	1.2	1.2	1.1	1.0	1.0
D	1.6	1.4	1.2	1.1	1.0
E	2.5	1.7	1.2	0.9	0.9
F	See Section 11.4.7 of ASCE 7				

Note: Use straight–line interpolation for intermediate values of PGA

For Site Class = D and PGA = 0.624 g, F_{PGA} = 1.000

Section 21.2.1.1 — Method 1 (from Chapter 21 – Site-Specific Ground Motion Procedures for Seismic Design)

From Figure 22-17 [5] C_{RS} = 0.974

From Figure 22-18 [6] C_{R1} = 0.988

Section 11.6 — Seismic Design Category

Table 11.6-1 Seismic Design Category Based on Short Period Response Acceleration Parameter

VALUE OF S_{DS}	RISK CATEGORY		
	I or II	III	IV
$S_{DS} < 0.167g$	A	A	A
$0.167g \le S_{DS} < 0.33g$	B	B	C
$0.33g \le S_{DS} < 0.50g$	C	C	D
$0.50g \le S_{DS}$	D	D	D

For Risk Category = I and S_{DS} = 1.107 g, Seismic Design Category = D

Table 11.6-2 Seismic Design Category Based on 1-S Period Response Acceleration Parameter

VALUE OF S_{D1}	RISK CATEGORY		
	I or II	III	IV
$S_{D1} < 0.067g$	A	A	A
$0.067g \le S_{D1} < 0.133g$	B	B	C
$0.133g \le S_{D1} < 0.20g$	C	C	D
$0.20g \le S_{D1}$	D	D	D

For Risk Category = I and S_{D1} = 0.615 g, Seismic Design Category = D

Note: When S_1 is greater than or equal to 0.75g, the Seismic Design Category is **E** for buildings in Risk Categories I, II, and III, and **F** for those in Risk Category IV, irrespective of the above.

Seismic Design Category ≡ "the more severe design category in accordance with Table 11.6-1 or 11.6-2" = D

Note: See Section 11.6 for alternative approaches to calculating Seismic Design Category.

References

1. *Figure 22-1*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-1.pdf
2. *Figure 22-2*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-2.pdf
3. *Figure 22-12*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-12.pdf
4. *Figure 22-7*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-7.pdf
5. *Figure 22-17*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-17.pdf
6. *Figure 22-18*: https://earthquake.usgs.gov/hazards/designmaps/downloads/pdfs/2010_ASCE-7_Figure_22-18.pdf

APPENDIX E

GENERAL EARTHWORK AND GRADING RECOMMENDATIONS

Leighton

APPENDIX E
LEIGHTON AND ASSOCIATES, INC.
GENERAL EARTHWORK AND GRADING SPECIFICATIONS FOR ROUGH GRADING

TABLE OF CONTENTS

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Standard Details

1.0 GENERAL

1.1 Intent

These General Earthwork and Grading Specifications are for the grading and earthwork shown on the approved grading plan(s) and/or indicated in the geotechnical report(s). These Specifications are a part of the recommendations contained in the geotechnical report(s). In case of conflict, the specific recommendations in the geotechnical report shall supersede these more general Specifications. Observations of the earthwork by the project Geotechnical Consultant during the course of grading may result in new or revised recommendations that could supersede these specifications or the recommendations in the geotechnical report(s).

1.2 The Geotechnical Consultant of Record

Prior to commencement of work, the owner shall employ the Geotechnical Consultant of Record (Geotechnical Consultant). The Geotechnical Consultants shall be responsible for reviewing the approved geotechnical report(s) and accepting the adequacy of the preliminary geotechnical findings, conclusions, and recommendations prior to the commencement of the grading.

Prior to commencement of grading, the Geotechnical Consultant shall review the "work plan" prepared by the Earthwork Contractor (Contractor) and schedule sufficient personnel to perform the appropriate level of observation, mapping, and compaction testing.

During the grading and earthwork operations, the Geotechnical Consultant shall observe, map, and document the subsurface exposures to verify the geotechnical design assumptions. If the observed conditions are found to be significantly different than the interpreted assumptions during the design phase, the Geotechnical Consultant shall inform the owner, recommend appropriate changes in design to accommodate the observed conditions, and notify the review agency where required. Subsurface areas to be geotechnically observed, mapped, elevations recorded, and/or tested include natural ground after it has been cleared for receiving fill but before fill is placed, bottoms of all "remedial removal" areas, all key bottoms, and benches made on sloping ground to receive fill.

The Geotechnical Consultant shall observe the moisture-conditioning and processing of the subgrade and fill materials and perform relative compaction testing of fill to determine the attained level of compaction.

The Geotechnical Consultant shall provide the test results to the owner and the Contractor on a routine and frequent basis.

1.3 The Earthwork Contractor

The Earthwork Contractor (Contractor) shall be qualified, experienced, and knowledgeable in earthwork logistics, preparation and processing of ground to receive fill, moisture-conditioning and processing of fill, and compacting fill. The Contractor shall review and accept the plans, geotechnical report(s), and these Specifications prior to commencement of grading. The Contractor shall be solely responsible for performing the grading in accordance with the plans and specifications.

The Contractor shall prepare and submit to the owner and the Geotechnical Consultant a work plan that indicates the sequence of earthwork grading, the number of "spreads" of work and the estimated quantities of daily earthwork contemplated for the site prior to commencement of grading. The Contractor shall inform the owner and the Geotechnical Consultant of changes in work schedules and updates to the work plan at least 24 hours in advance of such changes so that appropriate observations and tests can be planned and accomplished. The Contractor shall not assume that the Geotechnical Consultant is aware of all grading operations.

The Contractor shall have the sole responsibility to provide adequate equipment and methods to accomplish the earthwork in accordance with the applicable grading codes and agency ordinances, these Specifications, and the recommendations in the approved geotechnical report(s) and grading plan(s). If, in the opinion of the Geotechnical Consultant, unsatisfactory conditions, such as unsuitable soil, improper moisture condition, inadequate compaction, insufficient buttress key size, adverse weather, etc., are resulting in a quality of work less than required in these specifications, the Geotechnical Consultant shall reject the work and may recommend to the owner that construction be stopped until the conditions are rectified.

2.0 PREPARATION OF AREAS TO BE FILLED

2.1 Clearing and Grubbing

Vegetation, such as brush, grass, roots, and other deleterious material shall be sufficiently removed and properly disposed of in a method acceptable to the owner, governing agencies, and the Geotechnical Consultant.

The Geotechnical Consultant shall evaluate the extent of these removals depending on specific site conditions. Earth fill material shall not contain more than 1 percent of organic materials (by volume). No fill lift shall contain more than 5 percent of organic matter. Nesting of the organic materials shall not be allowed.

If potentially hazardous materials are encountered, the Contractor shall stop work in the affected area, and a hazardous material specialist shall be informed immediately for proper evaluation and handling of these materials prior to continuing to work in that area.

As presently defined by the State of California, most refined petroleum products (gasoline, diesel fuel, motor oil, grease, coolant, etc.) have chemical constituents that are considered to be hazardous waste. As such, the indiscriminate dumping or spillage of these fluids onto the ground may constitute a misdemeanor, punishable by fines and/or imprisonment, and shall not be allowed.

2.2 Processing

Existing ground that has been declared satisfactory for support of fill by the Geotechnical Consultant shall be scarified to a minimum depth of 6 inches. Existing ground that is not satisfactory shall be overexcavated as specified in the following section. Scarification shall continue until soils are broken down and free of large clay lumps or clods and the working surface is reasonably uniform, flat, and free of uneven features that would inhibit uniform compaction.

2.3 Overexcavation

In addition to removals and overexcavations recommended in the approved geotechnical report(s) and the grading plan, soft, loose, dry, saturated, spongy, organic-rich, highly fractured or otherwise unsuitable ground shall be overexcavated to competent ground as evaluated by the Geotechnical Consultant during grading.

2.4 Benching

Where fills are to be placed on ground with slopes steeper than 5:1 (horizontal to vertical units), the ground shall be stepped or benched. Please see the Standard Details for a graphic illustration. The lowest bench or key shall be a minimum of 15 feet wide and at least 2 feet deep, into competent material as evaluated by the Geotechnical Consultant. Other benches shall be excavated a minimum height of 4 feet into competent material or as otherwise recommended by the Geotechnical

Consultant. Fill placed on ground sloping flatter than 5:1 shall also be benched or otherwise overexcavated to provide a flat subgrade for the fill.

2.5 Evaluation/Acceptance of Fill Areas

All areas to receive fill, including removal and processed areas, key bottoms, and benches, shall be observed, mapped, elevations recorded, and/or tested prior to being accepted by the Geotechnical Consultant as suitable to receive fill. The Contractor shall obtain a written acceptance from the Geotechnical Consultant prior to fill placement. A licensed surveyor shall provide the survey control for determining elevations of processed areas, keys, and benches.

3.0 FILL MATERIAL

3.1 General

Material to be used as fill shall be essentially free of organic matter and other deleterious substances evaluated and accepted by the Geotechnical Consultant prior to placement. Soils of poor quality, such as those with unacceptable gradation, high expansion potential, or low strength shall be placed in areas acceptable to the Geotechnical Consultant or mixed with other soils to achieve satisfactory fill material.

3.2 Oversize

Oversize material defined as rock, or other irreducible material with a maximum dimension greater than 8 inches, shall not be buried or placed in fill unless location, materials, and placement methods are specifically accepted by the Geotechnical Consultant. Placement operations shall be such that nesting of oversized material does not occur and such that oversize material is completely surrounded by compacted or densified fill. Oversize material shall not be placed within 10 vertical feet of finish grade or within 2 feet of future utilities or underground construction.

3.3 Import

If importing of fill material is required for grading, proposed import material shall meet the requirements of Section 3.1. The potential import source shall be given to the Geotechnical Consultant at least 48 hours (2 working days) before importing begins so that its suitability can be determined and appropriate tests performed.

4.0 FILL PLACEMENT AND COMPACTION

4.1 Fill Layers

Approved fill material shall be placed in areas prepared to receive fill (per Section 3.0) in near-horizontal layers not exceeding 8 inches in loose thickness. The Geotechnical Consultant may accept thicker layers if testing indicates the grading procedures can adequately compact the thicker layers. Each layer shall be spread evenly and mixed thoroughly to attain relative uniformity of material and moisture throughout.

4.2 Fill Moisture Conditioning

Fill soils shall be watered, dried back, blended, and/or mixed, as necessary to attain a relatively uniform moisture content at or slightly over optimum. Maximum density and optimum soil moisture content tests shall be performed in accordance with the American Society of Testing and Materials (ASTM Test Method D1557).

4.3 Compaction of Fill

After each layer has been moisture-conditioned, mixed, and evenly spread, it shall be uniformly compacted to not less than 90 percent of maximum dry density (ASTM Test Method D1557). Compaction equipment shall be adequately sized and be either specifically designed for soil compaction or of proven reliability to efficiently achieve the specified level of compaction with uniformity.

4.4 Compaction of Fill Slopes

In addition to normal compaction procedures specified above, compaction of slopes shall be accomplished by backrolling of slopes with sheepsfoot rollers at increments of 3 to 4 feet in fill elevation, or by other methods producing satisfactory results acceptable to the Geotechnical Consultant. Upon completion of grading, relative compaction of the fill, out to the slope face, shall be at least 90 percent of maximum density per ASTM Test Method D1557.

4.5 Compaction Testing

Field-tests for moisture content and relative compaction of the fill soils shall be performed by the Geotechnical Consultant. Location and frequency of tests shall be at the Consultant's discretion based on field conditions encountered. Compaction test locations will not necessarily be selected on a random basis. Test locations shall be selected to verify

adequacy of compaction levels in areas that are judged to be prone to inadequate compaction (such as close to slope faces and at the fill/bedrock benches).

4.6 Frequency of Compaction Testing

Tests shall be taken at intervals not exceeding 2 feet in vertical rise and/or 1,000 cubic yards of compacted fill soils embankment. In addition, as a guideline, at least one test shall be taken on slope faces for each 5,000 square feet of slope face and/or each 10 feet of vertical height of slope. The Contractor shall assure that fill construction is such that the testing schedule can be accomplished by the Geotechnical Consultant. The Contractor shall stop or slow down the earthwork construction if these minimum standards are not met.

4.7 Compaction Test Locations

The Geotechnical Consultant shall document the approximate elevation and horizontal coordinates of each test location. The Contractor shall coordinate with the project surveyor to assure that sufficient grade stakes are established so that the Geotechnical Consultant can determine the test locations with sufficient accuracy. At a minimum, two grade stakes within a horizontal distance of 100 feet and vertically less than 5 feet apart from potential test locations shall be provided.

5.0 SUBDRAIN INSTALLATION

Subdrain systems shall be installed in accordance with the approved geotechnical report(s), the grading plan, and the Standard Details. The Geotechnical Consultant may recommend additional subdrains and/or changes in subdrain extent, location, grade, or material depending on conditions encountered during grading. All subdrains shall be surveyed by a land surveyor/civil engineer for line and grade after installation and prior to burial. Sufficient time should be allowed by the Contractor for these surveys.

6.0 EXCAVATION

Excavations, as well as over-excavation for remedial purposes, shall be evaluated by the Geotechnical Consultant during grading. Remedial removal depths shown on geotechnical plans are estimates only. The actual extent of removal shall be determined by the Geotechnical Consultant based on the field evaluation of exposed conditions during grading. Where fill-over-cut slopes are to be graded, the cut portion of the slope shall be made, evaluated, and accepted by the Geotechnical Consultant prior to placement of materials for construction of

the fill portion of the slope, unless otherwise recommended by the Geotechnical Consultant.

7.0 TRENCH BACKFILLS

7.1 Safety

The Contractor shall follow all OSHA and Cal/OSHA requirements for safety of trench excavations.

7.2 Bedding and Backfill

All bedding and backfill of utility trenches shall be performed in accordance with the applicable provisions of Standard Specifications of Public Works Construction. Bedding material shall have a Sand Equivalent greater than 30 (SE>30). The bedding shall be placed to 1 foot over the top of the conduit and densified by jetting. Backfill shall be placed and densified to a minimum of 90 percent of relative compaction from 1 foot above the top of the conduit to the surface.

The Geotechnical Consultant shall test the trench backfill for relative compaction. At least one test should be made for every 300 feet of trench and 2 feet of fill.

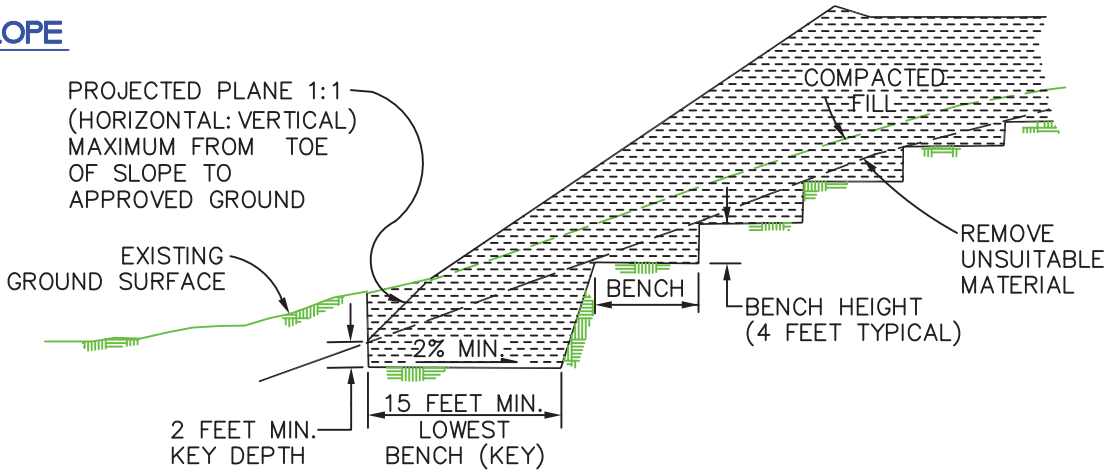
7.3 Lift Thickness

Lift thickness of trench backfill shall not exceed those allowed in the Standard Specifications of Public Works Construction unless the Contractor can demonstrate to the Geotechnical Consultant that the fill lift can be compacted to the minimum relative compaction by his alternative equipment and method.

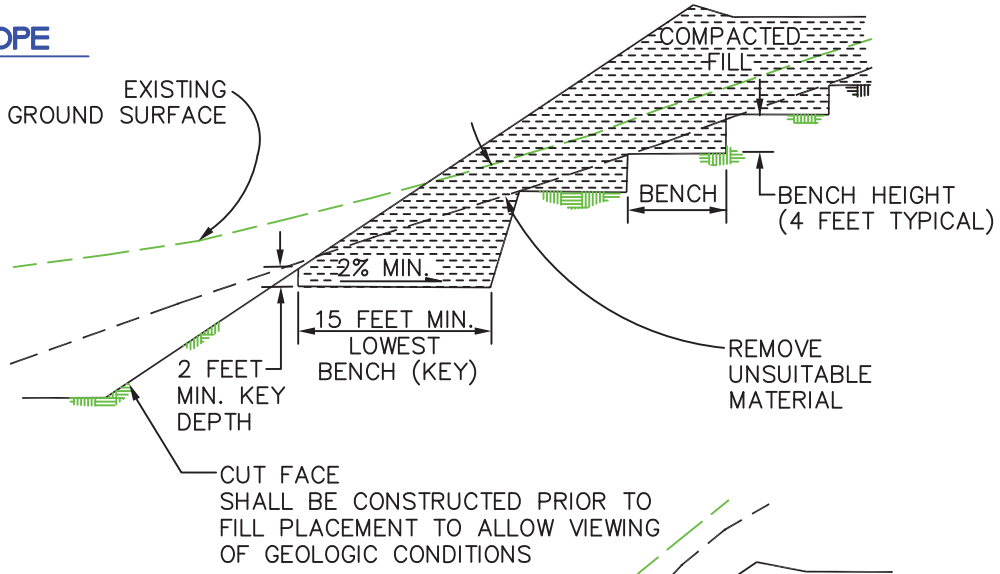
7.4 Observation and Testing

The jetting of the bedding around the conduits shall be observed by the Geotechnical Consultant.

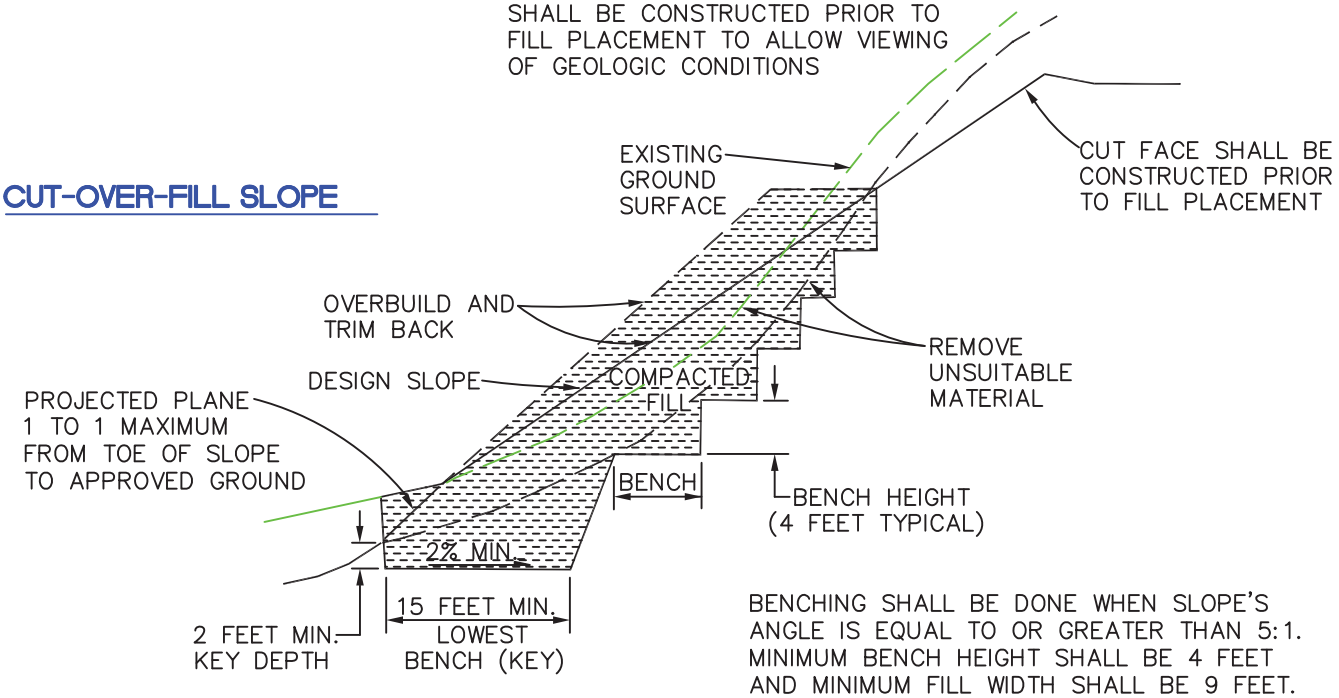
FILL SLOPE



FILL-OVER-CUT SLOPE

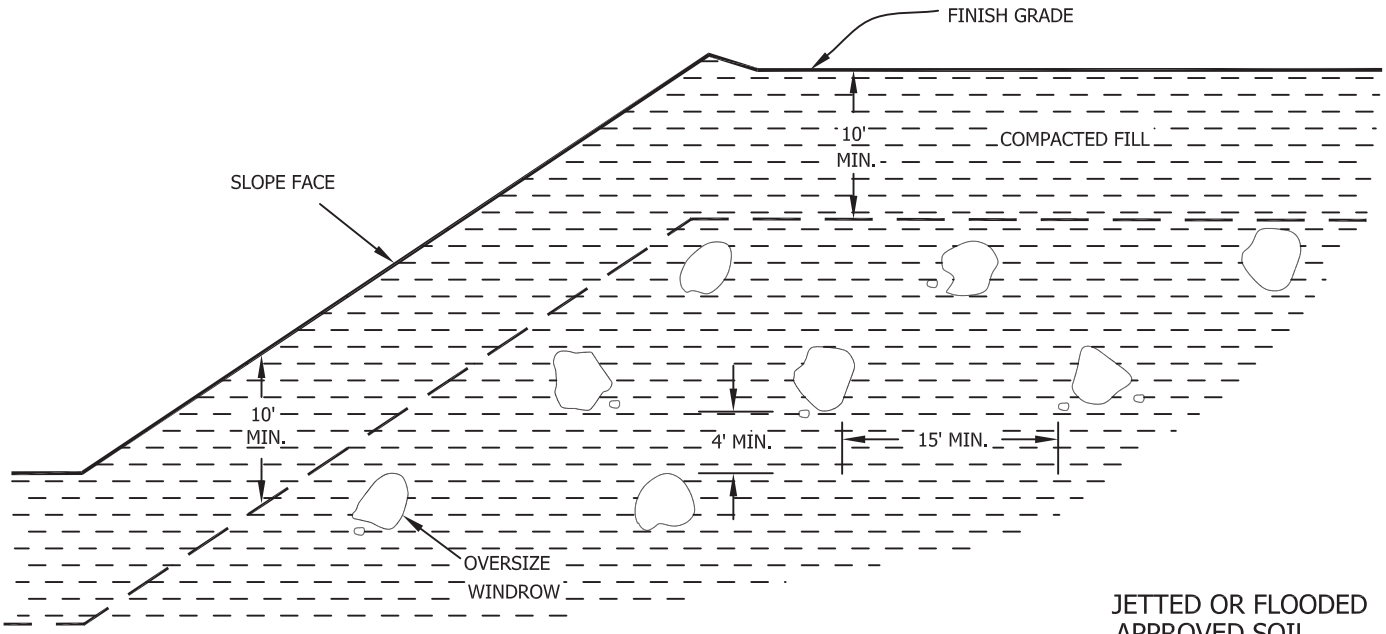


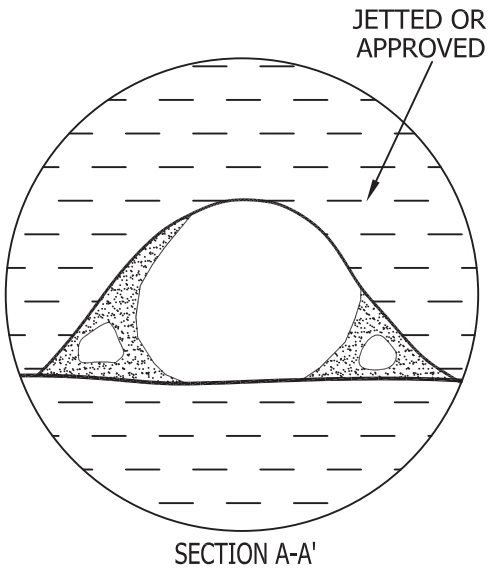
CUT-OVER-FILL SLOPE



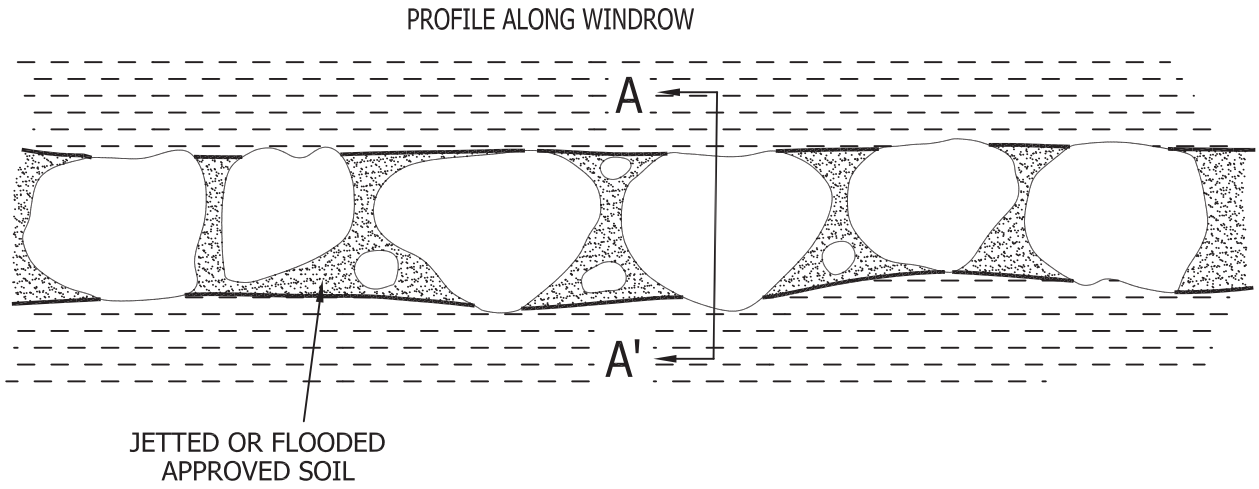
BENCHING SHALL BE DONE WHEN SLOPE'S ANGLE IS EQUAL TO OR GREATER THAN 5:1. MINIMUM BENCH HEIGHT SHALL BE 4 FEET AND MINIMUM FILL WIDTH SHALL BE 9 FEET.

KEYING AND BENCHING	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS A	Leighton





- Oversize rock is larger than 8 inches in largest dimension.
- Backfill with approved soil jetted or flooded in place to fill all the voids.
- Do not bury rock within 10 feet of finish grade.
- Windrow of buried rock shall be parallel to the finished slope face.



OVERSIZE ROCK DISPOSAL

GENERAL EARTHWORK AND GRADING
SPECIFICATIONS
STANDARD DETAILS B

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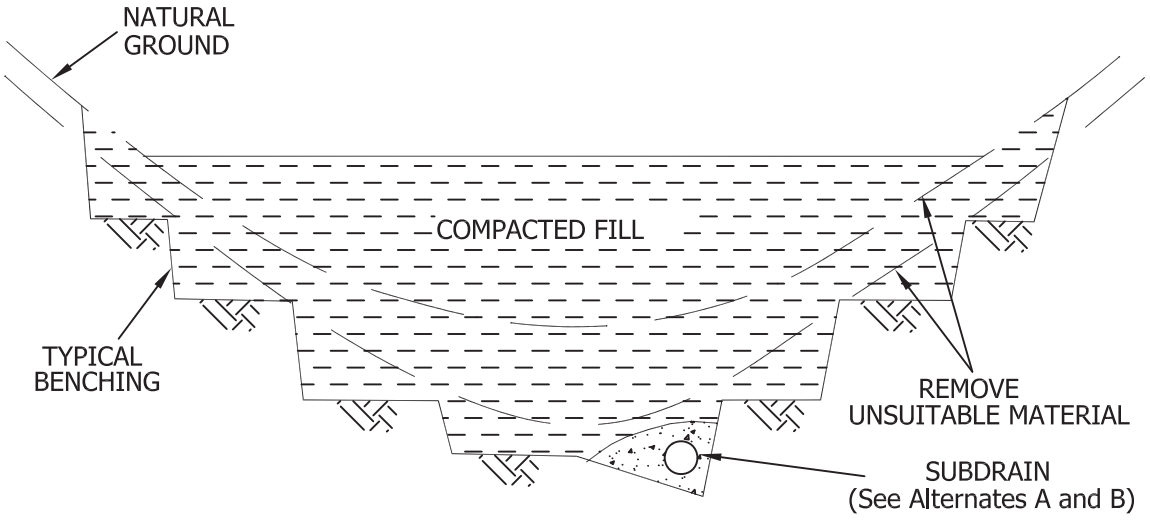
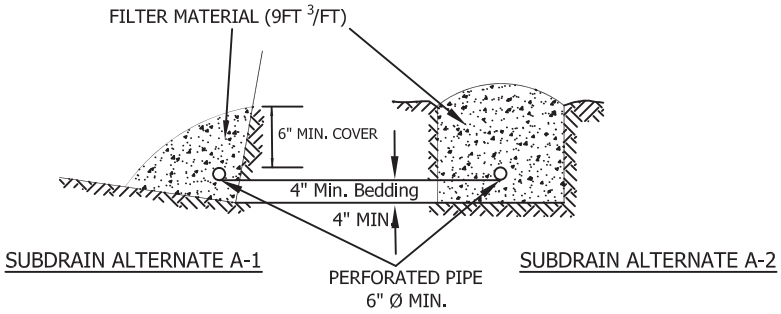
P:Drafting\templates\details\over-rock-disp.dwg (7/00)



SUBDRAIN ALTERNATE A

PERFORATED PIPE SURROUNDED
WITH FILTER MATERIAL

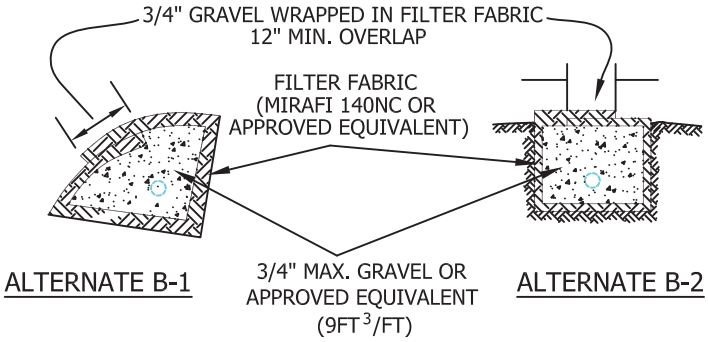


FILTER MATERIAL

FILTER MATERIAL SHALL BE CLASS 2 PERMEABLE MATERIAL PER STATE OF CALIFORNIA STANDARD SPECIFICATION, OR APPROVED ALTERNATE. CLASS 2 GRADING AS FOLLOWS:

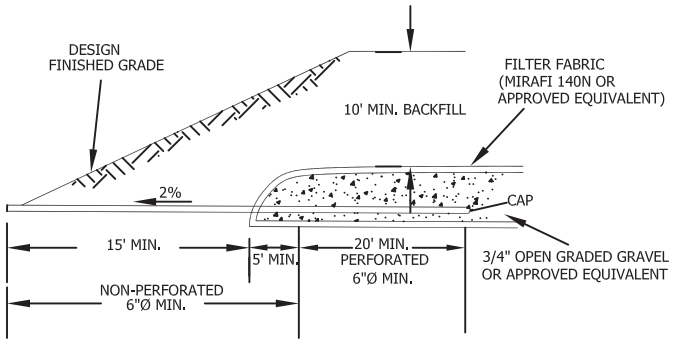
Sieve Size	Percent Passing
1"	100
3/4"	90-100
3/8"	40-100
No. 4	25-40
No. 8	18-33
No. 30	5-15
No. 50	0-7
No. 200	0-3

SUBDRAIN ALTERNATE B



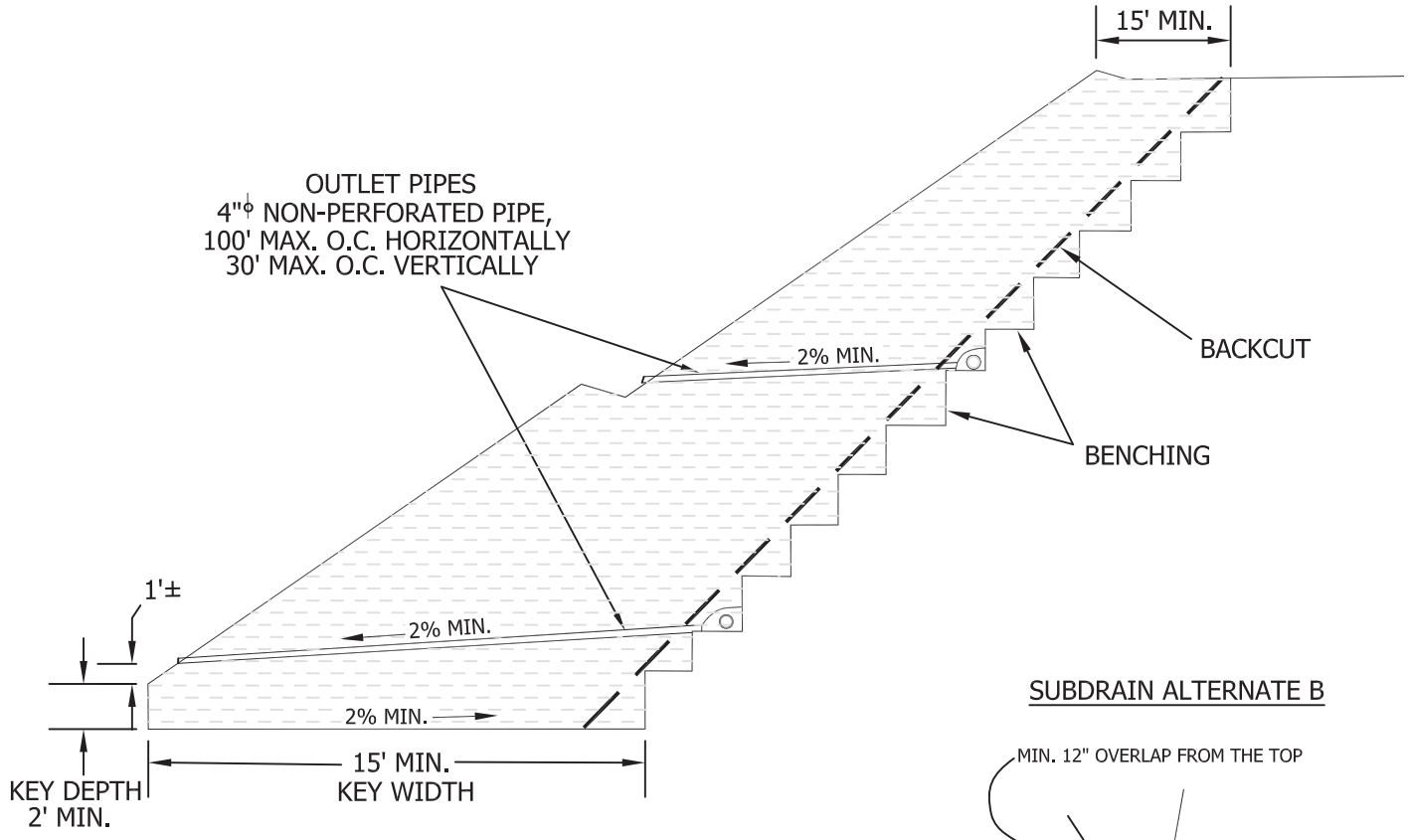
○ PERFORATED PIPE IS OPTIONAL PER GOVERNING AGENCY'S REQUIREMENTS

DETAIL OF CANYON SUBDRAIN TERMINAL

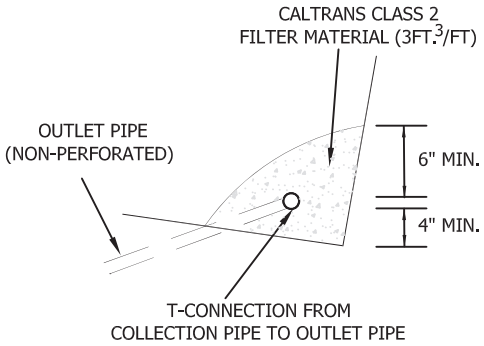


CANYON SUBDRAIN	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS C	Leighton

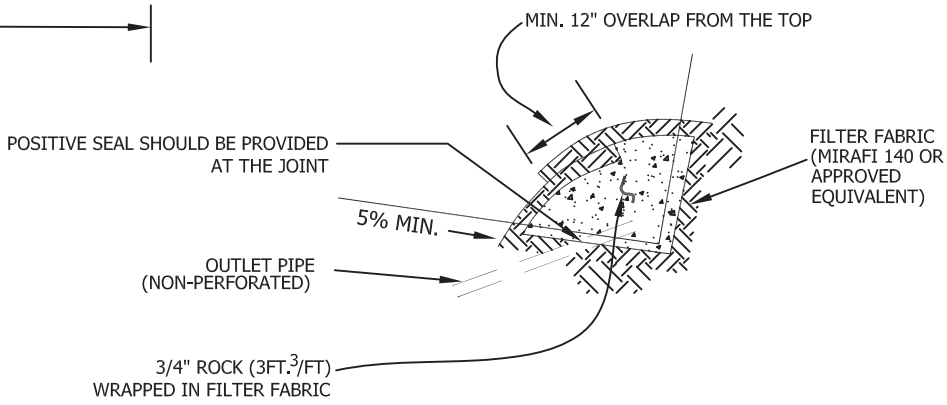
P:Drafting\templates\details\canyon_drains.dwg (7/00)



SUBDRAIN ALTERNATE A



SUBDRAIN ALTERNATE B

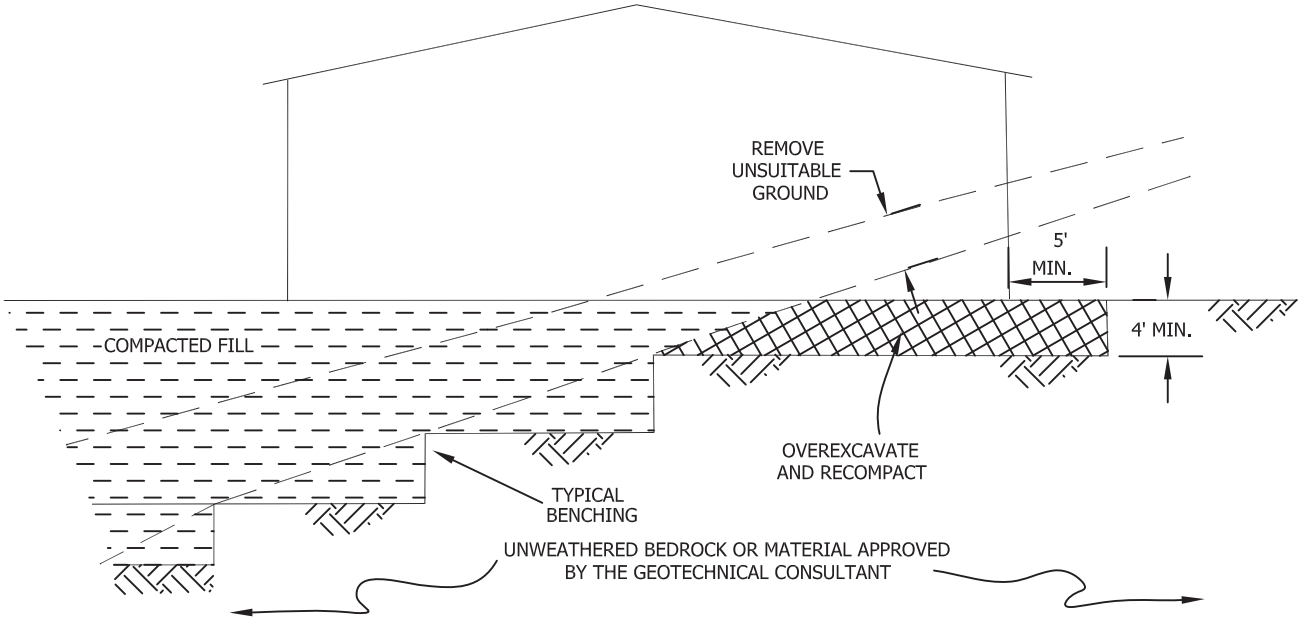


- SUBDRAIN INSTALLATION - Subdrain collector pipe shall be installed with perforations down or, unless otherwise designated by the geotechnical consultant. Outlet pipes shall be non-perforated pipe. The subdrain pipe shall have at least 8 perforations uniformly spaced per foot. Perforation shall be 1/4" to 1/2" if drilled holes are used. All subdrain pipes shall have a gradient at least 2% towards the outlet.
- SUBDRAIN PIPE - Subdrain pipe shall be ASTM D2751, ASTM D1527 (Schedule 40) or SDR 23.5 ABS pipe or ASTM D3034 (Schedule 40) or SDR 23.5 PVC pipe.
- All outlet pipe shall be placed in a trench and, after fill is placed above it, rodded to verify integrity.

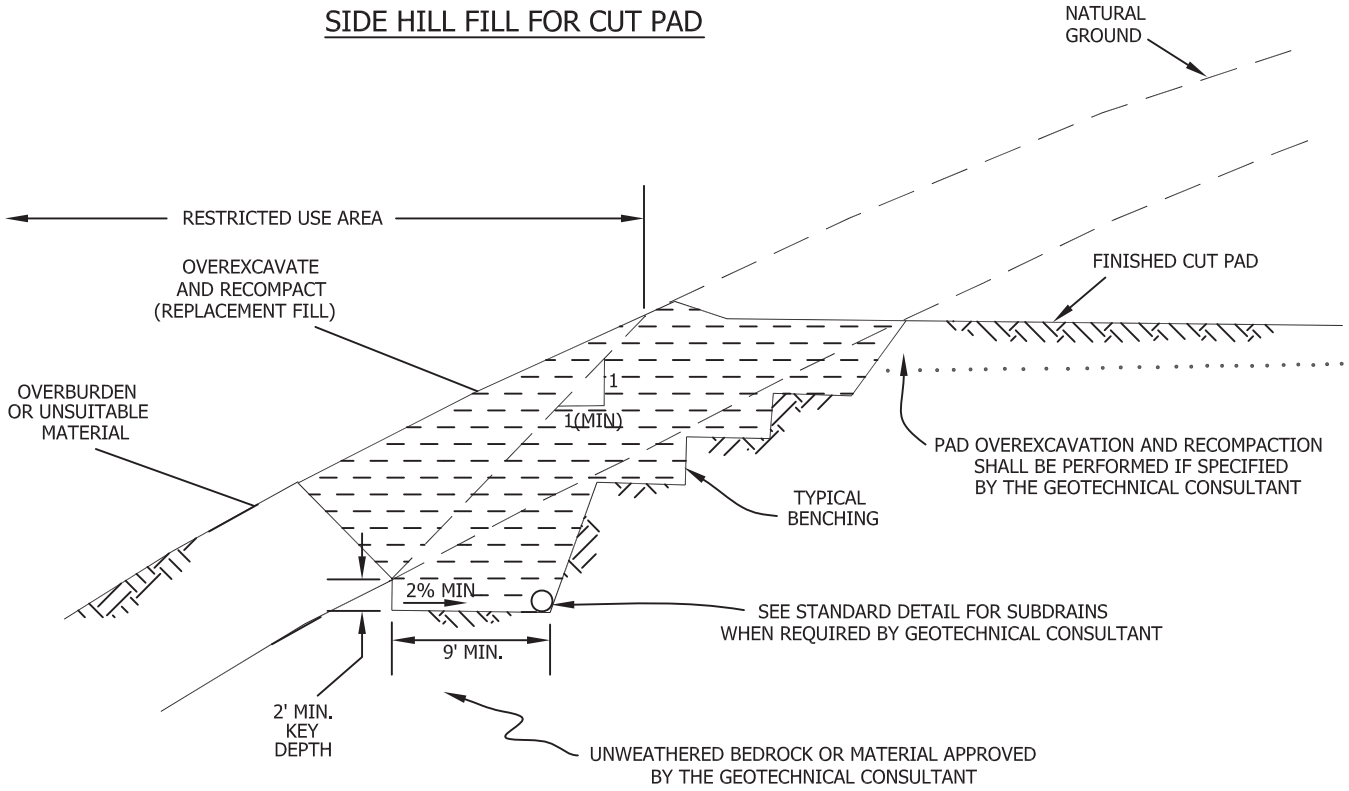
BUTTRESS OR REPLACEMENT FILL SUBDRAINS	GENERAL EARTHWORK AND GRADING SPECIFICATIONS STANDARD DETAILS D	Leighton

P:Drafting\templates\details\buttress_repl_sub.dwg (7/00)

CUT-FILL TRANSITION LOT OVEREXCAVATION



SIDE HILL FILL FOR CUT PAD



TRANSITION LOT FILLS AND SIDE HILL FILLS

GENERAL EARTHWORK AND GRADING SPECIFICATIONS
STANDARD DETAILS E

Leighton

P:Drafting\templates\details\transition_fills.dwg (7/00)

EASEMENT NOTES

NO. INDICATES ITEM NO. PER CHICAGO TITLE COMPANY TITLE REPORT ORDER NO. 00070972-002-LB-SG4 DATED JULY 07, 2017 AND PLOTTED HEREON.

1 WATER RIGHTS, CLAIMS OR TITLE TO WATER, WHETHER OR NOT DISCLOSED BY THE PUBLIC RECORDS.

2 AN OIL AND GAS LEASE FOR THE TERM THEREIN PROVIDED WITH CERTAIN COVENANTS, CONDITIONS AND PROVISIONS, TOGETHER WITH EASEMENTS, IF ANY, AS SET FORTH THEREIN.
DATED: APRIL 13, 1923
LESSOR: CLARA HELLMAN HELLER, FLORENCE HELLMAN EHRMAN, FRANCES J. HELLMAN, UNION TRUST CO. OF SAN FRANCISCO, TRUSTEES OF TRUST UNDER LAST WILL OF I. W. HELLMAN, JR., DECEASED
LESSEE: UNION OIL COMPANY OF CALIFORNIA, A CORPORATION
RECORDING DATE: MAY 9, 1923
RECORDING NO: BOOK 2192, PAGE 249 OF OFFICIAL RECORDS

NO INSURANCE IS MADE AS TO THE PRESENT OWNERSHIP OF THE LEASEHOLD CREATED BY SAID LEASE, NOR AS TO OTHER MATTERS AFFECTING THE RIGHTS OR INTERESTS OF THE LESSOR OR LESSEE IN SAID LEASE.

3 INDUSTRIAL FUEL SUPPLY COMPANY, A CORPORATION HOLDER OF AN EASEMENT FOR PIPELINE PURPOSES RECORDED IN BOOK 15430, PAGE 191 OF OFFICIAL RECORDS. (TO BE QUITCLAIMED WITH THE DEVELOPMENT OF THIS MAP)

4 SOUTHERN CALIFORNIA GAS COMPANY, A CORPORATION, AN UNDIVIDED THREE-FOURTHS INTEREST AND SOUTHERN COUNTIES GAS COMPANY OF CALIFORNIA, A CORPORATION, AN UNDIVIDED ONE-FOURTH INTEREST FOR PIPELINE PURPOSES RECORDED FEBRUARY 19, 1957 RECORDING NO. 1779, BOOK 53680, PAGE 286 OF OFFICIAL RECORDS.
(EASEMENT LIES WITHIN CENTRAL AVENUE)

5 SOUTHERN CALIFORNIA GAS COMPANY, A CALIFORNIA CORPORATION HOLDER OF AN EASEMENT FOR ONE OR MORE PIPELINES, WITH METERING, REGULATING AND OTHER EQUIPMENT, FOR THE TRANSMISSION OF GAS, WITH THE RIGHT OF INGRESS AND EGRESS TO AND FROM THE SAME RECORDED MAY 24, 1968 RECORDING NO: 4200 OF OFFICIAL RECORDS. (EASEMENT LIES WITHIN CENTRAL AVENUE)

6 COVENANTS, CONDITIONS AND RESTRICTIONS BUT OMITTING ANY COVENANTS OR RESTRICTIONS, IF ANY, INCLUDING BUT NOT LIMITED TO THOSE BASED UPON RACE, COLOR, RELIGION, SEX, SEXUAL ORIENTATION, FAMILIAL STATUS, MARITAL STATUS, DISABILITY, HANDICAP, NATIONAL ORIGIN, ANCESTRY, SOURCE OF INCOME, GENDER, GENDER IDENTITY, GENDER EXPRESSION, MEDICAL CONDITION OR GENETIC INFORMATION, AS SET FORTH IN APPLICABLE STATE OR FEDERAL LAWS, EXCEPT TO THE EXTENT THAT SAID COVENANT OR RESTRICTION IS PERMITTED BY APPLICABLE LAW, AS SET FORTH IN THE DOCUMENT RECORDED JULY 9, 1992 AS INSTRUMENT NO. 92-1250317 OF OFFICIAL RECORDS.

7 RECITALS AS SHOWN ON THAT CERTAIN PARCEL MAP NO. 24971

WHICH AMONG OTHER THINGS RECITES:

NOTE: PRIOR TO THE ISSUANCE OF A BUILDING PERMIT, A GRADING PLAN MUST BE APPROVED BY THE BUILDING AND SAFETY DEPARTMENT. THE SITE MUST BE GRADED ACCORDINGLY AND BE CERTIFIED BY THE SOILS ENGINEER INDICATING THAT THE UNCERTIFIED FILL AREAS MENTIONED IN THE SOILS REPORT PREPARED BY PACIFIC SOLIS ENGINEERING, INC., DATED MAY 5, 1998 AS WORK ORDER 101926-A ARE COMPACTED TO THE SATISFACTION OF THE CITY ENGINEER.

8 PROVISIONS, HEREIN RECITED, OF THE DEDICATION STATEMENT ON THE MAP OF PARCEL MAP NO. 24971
PROVISIONS: AS A DEDICATION TO PUBLIC USE, WHILE ALL OF CENTRAL AVENUE AND VICTORIA AVENUE WITHIN AND ADJACENT TO THE SUBDIVISION REMAIN PUBLIC STREETS, WE HEREBY GRANT TO THE CITY OF CARSON THE RIGHT TO RESTRICT DIRECT VEHICULAR INGRESS AND EGRESS TO THE SAID STREETS.

9 EASEMENT(S) FOR THE PURPOSE(S) SHOWN BELOW AND RIGHTS INCIDENTAL THERETO AS DELINEATED OR AS OFFERED FOR DEDICATION, ON THE MAP OF SAID PARCEL MAP NO. 24971;
PURPOSE: PRIVATE DRIVEWAY AND FIRE LANE (PORTION ON THIS PROPERTY TO BE QUITCLAIMED WITH THE DEVELOPMENT OF THIS MAP)

10 UNION OIL COMPANY OF CALIFORNIA, A CORPORATION HOLDER OF AN EASEMENT FOR PIPELINE OR PIPELINES FOR THE TRANSPORTATION OF GAS, PETROLEUM PRODUCTS, AND OTHER SUBSTANCES RECORDED JULY 21, 1992 AS INSTRUMENT NO. 92-1323396 OF OFFICIAL RECORDS.
THE EXACT LOCATION AND EXTENT OF SAID EASEMENT IS NOT DISCLOSED OF RECORD.

11 UNOCAL CALIFORNIA PIPELINE COMPANY, A CORPORATION HOLDER OF AN EASEMENT FOR PIPELINE OR PIPELINES FOR THE TRANSPORTATION OF OIL, GAS, PETROLEUM PRODUCTS AND OTHER SUBSTANCES RECORDED AUGUST 25, 1992 AS INSTRUMENT NO. 92-1582344 OF OFFICIAL RECORDS.
A PARTIAL QUITCLAIM OF SAID EASEMENT WAS RECORDED APRIL 7, 1999 AS INSTRUMENT NO. 99-599467 OF OFFICIAL RECORDS. (DOES NOT AFFECT PROPERTY)

13 THE LAND DESCRIBED HEREIN IS INCLUDED WITHIN A PROJECT AREA OF THE REDEVELOPMENT AGENCY SHOWN BELOW, AND THAT PROCEEDINGS FOR THE REDEVELOPMENT OF SAID PROJECT HAVE BEEN INSTITUTED UNDER THE REDEVELOPMENT LAW (SUCH REDEVELOPMENT TO PROCEED ONLY AFTER THE ADOPTION OF THE REDEVELOPMENT PLAN) AS DISCLOSED BY A DOCUMENT.
REDEVELOPMENT AGENCY: THE CITY OF CARSON REDEVELOPMENT AGENCY
RECORDED OCTOBER 29, 2007 AS INSTRUMENT NO. 20072435441 OF OFFICIAL RECORDS
AND INSTRUMENT NO: 20072435442 OF OFFICIAL RECORDS AND INSTRUMENT NO. 20072435443 OF OFFICIAL RECORDS AND INSTRUMENT NO. 20072435444 OF OFFICIAL RECORDS AND RECORDED DECEMBER 14, 2007 AS INSTRUMENT NO. 20072755798 OF OFFICIAL RECORDS.

14 AN INSTRUMENT ENTITLED COVENANT AND ENVIRONMENTAL RESTRICTION ON PROPERTY EXECUTED BY LITTLE BLACKFOOT, LLC IN FAVOR OF CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION RECORDED JULY 11, 2008 AS INSTRUMENT NO. 20081238354 OF OFFICIAL RECORDS WHICH AMONG OTHER THINGS PROVIDES AN ENVIRONMENTAL COVENANT PROVIDED FOR BY CIVIL CODE SECTION 1471 AND REQUIRED BY THE BOARD PURSUANT TO WATER CODE SECTION 13307.1, BECAUSE THE BURDENED PROPERTY IS CONTAINED BY HAZARDOUS MATERIALS AS DEFINED IN SECTION 25260 OF THE HEALTH AND SAFETY CODE.
REFERENCE IS HEREBY MADE TO SAID DOCUMENT FOR FULL PARTICULARS.

UTILITY PURVEYORS

SEWER
CITY OF CARSON
701 E CARSON ST
CARSON, CA 90745
(310)217-6300

WATER
CALIFORNIA WATER SERVICE COMPANY
2632 W. 237TH ST
TORRANCE, CA 90505
(310)257-1400

GAS
SOUTHERN CALIFORNIA GAS CO.
929 N. AVALON BLVD
WILMINGTON, CA 90744
(800)427-2200

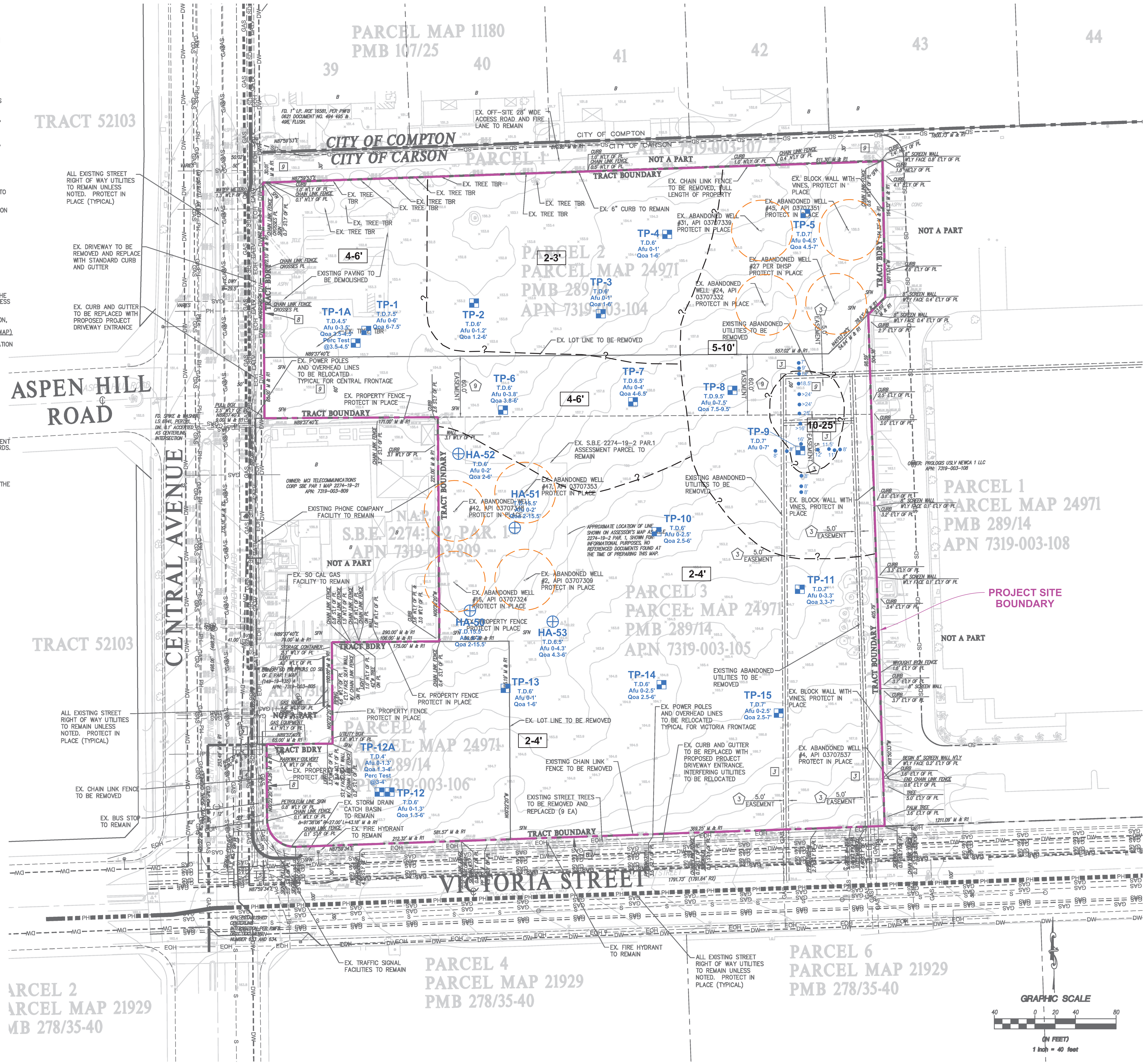
CABLE
TIME WARNER CABLE
605 E. G STREET
WILMINGTON, CA 90744
(888)892-2253

ELECTRICAL
SOUTHERN CALIFORNIA EDISON CO.
1924 CASHDAN ST
COMPTON, CA 90220
(800)655-4555

TRASH
WASTE MANAGEMENT
1970 E 213TH ST
LONG BEACH, CA 90810
(310)328-0900

TELEPHONE
AT&T BROADBAND
20930 BONITA ST. SUITE Z
CARSON, CA 90746
DIAL 611

STORM DRAIN
CITY OF CARSON
701 E CARSON ST
CARSON, CA 90745
(310)217-6300



LEGEND

TP-15 T.D.7' Afu 0-2.5' Qoa 2.5-7'	APPROXIMATE LOCATION OF GEOTECHNICAL TEST PIT (TP) SHOWING TOTAL DEPTH (T.D.), DEPTH OF GEOLOGIC UNITS AND DEPTH OF PERCOLATION TEST (TP-1A AND TP-12A) IN FEET BELOW EXISTING GRADE
Afu	ARTIFICIAL FILL, UNDOCUMENTED
Qoa	QUATERNARY (PLEISTOCENE) OLD ALLUVIAL VALLEY DEPOSITS
4-6'	APPROXIMATE DEPTH OF UNDOCUMENTED ARTIFICIAL FILL IN FEET BELOW EXISTING GRADE THAT WILL REQUIRE REMOVAL AND RECOMPACTION. FOR AREAS WHERE REMEDIAL REMOVALS ARE LESS THAN 5' BELOW DESIGN FINISH GRADE, ADDITIONAL OVEREXCAVATION AND RECOMPACTION IS RECOMMENDED.
(dashed circle)	AREAS SURROUNDING EXISTING ABANDONED OIL WELLS THAT MAY CONTAIN DEEPER UNDOCUMENTED FILL SOILS, REQUIRING REMOVAL AND RECOMPACTION WITHIN THE ZONE OF INFLUENCE FOR PLANNED STRUCTURAL IMPROVEMENTS
>24'	APPROXIMATE DEPTH OF UNDOCUMENTED FILL BASED ON INTERPRETATION OF DIRECT PUSH BORING PERFORMED AND PROVIDED BY HAYLEY & ALDRICH, INC. APPROXIMATE DIRECT PUSH BORING LOCATIONS AND DEPTH OF FILL BELOW EXISTING GRADE AT EACH LOCATION SHOWN FOR REFERENCE
HA-53 T.D.6.5' Afu 0-4.3' Qoa 4.3-6'	APPROXIMATE LOCATION OF DIRECT PUSH BORING PERFORMED BY HAYLEY & ALDRICH, INC. AND CO-LOGGED BY LEIGHTON, SHOWING TOTAL DEPTH (T.D.) AND DEPTH OF GEOLOGIC UNITS IN FEET BELOW EXISTING GRADE

PLATE 1	GEOTECHNICAL MAP Proposed Residential Development NE Corner of Central Avenue and Victoria Street Carson, California	
Leighton	Proj: 11738.001	Eng/Geol: CCK/JMP
	Scale: 1"=40'	Date: October 2017
	Drafted By: BQT	Checked By: BQT

V:\DRAFTING\11738\001\CAD\2017-09-15\11738-001_P01_BLM_2017-10-31.DWG (10-31-17 10:18:59AM) Plotted by: btran

VESTING TENTATIVE TRACT MAP NO. 78226
FOR CONDOMINIUM PURPOSES
CONSTRAINTS MAP
CITY OF CARSON
COMMUNITY DEVELOPMENT DEPARTMENT

INTEGRAL COMMUNITIES

URBAN RESOURCE
CONSULTING CIVIL ENGINEERS

REVISIONS

☒ VESTING TENTATIVE TRACT MAP
FILE CASE # XXX

SHEET 4 OF 6

JOB NO. 316.598

PLAN SET: A
PLAN CONTROL