KOURY
ENGINEERING
& TESTING, INC.

GEOTECHNICAL & SEISMIC ENGINEERING,
CONSTRUCTION INSPECTION &
MATERIALS TESTING SERVICES

CONSTRUCTION LEVEL GEOTECHNICAL STUDY

MAJESTIC CHINO LOGISTIC CENTER
SOUTHEAST CORNER OF
BICKMORE AVENUE AND MOUNTAIN AVENUE
CITY OF CHINO, CALIFORNIA

PREPARED FOR:
COMMERCE CONSTRUCTION CO., L.P.
13191 CROSSROADS PARKWAY NORTH 6th FLOOR
CITY OF INDUSTRY, CA 91746

PREPARED BY:
KOURY ENGINEERING & TESTING, INC.
14280 EUCLID AVENUE
CHINO, CALIFORNIA 91710

PROJECT NO. 18-0817

OCTOBER 24, 2018, REVISED FEBRUARY 14, 2019

TABLE OF CONTENTS

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Project No.18-0817

Mr. John R. Burroughs, LEED AP, President
Commerce Construction Co., L.P.
13191 Crossroads Parkway North 6th Floor
City of Industry, CA 91746

SUBJECT: Construction Level Geotechnical Study
Majestic Chino Logistic Center
Southeast Corner of Bickmore Avenue and Mountain Avenue
City of Chino, CA

1. INTRODUCTION

This report presents the results of a Geotechnical Investigation performed by Koury Engineering & Testing, Inc. (Koury) for the construction of two large distribution center buildings and associated improvements known as Majestic Chino Logistic Center located at the southeast corner of Bickmore Avenue and Mountain Avenue in the City of Chino (see Figure A-1 in Appendix A). The geotechnical study was performed to evaluate the subsurface soil conditions at the site in order to provide geotechnical recommendations for design and construction of the proposed facilities. This report includes our findings and recommendations for the design and construction of the proposed buildings and associated improvements from a geotechnical standpoint.

The recommendations provided within this submittal are based on the results of our field exploration, laboratory testing and engineering analyses. Our services were performed in general accordance with our Proposal No. 18-0817, dated August 20, 2018.

Our professional services have been performed using the degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical consultants practicing in this or similar localities. No other warranty, expressed or implied, is made as to the professional advice included in this report. This report has been prepared exclusively for Commerce Construction Co.,

L.P. and their consultants for the subject project. The report has not been prepared for use by other parties and may not contain sufficient information for the purposes of other parties or other uses.

2. SITE CONDITIONS

The site is bounded by Bickmore Avenue on the north, Mountain Avenue on the west, a golf course on the south, and a vacant lot and a concrete drainage channel on the east. Access is presently via Mountain Avenue on the west side. The site consists roughly of two rectangular areas; the northern area is parallel to Bickmore Avenue and measures about 2,420 feet in the east-west direction and 870 feet in the northerly direction. The southern area measures about 1,660 feet in the east-west direction, 1,340 feet in the northerly direction, and abuts against Mountain Avenue on the west.

The site was previously used as dairy farm and cattle raising. The site is presently vacant, and the buildings and cattle shelters have been removed. However, many of the slabs on grade, foundations, and most likely some of the underground utilities are still in place. At the time of the field exploration in September 2018, most of the site exposed bare ground. There was a few trees and shrubs along Mountain Avenue and around the seasonal water ponds.

The northeast corner of the site contains several water detention basins that are 3 to 5 feet deep; most of these basins have concrete-lined spillways. Within the same area, there is a relatively deep pond (roughly 80 to 100 feet wide, 200 feet long and 12 to 20 feet deep) containing vegetation and trash; this pond retains water during several months of the year. Two relatively smaller ponds were observed adjacent to Mountain Avenue; these ponds also retain storm water for several months of the year until the water evaporates. These ponds are about 10 to 12 feet deep.

The site generally slopes gently from north to south with elevations ranging from about 565 to 553 feet. Along the east property line, within the southeast portion of the site, there is a slope descending about 10 to 13 feet to a flood basin area. This slope gradually decreases in height in the north direction until it reaches a height of about 5 feet about 150 feet south of the proposed Building 1. We understand that a retaining wall ranging in height from about 1 to 12 feet and a length slightly over 400 feet will be constructed in the southeast corner of the Building 1 area to allow grading for the parking and driveway.

In its present state, the site has been cleared of the past structures such as buildings, shelters, and above ground ancillary facilities. The dominant features of the site are the many berms/levees that were constructed across the site. Many of these berms appear to have been constructed by pushing onsite soils into piles; however, the upper portion of some of the berms include imported soils. Within the northeast corner of the site, some of the berms are fitted with concrete spillways. Most of the berms have heights in the range of 3 to 6 feet and consist of relatively loose undocumented fill.

Within the northeastern portion of the proposed Building 2, there is an area measuring about 200 by 200 feet that was used to place import material. Several truckloads of soils were brought in and dumped in place without spreading. The average thickness of dumped material is on the order of 2½ to 3 feet.

3. PROPOSED IMPROVEMENTS

Koury understands the proposed project include the construction of two one-story tilt-up concrete buildings with slab on grade and relevant parking lots and site work. The larger rectangular-shaped Building 1 located within the northern portion of the property will have a footprint of approximately 1,172,387 square feet. This northern building will be about 2,112 feet long and 555 feet wide. The smaller Building 2, to be located within the southern portion of the property, will have a footprint of about 910,087 square feet. This southern building will measure about 1,400 by 650 feet in plan.

In accordance with the conceptual grading plan, there will be two detention basins located immediately south of the smaller building with storage capacities of 14.1 acre-feet and 9.7 acre-feet, respectively. Other proposed improvements include storm and a sewer pump building, construction of parking lots, driveways, retaining walls and some off-site work such as widening Mountain Avenue along the project frontage and construction of curbs and gutters.

We understand that the building pad will be raised to elevation 567 feet, which is one foot above the flood elevation of 566 feet. Most of the Building 1 area will require fill in the range of 2 to 8 feet in thickness with an average of about 5 feet above existing grade at the boring and test pit locations except for the existing retention pond/basin areas where deeper fill will be required to reach design grade. The proposed fill thickness above the existing bottom of the main retention pond is anticipated to be on the order of 30 feet, not including the required overexcavation. This

pond contains debris and vegetation, and stores water during several months of the year. The existing detention basin at the northeast corner of the proposed Building 1 is not part of this project. There will be relatively small permanent cuts in the range of 1 to 5 feet in localized areas north and south of Building 1.

Except for the proposed two basins and some localized areas along Mountain Avenue, the grades in the southern half of the site will be raised. The grades within the area of Building 2 will generally be raised by 10 to 12 feet above existing grades. There are two existing water ponds encroaching within the proposed Building 2 footprint along Mountain Avenue that will require about 22 feet or more of backfill above existing grade.

Architectural and structural design details for the buildings were not provided. For the purpose of this report we understand that the maximum column loads will be about 95 kips and wall load approximately 8 kips per lineal foot. We understand that bearing pressures of 2,500 psf for footing and 1,000 psf for slab on grade are typically used.

4. FIELD EXPLORATION

The field exploration programs, including the feasibility study, consisted of drilling 14 soil test borings in Building 1, 10 soil test borings in Building 2, two soil test borings in the Detention Basin A and one boring in the WQ Basin B. Truck-mounted hollow-stem auger drilling equipment was used to drill the test borings, which range in depth from about 16½ to 71½ feet. In addition, a rubber tire backhoe was used to excavate a total of 71 test pits ranging in depth from about 4½ to 16½ feet. The borings and test pits were excavated during the months of May 2017 and August and September of 2018.

The locations of the borings and test pits are shown on the Field Exploration Map, Figures A-2a and A-2b, Appendix A. Standard Penetration Test samples, California Ring samples and bulk samples were obtained from the borings for laboratory testing, and bulk samples were obtained from the test pits. The contractor used a 140-lbs automatic hammer to drive the samplers 18 inches into the soils.

5. LABORATORY TESTING

Laboratory tests, including moisture content, dry unit weight, #200 sieve wash, pocket penetrometer, expansion index, plasticity index, consolidation, direct shear and maximum density were performed to aid in the classification of the materials encountered and to evaluate their engineering properties. Sulfates, chlorides, resistivity, and PH tests (corrosivity tests) were also performed on selected samples. The results of pertinent laboratory tests are presented on the boring logs in Appendix B, and/or in Appendix C.

6. SOIL CONDITIONS

The subsurface soil profile consists generally of artificial fill underlain by alluvial deposits. For the most part, the existing fill is generally 1 to 3 feet thick except for the berms/levees that were constructed, which range in height predominantly between 3 and 7 feet. The fill derived from onsite soils consists predominantly of medium plastic clay (lean clay with sand and sandy lean clay). The fill derived from previously imported material include various mixtures of soils, including asphalt, silty sand, gravel, cobbles, boulders, clay, and shale.

A large portion of the site contains a layer of younger alluvium underneath the fill and above the older alluvium. This younger alluvium generally ranges in thickness from about 2 to 6 feet and consists predominantly of lean clay with sand with localized areas of fat clay. The older alluvium was encountered at depths predominantly between 3½ and 6 feet, and for the most part also consists of clay (both fat and lean clay). The fat clay generally has a higher moisture content and is more expansive than the lean clay, and is considered a less desirable material.

California drive samples were obtained from the borings and test pits. Nuclear gauge tests were also performed in selected test pits. The test data for the drive samples within the test pits and the nuclear gauge tests is summarized in Table C-1 presented in Appendix C. The dry unit weights of the California drive samples range from about 72 to 134 pcf with an average of about 105 pcf. The nuclear gauge tests results (on shallow soils in test pits up to 7 ½ feet) indicate dry unit weight ranging from 86 to 118 pcf with an average of about 103 pcf. The insitu moisture contents of the tested soils range from about 8 to 29½ percent with an average of about 18 percent. Depending upon the time of the year, the soil moisture content near the ground surface may vary. Table 1 presents the results of the moisture content tests within the upper 2½ and 8 feet and of the test pits

and borings. This tables indicates that the moisture contents increase with depth and the moisture contents of the recent borings and test pits are lower than the previous borings, thus reflecting seasonal variation.

Table 1 – Moisture Content Test Results

Test Pit / Boring	Min Moisture (%)		Max Moisture (%)		Average Moisture (%)	
	2½ feet	8 feet	2½ feet	8 feet	2½ feet	8 feet
TP-1 to TP-21 (Old)	8.6	8.6	33.3	40.2	17.5	19.5
TP-22 to TP-72 (New)	4.2	4.2	37.1	39.4	15.1	18.4
B-1 to B-10 (Old)	8.1	8.1	21.9	29.8	15.9	17.9
B-11 to B-28 (New)	5.4	5.4	16.8	25.2	11.6	13.3

The degree of saturation was calculated based on the moisture content and the dry density of the tested samples. The results of our calculations show that for the samples at depths between about 2½ and 6 feet, the degree of saturation varies from about 40½ to 100 percent with an average of about 82 percent. Soils with insitu degree of saturation of 85 percent or higher normally require higher compaction efforts to obtain 90 percent relative compaction.

Maximum density tests were performed to evaluate the required dry back of the soils to satisfy the compaction requirements. The following Table 2 indicates the range of optimum moisture for the tests performed to date, which provide some indication of the possible dry back required to facilitate compaction.

Table 2 – Maximum Density Test Results

Test Pit Number/Depth	**TP-7**/7’	**TP-8**/12’	**TP-10/2’**	**TP-40/3’-3.8’**
Maximum Dry Density (pcf)	115.3	112.2	122.8	123.7
Optimum Moisture Content (%)	12.5	14.3	11.2	11.7

To aid in the soils classification and to correlate the soil plasticity with the soil expansion, four plasticity index tests (Atterberg Limits) were performed on samples from depths ranging between about 2 and 12 feet. As shown in Table 3, the liquid limits for the tested samples range between

about 39 and 68 and the plasticity index between 20 and 46, which indicate material ranging from low to high plasticity.

Table 3 – Plasticity Test Results

Test Pit Number/Depth	**TP-5**/2’	**TP-7**/8’	**TP-8**/12’	**TP-10**/2’
Liquid Limit	39	51	68	39
Plastic Limit	19	21	22	17
Plasticity Index	20	30	46	22

Our #200 sieve wash tests indicated that the sand has fines contents in the range of 6 to 46 percent (average of about 27%) and the clay and silt have fines contents in the range of 50 to 99 percent with an average of about 73%. The dry unit weights range from about 72 to 134 pcf with an average of approximately 105 pcf. The consolidation tests indicated moderate consolidation with low potential for expansion and collapse upon addition of water under pressures of 3200 psf; however, some of the rebound curves indicate that the soils could expand significantly under low confining pressures. One direct shear test on a sample remolded to about 90 percent relative compaction indicated a peak friction angle of about 26 degrees and a peak cohesion of approximately 386 psf. The corresponding ultimate values are 28 degrees and 12 psf, respectively

The site soils are generally expansive (EI>20). Table 4 presents the data for 39 tests with depths ranging between 1 and 12 feet. These tests indicate expansion index ranging from 20 to 162 with an average of about 79. Within the upper 2½ feet, the range of expansion index is 20 to 102 with an average of about 68.

Table 4 – Expansion Index Test Results

Boring/Test Pit	Depth (ft)	Field Moisture (%)	Percentage of Fines	Expansion Index
TP-1	6	25.4	84	78
TP-3	5	16.0	76	62
TP-5	2	23.3	71	50
TP-7	7	27.8	81	59
TP-8	12	23.3	84	90
TP-14	1	35.2	77	89
TP-15	3	31.0	86	60
TP-17	2	33.3	92	96
TP-19	1	17.1	79	24
TP-22	3-3.8	17.4	83	126
TP-22	4-4.8	16-4-18.8	81-80	62
TP-23	1.5-2.2	17.6	60	97
TP-26	Surface	13.4	80	20
TP-26	4.2-4.9	39.4	66	74
TP-27	3.5-4.2	18.4-20.9	65-66	144
TP-28	3-3.8	20.4	71	81
TP-30	3-3.5	15.9	86	48
TP-31	3.8-4.3	16.1	63	86
TP-32	3.8-4.3	8.3	79	61
TP-33	2.5-3	17.9	59	63
TP-37	3-3.5	22.2	70	105
TP-40	3-3.8	10-7-11.5	79-77	162
TP-42	2.7-3.2	12.8	65	62
TP-44	3-3.5	15.1	73	57
TP-48	1.8-2.3	13.5	75	64
TP-50	2-2.5	16.4	73	71
TP-53	3-3.5	20.8	63	50
TP-55	2-4	15.3	80	111
TP-58	3-3.5	14.9	78	59
TP-59	3.5-4	--	--	88
TP-60	22.5’	22.3	89	102

Table 4 – Expansion Index Test Results (continued)

Boring/Test Pit	Depth (ft)	Field Moisture (%)	Percentage of Fines	Expansion Index
TP-65	6-6.5	24	82	99
TP-70	2.5-3.5	12	57	160
TP-71	2.5-3	14.2	59	45
B-11	0-4	15-6-16.8	64-69	52
B-13	0-4	10.2-11.7	72-66	47
B-23	2-4	16.3	76	107
B-24	2-4	15.8	77	96
B-25	2-4	14.5	84	78

There is a rough correlation between in situ natural moisture content at depth and expansion index. For the same amount of fines, site soils with higher moisture and higher plasticity index tend to have higher expansion index.

7. GROUNDWATER

According to Carson and Matti, 1985, the depth to regional groundwater should be about 35 to 45 feet below the existing ground surface. Groundwater was encountered in the borings at depths between about 24 and 44 feet below the existing ground surface with corresponding elevations between approximately 518 and 539 feet (NAVD88). Groundwater seepage was encountered in three test pits at about elevations between 539 and 541 feet. The groundwater encountered in the test pits and within Boring B-26 is believed to be perched water. The following table summarizes the groundwater depths and elevations encountered in the borings and test pits.

Table 5 - Summary of Groundwater Data

Boring/Test Pit	Ground Elevation (feet)	Groundwater Depth (feet)	Groundwater Elevation (feet)
B-1	557.5	32.5	525.0
B-2	554.3	31.0	523.3
B-7	562.0	28.0	534.0
B-8	556.5	33.0	523.5
TP-8	556.5	*15.5	*541.0
TP-15	552.4	*10.5	*542.4
B-16	560.7	41	518.7
B-24	563.0	27.5	535.5
B-26	563.0	**24	**539.0
TP-68	540.0	**2	**538.0

*Seepage **Perched water

Fluctuations of the groundwater level, localized zones of perched water, and elevated soil moisture contents should be anticipated during and following the rainy season.

8. SITE GEOLOGY

The site is located within the Upper Santa Ana River Valley, which consists of a series of coalescing alluvial fans formed by streams flowing out of the San Gabriel Mountains to the north. The valley lies within the Peninsular Ranges geomorphic province, which is characterized by alluviated basins, elevated erosion surfaces, and northwest-trending mountain ranges bounded by northwest trending faults. The site, which is located within the Chino Basin, is underlain by sediments deposited by the Santa Ana River and its tributaries such as the Chino Creek.

Morton and Miller (2006) show the site to be underlain by very old alluvial-fan deposits (See Figure A-3 in Appendix A). The sediments observed during drilling consisted predominantly of clay.

9. SEISMIC CONSIDERATIONS

9.1. General

The project site, like the rest of Southern California, is located within a seismically active region as a result of being located near the active margin between the North American and Pacific tectonic plates. The principal source of seismic activity is movement along the northwest-trending regional faults such as the San Andreas, San Jacinto, Newport-Inglewood and Whittier-Elsinore fault zones.

By definition of the California Geological Survey (CGS), an active fault is one which has had surface displacement within the Holocene Epoch (roughly the last 11,000 years). The CGS has defined a potentially active fault as any fault which has been active during the Quaternary Period (approximately the last 2,000,000 years). These definitions are used in delineating Earthquake Fault Zones as mandated by the Alquist-Priolo Geologic Hazard Zones Act of 1972 and as subsequently revised in 1997 as the Alquist-Priolo Earthquake Fault Zones. The intent of the act is to require fault investigations on sites located within Special Studies Zone to preclude new construction of certain inhabited structures across the trace of active faults.

The subject site is not located within an Alquist-Priolo Earthquake Fault Zone. Probably the most important fault to the site from a seismic shaking standpoint is the northwest trending Chino Fault, located approximately 1.4 miles southwest of the site. The Whittier Fault is located about 5¾ miles to the southwest. Based on the available maps, the "potentially active" Central Avenue Fault (presently not known to be active) passes through the southwest corner of Building 2. This fault is not known to have moved during the last 11, 000 years. Based on the information available at this time, it is our opinion that a Mw6.7 earthquake may occur on the Chino Fault and a Mw6.9 earthquake may occur on the nearest active segment of the Whittier Fault (see Figure A-4, Fault Map, for fault locations).

Large earthquakes could occur on other faults in the general area, but because of their greater distance and/or lower probability of occurrence, they are less important to the site from a seismic shaking standpoint. Due to the proximity of these faults, near field effects from strong ground motion associated with large earthquakes along these faults may occur at the site. These near field effects, including "fling" and directivity of strong ground motion, may result in significantly higher accelerations at the site, which is normally accounted for/mitigated by the structural design of the project.

9.2. Landsliding

The site is not located in a Landslide Hazard Zone on the State of California Seismic Hazard Zones Map. No evidence for landsliding was observed on or in the immediate vicinity of the site at the time of our field exploration. Based on topographic conditions, landsliding is not considered a potential hazard at the site.

9.3. Liquefaction and Seismic Settlement

Liquefaction may occur when saturated, loose to medium dense, cohesionless soils are densified by ground shaking or vibrations. The densification results in increased pore water pressures if the soils are not sufficiently permeable to dissipate these pressures during and immediately following an earthquake. When the pore water pressure is equal to or exceeds the overburden pressure, liquefaction of the affected soil layers occurs. For liquefaction to occur, three conditions are required:

- Ground shaking of sufficient magnitude and duration;
- Groundwater level at or above the level of the susceptible soils during the ground shaking; and
- Soils that are susceptible to liquefaction.

The Liquefaction Hazards zone on the State of California Seismic Hazards Zones Map indicates that the site is not located in a liquefaction susceptibility zone. However, for seismic settlement due to ground shaking should be considered. For seismic settlement analysis, we calculated an earthquake magnitude of Mw6.49 from a seismic-hazard deaggregation using the USGS Unified Hazard Tool. Our analysis also utilized a site acceleration of 0.71g (PGA_M) obtained from the USGS Design Maps Detailed Report. The SPT tests were performed with an automatic hammer and unlined SPT samplers.

Using the LiquifyPro software, we calculated maximum seismic settlements less than ½ inch for the alluvium to a depth of 50 feet (see result of calculations in Appendix C). Considering the recommendations in Section 7.66 of the SCEC Guidelines for Implementation of Special Publication 117 and our total seismic settlement calculations, it is our opinion that a relatively small differential settlement on the order of ¼ inch in 30 feet may be used for the design seismic event.

9.4. Tsunamis and Seiches

The site is located at an average elevation of approximately 560 feet and 28 miles away from the coastline. There is no mapped major reservoir in the immediate vicinity and upslope of the site. Therefore, tsunamis and seiches are not considered potential hazards.

10. FLOODING

Except for localized areas within the southwest portion of the site, the project area lies outside the 100-year flood zone as shown on the FEMA Flood Map # 06071C9335H, effective date 08/28/2008 (Figure A-5, Appendix A). The site is located at elevations between about 553 and 565 feet (NAVD88) and the existing Prado Dam spillway is reportedly near elevation 543 feet. However, it is understood that the spillway could be raised to elevation 566 feet, which would locate portions of the site, outside the building pads, within the 100-year flood zone.

11. COLLAPSIBLE SOILS

Soils prone to collapse are generally young and deposited by flash floods and wind. The onsite soil moisture contents are generally above optimum, which mitigate collapse potential. Our laboratory tests did not indicate significant collapse. Therefore, the potential for collapse is considered low. Overerexcavation and recompaction, and appropriate drainage are anticipated to mitigate the potential for hydrocollapse.

12. CONCLUSIONS AND RECOMMENDATIONS

12.1. General

In our opinion, the planned improvements are feasible from a geotechnical engineering point of view. The main concerns from a geotechnical standpoint are the presence of fill, soft alluvium near the ground surface, the presence of deep-water ponds encroaching within the building pads, the soil expansion potential, and the soil consolidation due to the proposed fill.

For the proposed buildings, we understand that bearing pressures of 2,000 to 2500 psf are typically used for footings and 1,000 psf for slab on grade. The proposed buildings may be supported on conventional continuous footings or isolated pad footings underlain by engineered fill.

The following sections contain preliminary geotechnical recommendations for the design and construction of the proposed improvements and include our recommendations and discussions about bearing capacity, settlement, flatwork, slabs-on-grade, temporary excavations, and utility trenches.

12.2. Site Grading and Clearing

The site should be cleared of all remaining foundations, concrete and wood debris. One area of the proposed Building 2 contains bark at the ground surface. We recommend that this bark material be raked, and the material taken offsite along with any other onsite vegetation such as trees, shrubs and stumps. There is also some asphalt and oversize cobbles and boulders that should be taken offsite.

All existing fill should be removed, including all the earth berms, and should be replaced as engineered fill. Depending upon the grading time of the year, excessively wet, soft or dry soils may be encountered within the upper 2 to 3 feet of the ground surface. Due to soil expansion potential, all soil with moisture content less than 2 percent above optimum within the building pad area and less than 1 percent above optimum outside the building pad should be overexcavated unless indicated otherwise by the Geotechnical Engineer at the time of construction. To remove the most compressible soils, we anticipate that most of the removal will be on the order of 2½ to 3½ feet deep outside building areas and 4 to 6 feet deep within building areas, extending below the existing undocumented fill bottom. Deeper removal will be required in areas of wet soils and former basins. A table of estimated removal depths at the test pit and boring locations is enclosed in Appendix C and preliminary Remedial Grading Maps (Figure A-2e and A-2f) are presented in Appendix A.

Some of the soils to be removed near the surface generally have a lower expansion potential than the deeper soils. Except for the obvious area of high expansive soils near the surface, we suggest separating the upper 2 to 2½ feet of soil and re-using these soils within the upper 2 feet of pavement subgrade or within the upper 6 to 7 feet of the building pad subgrade. Although less desirable, blending of soils with high expansion and low expansion potential may be acceptable if they are of similar composition (e.g. sandy lean clay with lean clay).

We anticipate the soils with an expansion index less than 80 (“moderate quality dirt”) to perform satisfactorily below foundations provided the moisture content of the soils remain stable during the

project life. It is therefore important to provide good drainage and to avoid constructing planters immediately adjacent to buildings and other foundations. Soils with greater expansion potential should be placed at least 4 feet below footings and at least 5 feet away from the buildings/structures and in areas such as parking lots, driveways, and planters at the discretion of the owner.

12.3 Grading of Existing Ponds

There are two ponds within the northeast portion of the site (see blue highlighting on Figures A-2a and A-2e). Immediately outside the southeast end of Building 1, there is a former detention basin with a length of approximately 380 feet and a width ranging between about 40 and 80 feet (see Cross Section B-B', Figure A-2d). There is also a water pond encroaching approximately 150 feet within the footprint of the proposed Building 1 (see Cross Section A-A', Figure A-2c, in Appendix A). This water pond is about 80 to 100 feet wide and 200 feet long. The water pond stands about 12 to 20 feet below the high adjacent grades and contains trash and vegetation along most of its perimeter. There is a relatively low area east of the pond.

At the west end of Building 2, there are two water ponds encroaching within the footprint of the building (see blue highlighting on Figure A-2b and A-2f). These ponds, which are located east of Mountain Avenue, retain storm water for several months of the year until the water evaporates. These two ponds are separated by a driveway running east-west. The northern pond measures about 45 by 190 feet in plan and has a depth of 10 to 12 feet and the southern pond is about 80 to 100 feet wide and approximately 190 feet in long and has a depth similar to the northern pond.

During the recent field exploration, the water had evaporated from all the ponds and test pits were excavated in the three ponds. Two test pits were previously excavated within the desilting basin southeast corner of Building 1. The estimated depth of removal presented in the table below are based on our evaluation of the test pit data. The actual depth of removal may vary depending upon the conditions observed at the time of grading.

Pond/Basin Location	Test Pit No.	Anticipated Removal *Depth (feet)
East of Building 1	TP-68	11+
Southeast Corner of Building 1	TP-14 and TP-15	15+
West end of Bldg 2, north pond	TP-67	4+
West end of Bldg 2, south pond	TP-66	4+

*Based on the lowest portion of the pond. Exact depth to be determined at time of construction

Groundwater should be anticipated during the removal operation within the two ponds adjacent to Building 1. During and/or shortly after the rainy seasons, groundwater may also be encountered in the other ponds. The total fill depths above the existing pond bottoms are anticipated to be approximately 26 feet for the pond encroaching on the east end of Building 1, about 10 feet for the desilting pond at the southeast corner of Building 1 and 21 feet for the two ponds encroaching on the west end of Building 2.

The bottom of these ponds is anticipated to be "pumping" under the weight of rubber tire equipment. Track mounted backhoes or excavators are recommended for the bottom excavation of these ponds. To stabilize the subgrade for compaction purpose, we recommend placement of 18 inches of ¾-inch crushed rock wrapped with filter fabric (placed above and below the rock). The intent of the crushed rock is not only to stabilize the bottom for compaction purpose but also to provide a drainage path to enhance consolidation of the soils.

Considering the removal depths, the thickness of fill for these ponds will be in the range of about 20 to 30 feet. In order to reduce differential settlement, we suggest overexcavating, backfilling, and raising the grades to quasi final grades within the existing pond areas during the first phase of grading (at the beginning of grading) to accommodate as much settlement as possible before completing the project grading. For the pond encroaching on the east end of Building 1, to accelerate consolidation settlement, we recommend surcharging the pond area with about 10 feet of soil stockpile. We recommend installing two settlement monuments and to monitor the rate of settlement to determine the most appropriate time to remove the stockpile since we cannot accurately predict the amount of time required for settlement (a rough estimate is 6 months for about one half the anticipated settlement since not all settlement needs to occur). Because consolidation settlement depends on subsurface drainage and time, the surcharge load would have

to be doubled to reduce the estimated time to 4 months. The following table indicates roughly the anticipated surcharge depth versus time. The actual surcharge duration required should be based on settlement monitoring.

Surcharge Parameters

Estimated Duration (month)	6	5½	4	3½
Minimum Surcharge Depth (ft)	10	15	20	25

12.4 General Grading Requirements

1. All fill, unless otherwise specifically stated in the report, should be compacted to at least 90 percent of the maximum dry density as determined by ASTM D1557 Method of Soil Compaction for clay soils and 95 percent relative compaction for sand and other granular soils.

2. No fill should be placed until the area to receive the fill has been adequately prepared and approved by the Geotechnical Consultant or his representative.

3. Fill soils should be kept free of debris and organic material.

4. Rocks or hard fragments larger than 4 inches may not be placed in the fill without approval of the Geotechnical Consultant or his representative, and in a manner specified for each occurrence. There should not be any concentrations of particles sizes of 2 inches or greater; proper mixing should be performed. If encountered, oversize materials should be disposed outside the structural fill and flatwork areas at the locations designated by the Engineer.

5. The fill material should be placed in lifts which, when loose, should not exceed 8 inches per lift. Each lift should be spread evenly and should be thoroughly mixed during the spreading operation to obtain uniformity of material and moisture.

6. When the moisture content of the fill material is lower than the specified value or is too low to obtain adequate compaction, water should be added and thoroughly dispersed until the soil has a moisture within 2½ percent of optimum moisture content for sand material and 125 percent of optimum for clay soils placed 6 feet below finish subgrade and 130 percent of optimum for clay soil placed within 6 feet of finish subgrade unless indicated otherwise in this report and/or by the Geotechnical Engineer at the time of construction. The moisture content of finished clay subgrade should be maintained until the time of hardscaping by frequent watering or by covering the surface with visqueen, granular material or other methods as agreed upon by the owner representative. The moisture content should be checked for compliance prior to construction above the subgrade.

7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material should be aerated by blading or other satisfactory methods until the soil has a moisture content as specified herein.

8. Permanent fill and cut slopes should not be constructed at gradients steeper than 2:1(H: V).

Based on the few maximum density tests performed to date, the optimum moisture contents of the onsite clay soils appear to be predominantly in the range of 11 to 15 percent. It should be noted that some of the clay soils have a high degree of saturation and moisture contents about 5 to 12 percent above optimum and outside the compactable moisture range. The contractor will have to select appropriate excavation and compaction equipment to avoid disturbing the high moisture content subgrade soils and to be able to compact the fill to the project specifications above relatively soft subgrade. Any scarified clay soils must be compacted to at least 90 percent relative compaction as determined by ASTM D1557.

12.5 Fill Materials

12.5.1. Onsite Materials

The onsite shallow clay soils encountered in the borings and test pits are considered to have a low to very high expansion potential. In general, the soils with high expansion potential should not be re-used as backfill within the upper 6 feet of finished subgrade (at least 4 feet below footings and 4 feet below flatwork subgrade). The clay soils with low to moderate expansion potential are considered suitable for backfilling purpose at shallow depths provided they are free of deleterious and oversize materials and are properly processed and moisture conditioned. Import materials will also be needed for backfilling purpose.

Overexcavation and re-compaction will induce fill shrinkage. Many factors such as mixing, relative compaction of the fill, and topographic approximations will affect shrinkage. We cannot estimate the exact amount of shrinkage; however, in our opinion, the shrinkage may be on the order of 15 percent for existing soils excavated and recompacted to 90 percent relative compaction. This estimate does not include the material that will be required to fill in the excavations after the removal of any subsurface structures from the prior use of the site and removal of topsoil.

12.5.2. Import

Import materials should contain sufficient fines (binder material) to be relatively impermeable and result in a stable subgrade when compacted. Soils with high expansion potential expansion are not recommended for import. Where possible, the imported materials should have an expansion index (EI) less than about 80 and should be free of organic materials, debris, and cobbles larger than 4 inches. Selective grading is suggested to place the better import materials (lower expansion) within

the upper portion of the fill below building areas (at least 4 feet below footings and at least 5 feet away from the buildings) and to place the less desirable import material (more clayey and higher expansion) below parking lots, driveways, and other areas as designated by the owner representative. The contractor should also consider that some of the better soils may be encountered at shallow depths in the borrow sites, which may affect the grading sequence. A bulk sample of potential import material, weighing at least 35 pounds, should be submitted to the Geotechnical Consultant at least 48 hours before fill operations. Other than aggregate base and bedding sand, all proposed import materials should be tested for corrosivity, should be environmentally cleared from contamination and should be approved by the Geotechnical Consultant prior to being imported onsite.

12.6 Temporary Excavations

Temporary excavations adjacent to un-surcharged areas are anticipated to be stable vertically to a depth up to 5 feet in fill and alluvium. For deeper excavations up to a depth of 8 feet, we recommend a gradient no steeper than ¾:1 (H:V) for unsurcharged excavations unless shoring is used.

The tops of slopes should be barricaded to prevent vehicles and storage loads within 6 feet of the tops of slopes or within ½ the slope height, whichever is greater. A greater setback may be necessary when considering heavy vehicles, such as concrete trucks and cranes; we should be advised of such heavy vehicle loadings so that specific setback requirements can be established. When excavating adjacent to existing footings or building supports, proper means should be employed to prevent any possible damage to the existing structure. Un-shored excavations should not extend below a 1¼:1 (H:V) plane extending downward from the lower edge of adjacent footings and should start at least 2 feet away from the footing edge. Where there is insufficient space to slope back an excavation, shoring may be required. All regulations of State and Federal OSHA should be followed.

Temporary excavations are assumed to be those that will remain un-shored for a period of time not exceeding one week. In dry weather, the excavation slopes should be kept moist, but not soaked. If excavations are made during the rainy season (normally from November through April), particular care should be taken to protect slopes against erosion. Mitigative measures, such as installation of berms, plastic sheeting, or other devices, may be warranted to prevent surface water from flowing over or ponding at the top of excavations.

12.7 Floor Slabs

12.7.1. General

We understand that 7-inch thick slabs with 4000 psi concrete will be used for the building floors. We also anticipate that 6 inches of crushed miscellaneous aggregate base will be placed below the building slabs.

The building code requires minimum slab reinforcement consisting of #3 bars at 18 inches on center both directions when a slab is supported on soils with an expansion index greater than 20. In addition, the soils should be moisture conditioned to at least 130 percent of optimum as indicated in the grading section of this report unless indicated otherwise by the Geotechnical Engineer at the time of construction. The subgrade moisture content should be re-tested and confirmed within 48 hours prior to placement of the aggregate base.

12.7.2 Moisture Sensitive Floor Covering

Water vapor transmitted through floor slabs is a common cause of floor covering problems. In areas where moisture-sensitive floor coverings (such as tile, hardwood floors, linoleum or carpeting) are planned, a vapor retarder should be installed below the concrete slab to reduce excess vapor transmission through the slab.

The function of the recommended impermeable membrane (vapor retarder) is to reduce the amount of soil moisture or water vapor that is transmitted through the floor slab. The membrane should be at least 15-mil thick Stego Wrap, Class A, and care should be taken to preserve the continuity and integrity of the membrane beneath the floor slab. The vapor retarder should conform to ASTM E1745.

Another factor affecting vapor transmission through floor slabs is the water to cement ratio in the concrete used for the floor slab. A high water to cement ratio increases the porosity of the concrete, thereby facilitating the transmission of water vapor through the slab. The project Structural Engineer should provide recommendations for design of building slabs in accordance with the latest version of the applicable codes. We recommend a concrete with a water cement ratio not exceeding 0.45. The placement of sand above the vapor retarder is the purview of the Structural Engineer.

12.8 Seismic Coefficients

Under the Earthquake Design Regulations of Chapter 16A, Section 1613A of the CBC 2016, and based on the mapped values, the coefficients and factors presented in Table 6 were calculated using the USGS web site (refer to Figure A-6 in Appendix A).

The site class is determined in accordance with ASCE 7 Chapter 20 using shear wave velocity, SPT blow count or undrained shear strength. For a site to be classified as Site Class D the weighted average SPT blow count should be between 15 and 50 and the average weighted undrained shear strength should be between 1,000 and 2,000 psf within the upper 100 feet of soil. The SPT blow count test results presented on the boring logs indicate that the requirements for Class D are met.

Table 6 – Seismic Coefficients and Factors

Site Class (CBC 2016 – 1613A.3.2)	D
Seismic Design Category based on Occupancy Category III (CBC 2016-1604A.5 &1613A.3.5)	D
Mapped Acceleration Parameter for Short Period (0.2 Second), S_S	2.001
Mapped Acceleration Parameter for 1.0 Second, S_1	0.732
Adjusted Maximum Spectral Response Parameter for Short Period (0.2 Second), S_{MS}	2.001
Adjusted Maximum Spectral Response Parameter for 1.0 Second Period, S_{M1}	1.099
Design Spectral Response Acceleration Parameter, S_{DS}	1.334
Design Spectral Response Acceleration Parameter, S_{D1}	0.732
Peak Ground Acceleration (PGA_M)	0.718

Project Site Coordinates: Longitude: W117.66298° Latitude: N33.957164° (WGS84)

12.9 Shallow Foundations

General: For the purpose of preparing this report, we assumed that the proposed building structure will impose maximum column load of about 95 kips and wall loads less than 8 kips per lineal foot. The recommendations for preparation of the subgrade underlying the footings are provided in the

"Earthwork" Section of this report. The Structural Engineer should design foundations in accordance with the requirements of the applicable building code.

Footings should have a minimum width of 2 feet for isolated footings and 18 inches for continuous footings. The bottom of building footings should be located at least 36 inches below the lowest adjacent finish grade, and reinforcement should consist of a minimum of two No.5 bars, top and bottom or equivalent as determined by the Structural Engineer.

The proposed building structures may be supported on isolated and/or strip footings designed using a net allowable bearing pressure of 2,250 pounds per square foot (psf) for footings supported on at least 3½ feet of engineered fill as indicated in the grading section of this report and embedded at least 3 feet below the lowest adjacent grade. A one-third increase in the bearing value may be used when considering wind or seismic loads. In the event of new footings located within one footing width of an existing footing, we recommend reducing the bearing pressure of the new footing by 30 percent.

Minor footings may be required for low height exterior landscape walls (4 feet or less in height), or other small ancillary structures. These footings should be supported on at least 2½ feet of new engineered fill and should be embedded at least 24 inches. A vertical bearing pressure of 2,000 psf may be used for these footings.

Lateral Resistance of Footings: Lateral load resistance may be derived from passive resistance along the vertical sides of the foundations, friction acting at the base of the foundations, or a combination of the two. A coefficient of friction of 0.30 may be used between the footings, floor slabs, and the supporting soils comprised of engineered fill. Where a vapor retarder is used below the slab, the friction coefficient should not exceed 0.12. The passive resistance of level properly compacted fill soils in direct contact with the footings may be assumed to be equal to the pressure developed by a fluid with a density of 200 pcf, to a maximum pressure of 2,000 psf. A one-third increase in the passive value may be used for wind or seismic loads. The frictional resistance and the passive resistance of the soils may be combined provided that the passive resistance is reduced by one third. We recommend that the first foot of soil cover be neglected in the passive resistance calculations if the ground surface is not protected from erosion or disturbance by a slab, pavement or in a similar manner.

Estimated Settlement of Footings: Based on the results of our analyses and provided that our recommendations in preceding sections of this report are followed, we estimate that once the settlement due to fill placement has occurred, the total static settlement of isolated and/or strip footings under sustained loads will be on the order of 1 inch for the anticipated maximum structural load. The maximum static differential settlement due to building loading, over a horizontal distance of 20 feet, is anticipated to be on the order of ½ inch for similarly loaded footings. The differential settlement during the design seismic event is anticipated to be on the order of ¼ inch between adjacent columns located 30 feet apart.

The settlement during fill placement is anticipated to be on the order of 1 to 2½ inches depending upon the fill thickness except for the areas of deep ponds where the settlement is anticipated to be on the order of 3 to 5 inches. Except for the pond areas, a large portion of the calculated settlement is anticipated to have occurred one month following grading.

12.10 Retaining Wall

We have assumed that retaining walls will have a maximum height of 12 feet as shown on the drawings along the eastern portion of Building 2. Design earth pressures for retaining walls depend primarily on the allowable wall movement, wall inclination, type of backfill materials, backfill slopes, surcharges, and drainage. The earth pressures provided assume that non-expansive soil backfill will be used and a drainage system will be installed behind the walls so that hydrostatic pressure will not develop. If a drainage system is not installed, the cantilever level-backfilled walls, under static conditions, should be designed to resist a hydrostatic pressure equal to that developed by a fluid with a density of 90 pcf for the full height of the wall.

Determination of whether the active or at-rest condition is appropriate for design will depend on the flexibility of the wall. Walls that are free to rotate at least 0.002 radians (deflection at the top of the wall of at least 0.002 x H, where H is the unbalanced wall height) may be designed for the active condition. Walls that are not capable of this movement should be assumed rigid and designed for the at-rest conditions. Assuming that the backfill behind the retaining walls will consist of import sand, the recommended static active and at-rest earth pressures are as follow.

Table 7 - Earth Pressures for Retaining Walls

Wall Movement	Backfill Condition	Equivalent Fluid Pressure
Free to Deflect	Level	45
Restrained	Level	65

The above lateral earth pressures do not include the effects of surcharge (e.g., traffic, footings, sloping ground) or compaction-induced wall pressures. Any surcharge (live, including traffic, dead load, or slope) located within a 1:1 plane drawn upward from the base of the excavation should be added to the lateral earth pressures. The lateral contribution of a uniform surcharge load located immediately behind walls may be calculated by multiplying the surcharge by 0.33 for cantilevered walls and 0.5 for restrained walls. For vehicular surcharge, adjacent to driveways or parking areas a uniform lateral pressure of 100 pounds per square foot, acting as a result of an assumed 300 pounds per square foot traffic surcharge should be used. The onsite clay soils should not be used as backfill for the walls unless the soil expansion is considered in the design due to an increase of lateral pressure.

Walls should be waterproofed using appropriate membranes, and properly drained or designed to resist hydrostatic pressures. The waterproofing membrane should be covered with a protection board or equivalent to prevent perforation during backfilling.

Except for the upper 1½ feet, the backfill immediately behind retaining walls (minimum horizontal distance of 12 inches measured perpendicular to the wall) should consist of free-draining ¾-inch crushed rock wrapped with filter fabric. The upper 1½ feet of cover backfill should consist of relatively impervious onsite material. A 4-inch diameter perforated PVC pipe, placed perforations down at the bottom of the crushed rock layer, leading to a suitable gravity outlet, should be installed at the base of the walls. Geocomposite panel drains may be used as an alternative to extending the crushed rock to within 1½ feet of the ground surface for the wall drain. With wall drain panels, the 4-inch diameter perforated pipe located at the heel of the wall/footing should be surrounded with one cubic foot of ¾-inch crushed rock wrapped with filter fabric; the pipe invert should be supported on about 1½ inches of crushed rock. All drainage should be directed to the street or to a storm drain in non-erosive devices.

In the event of a large earthquake, the lateral earth pressure on walls may be significant. When combining both static and seismic lateral earth pressures, a decreased factor of safety may be used in the design of retaining walls when checking for sliding and overturning stability. For cantilever walls, we have calculated the seismic increment of lateral pressure using the Mononobe-Okabe equation assuming the seismic coefficient to be 1/3 of the peak acceleration (PGA_M). We suggest using a dynamic earth pressure increment of 30 psf/ft for cantilever yielding walls with level backfill assuming the walls will not exceed 10 feet in height. The pressure should be taken as an inverted triangular distribution with the zero pressure point at the toe of the wall and 30 H (psf where H in feet) at the top of the wall, where H is the wall height in feet. The point of application of the dynamic thrust may be taken at 0.6H above the toe of the wall. The Structural Engineer should determine if a seismic increment of lateral earth pressure is applicable based on wall heights and allowable wall movements.

The proposed wall along the east property line is located above a 10 to 13-foot high slope. Due to the proximity of the slope and expansive soils, we recommend a footing embedment of at least 3 feet; the edge of the footing should be located at least 6 feet from the slope face. The passive pressure should be reduced to 120 pcf due to the slope proximity and the presence of expansive soils. The thickness of engineered fill below wall footings should be at least 3 feet. It appears that portions of the slopes were constructed without placing and compacting the fill in thin lifts and without appropriate compaction, and the soils were found to be loose/soft. Deep removal should be anticipated along large portions of the slopes. All undocumented fill should be removed in the vicinity of the retaining walls and slopes.

12.11 Utility Trench Backfill

Bedding material surrounding utility lines and extending to a point 12 inches above the lines should consist of non-expansive soil to support and/or to protect the lines. Where bedding is required, a minimum of 4-inch thick bedding material should be placed below the bottom of the utility lines, on a firm and unyielding subgrade. The bedding material should meet the specifications provided in the latest edition of the “Standard Specifications for Public Works Construction” (Greenbook).

Above the bedding, up to finished subgrade in areas other than landscape and up to one foot below flatworks and pavements, utility trenches should be backfilled with onsite materials or imported

materials with a low expansion potential and mechanically compacted to at least 90% of the maximum dry density of the soils.

For utility trenches within the building areas, the backfill should be compacted to the minimum required relative compaction indicated under the "Grading" Section of this report. The backfill material should be observed, tested and approved by the Geotechnical Consultant.

When adjacent to any footings, utility trenches and pipes should be laid above an imaginary line measured at a gradient of 1½ (H:V) projected down from the bottom edges of any footings. Otherwise, the pipe should be designed to accept the lateral effect from the footing load, or the footing bottom should be deepened as needed to comply with this requirement. Backfill consisting of 2-sack sand cement slurry may also be used.

12.12 Drainage

Foundation, slab, flatwork, and pavement performance depends greatly on proper drainage within and along the boundary of the improvements. Perimeter grades surrounding any type of structures should be sloped in a manner allowing water to drain away from the structure and not pond next to the foundations. Per the 2016 CBC, landscape areas within 10 feet of structures should slope away at gradients of at least 5 percent. Paved areas within 10 feet of structures should slope away at gradients of at least 2 percent. Proper drainage is recommended for all surfaces to reduce the risk of soil movement due to soil expansion.

Common measures to mitigate expansion risk include removal of the more susceptible material and recompaction, preventing and repairing promptly utility line leaks, maintaining site drainage and drainage devices, and proper management of landscape watering to reduce the likelihood of water infiltrating deeper materials. To reduce the potential for overwatering, irrigation should be performed under the management of experienced landscape architects, and not under the control of a landscape contractor.

12.13 Percolation Testing

Three percolation tests were performed; one located near the west side of Detention Basin A, south of Building 2, and two percolation tests within the WQ Basin B. The drilling for the holes and

percolation testing were performed on a sunny day. No significant rain had occurred for several weeks prior to percolation testing. The depths of the holes for the three percolation tests were 20, 15 and 22 feet.

Since the County of San Bernardino does not have specific infiltration test procedures for storm water disposal, Koury performed the tests in substantial conformance with the boring percolation test procedures of the County of Riverside as defined in County Document, Riverside County – Low Impact Development BMP Design Handbook, Rev. 9/2011. The test procedures consisted of drilling 8-inch diameter boreholes to the test depths and placing a 2-inch layer of filter gravel at the bottom of the holes. We also placed a 3½-inch diameter perforated pipe in the holes and backfilled the annulus with clean gravel to avoid caving in the test zone. The procedure involved pre-soaking the percolation zone prior to testing. Following presoaking, the infiltration testing began by filling the bottom of the holes with water and measuring the drop-in water level. For the percolation tests, the water column height in P-1, P-2 and P-3 was about 5, 2½ and 8½ feet, respectively. Based on the infiltration rate during the presoaking period, we selected measuring intervals of 10 and 30 minutes per the test method. The water level drop measurements were repeated several times until consistent results were noted.

The in-situ field percolation tests performed provide short-term percolation rates, which apply mainly to the initiation of the infiltration process due to the short time of the test (minutes to hours instead of days) and the amount of water used. Where appropriate, the short-term infiltration rates should be converted to long-term infiltration rates using reduction factors ranging from 3 to 12 depending upon the degree of infiltrate quality, maintenance access and frequency, site variability, subsurface stratigraphy variation, hydraulic gradient, volume of water to be disposed of and other factors. The small-scale percolation testing cannot model the complexity of the effect of interbedded layers of different soil composition and our test results should be considered index values of infiltration rate.

We have applied a correction factor of 4 and calculated long-term infiltration rates of the percolation tests. For percolation tests P-2 and P-3, the estimated percolation rates are negligible. For percolation test P-1, the long-term rate of infiltration is on the order of 0.3 in/hr or less. The calculations are presented in Appendix C. Based on the boring logs, the

fines contents of the soils are high and a low infiltration rate should be expected. The boring logs presented in Appendix B indicate the fines contents of the soils for different depths.

Other Geotechnical Considerations

The areas of the percolation tests were found to be underlain by alluvium materials consisting predominantly of clay at shallow depth, which are relatively impervious and are not conducive to infiltration and other methods of storm water disposal should be considered (e.g. bioswale). Groundwater was encountered at relatively shallow depths in the proposed WQ Basin. Therefore, onsite infiltration is not considered practical.

12.14 Asphalt Concrete (AC) Pavement

The required pavement structural sections depend on the expected wheel loads, volume of traffic, and subgrade soils. The characteristics of subgrade soils are determined by R-value testing. Based on soil classification and laboratory testing results, an R-value of 5 was selected for pavement design. The R-value may be confirmed by additional testing once pavement subgrade level has been reached, if necessary, at the time of construction. The following pavement sections were calculated based on assumed traffic indices of 4, 5, 6 and 7. The project Civil Engineer should determine the traffic index to be used for different areas of the site.

Table 8 – Alternative Pavement Sections for Vehicular Traffic

Traffic Index	Asphalt Thickness (Inches)	Base Course (CAB) Thickness (Inches)
4	3.0	7.0
5	3.0	10.0
6	3.5	13.0
7	4.0	15.0

Base course material should consist of Crushed Aggregate Base (CAB) as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction ("Greenbook"). Base course and asphalt concrete should be compacted to at least 95 percent of the maximum dry density of that

material. Crushed Miscellaneous Base (CMB) may be used only if the supplier can demonstrate that the aggregate does not contain contaminated material and provide documentation to that effect.

The subgrade underlying the pavement areas should be prepared as discussed under the grading section of this report to remove all soft and dry soils present at subgrade level. Prior to fill placement, the exposed surface should be scarified to a minimum depth of 8 inches, moisture conditioned and compacted to at least 90% of the maximum dry density obtained per ASTM D1557. The subgrade should be in a "non-pumping" condition at the time of compaction. Prior to placement of the aggregate base, the moisture content of the upper foot of clay subgrade should be verified to be at least 125 percent of optimum moisture unless approved otherwise by the Geotechnical Engineer.

Any onsite surficial organic soils within landscaped/turf areas should not be used as subgrade materials. Where feasible, the overexcavation should be laterally extended a minimum of 2 feet beyond the perimeters and edges of parking areas, roadways and curbs. Any abandoned footing and/or underground concrete structure within the work limit should be removed entirely and the excavation should be backfilled to grade.

In order to increase pavement performance and extend the pavement life, concrete curbs and gutters could be deepened to extend below the base course material and be seated in the compacted subgrade. Priority should be given to areas where heavier traffic is anticipated and where irrigation may be greater. The intent of deepening the curbs and gutters is to form a "cut-off" wall to reduce the amount of water flow through the base course material from adjacent landscaped areas. Subgrade soils, which become soaked as a result of water flowing through base course material, can reduce the life of the pavement and cause heaving of the pavement. The curbs should be deepened to an elevation of at least 6 inches below the bottom level of the proposed base course section. Proper pavement surface drainage and maintenance is important since longer lasting pavements are associated with soils that do not become excessively moist or soils that have a low expansion potential below the aggregate base.

12.15 Portland Cement Concrete (PCC) Vehicular Pavement

The grading recommendations for vehicular PCC pavement are provided in Section 12.2 of this report. Base course material used in the pavement sections should consist of Crushed Aggregate

Base (CAB) as defined by Section 200-2.2 of the Standard Specifications for Public Works Construction (Greenbook 2018) or by Crushed Miscellaneous Base (CMB), as defined by Section 200-2.4 of the Greenbook. The aggregate base course should be compacted to at least 95% of the maximum dry density of that material. Better pavement performance is anticipated where the soils immediately below the aggregate base are prevented from gaining moisture.

The subgrade underlying the pavement areas should be prepared as discussed under the grading section of this report to remove all soft and dry soils present at subgrade level. Prior to placement of the aggregate base, the moisture content of the upper foot of clay subgrade should be verified to be at least 130 percent of optimum moisture unless approved otherwise by the Geotechnical Engineer. The subgrade should be in a "non-pumping" condition at the time of aggregate base placement.

The recommendations presented herein should be used for design and construction of the slabs and pertaining grading work underlying vehicular pavement areas. A minimum modulus of rupture of 550 psi for concrete has been assumed in designing of the PCC pavement sections; this corresponds to a concrete compressive strength of approximately 4,000 psi at 28 days. A qualified design professional should specify traffic index for different areas of the site.

Table 9 - PCC Pavement Sections

Traffic Index	Portland Cement Concrete Thickness (inches)	Base Course (CAB) Thickness (inches)
4	6.5	4.0
5	7.0	4.0
6	7.5	4.0
7	8.0	4.0

The following recommendations should also be incorporated into the design and construction of PCC pavement sections:

- The pavement sections should be reinforced at the discretion of the owner with No. 3 rebar spaced at 18 inches on centers each way to reduce the amount of shrinkage cracking.

- Joint spacing in feet should not exceed twice the slab thickness in inches, e.g., 10 feet for a 5-inch thick slab. Regardless of slab thickness, joint spacing should not exceed 10 feet due to the presence of expansive soil.
- Layout joints should form square panels. When this is not practical, rectangular panels can be used if the long dimension is no more than 1.5 times the short one.
- Control joints should have a depth of at least 1/4 the slab thickness, e.g., 1 inch for a 4-inch thick slab.
- Where the pavement does not abut against a curb or gutter, an 8-inch thickened edge should be constructed if landscaping is anticipated.
- Pavement section design assumes that proper maintenance such as sealing, and repair of localized distress will be performed on a periodic basis to prevent the subgrade soils to gain moisture.

Exterior concrete slabs for pedestrian traffic or landscape should be at least four inches thick. Weakened plane joints should be located at intervals of no more than about 6 feet unless slabs thicker than 4 inches are used. A thickened edge (10-inch deep) is recommended at the exterior edge of the flatwork adjacent to landscape subject to irrigation. The upper 18 inches of the clay subgrade should have a moisture content of at least 130 percent of optimum prior to placement of the granular soils. The concrete strength for pedestrian walkways should be at least 2,500 psi unless determined otherwise by the Structural Engineer.

13. SOIL EXPANSIVITY

The subsurface soils encountered in our borings and test pits consist mostly of lean to fat clay. These types of material generally have a moderate to very high susceptibility to expansion when facing seasonal cycles of saturation/desiccation. The expansion index test indicated a range between about 20 and 162 with an average of about 79, which is generally considered a moderate to high expansion potential. The plasticity index test also indicated a moderate expansion potential; however, the expansion potential should be expected to vary throughout the site. As such, the recommendations provided in this report regarding drainage system, moisture content during compaction, presoaking if needed, the use of sand/aggregate base blankets and other pertinent recommendations for site improvements should be incorporated into the design and construction.

14. SOIL CORROSIVITY

The corrosion potential of the onsite materials to steel and buried concrete was preliminarily evaluated. Laboratory testing was performed on selected soil samples to evaluate pH, minimum resistivity, chloride and soluble sulfate content. These tests are only an indicator of soil corrosivity for the samples tested. Other soils found on site may be more, less, or of a similar corrosive nature. Imported fill materials should be tested to confirm that their corrosion potential is not significantly more severe than those noted. The test results are presented in the following table.

Table 10 - Corrosion Test Results

Boring	Depth (ft)	Minimum Resistivity (ohm-cm)	pH	Soluble Sulfate Content (ppm)	Soluble Chloride Content (ppm)
B-6	0 – 2	288	8.2	819	910
TP-4	2.5 – 3	1,550	7.4	112	65
B-18	0 – 2	1,770	7.9	147	25
B-23	2 – 4	1,740	7.8	215	45
TP-27	3.5 – 4.2	1,310	8.5	226	145

Based on the minimum resistivity results, some of the near-surface site soils are severely corrosive towards buried ferrous metals. The concentrations of soluble sulfates indicate that the potential of sulfate attack on concrete in contact with the onsite soils is “negligible” based on ACI 318 Table 4.3.1. Cement Type II may be used in the concrete. Maximum water-cement ratios are not specified for the sulfate concentrations; however, the Structural Engineer should select a concrete with appropriate strength.

Further interpretation of the corrosivity test results, including the resistivity value, and providing corrosion design and construction recommendations are the purview of a corrosion specialists/consultants.

15. OBSERVATION AND TESTING

This report has been prepared assuming that Koury Engineering & Testing, Inc. will perform all geotechnical-related field observations and testing. If the recommendations presented in this report

are utilized, and observation of the geotechnical work is performed by others, the party performing the observations must review this report and assume responsibility for the recommendations contained herein. That party would then assume the title of "Geotechnical Consultant of Record". A representative of the Geotechnical Consultant should be present to observe all grading operations as well as all footing excavations. The proposed import soils should be tested prior to transportation on site.

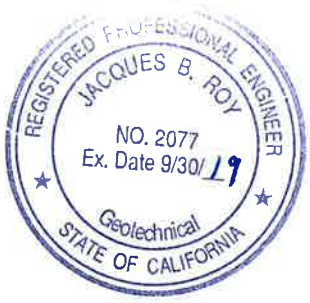
16. CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations, combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either expressed or implied. Subsurface variations between borings and test pits should be anticipated. Koury should be notified if subsurface conditions are encountered, which differ from those described in this report since updated recommendations may be required. Samples obtained during this investigation will be retained in our laboratory for a period of 45 days from the date of this report and will be disposed after this period.

Should you have any questions concerning this submittal, or the recommendations contained herewith, please do not hesitate to call our office.

Respectfully submitted,

KOURY ENGINEERING & TESTING, INC.



Jacques B. Roy P.E. G.E.
Principal Geotechnical Engineer

Distribution: 1. Addressee (1 wet stamped copy + a pdf copy via e-mail)
2. File (B)

APPENDICES

Appendix A: Maps and Plans

Vicinity Map – Figure A-1
Field Exploration Points – Figures A-2a and A-2b
Cross Section A-A' – Figure A-2c
Preliminary Remedial Grading Maps – Figure A-2d and A-2e
Geology Map – Figure A-3
Fault Map – Figure A-4
Flood Map – Figure A-5
Response Spectrum – Figure A-6

Appendix B: Field Exploratory Boring and Test Pit Logs

Borings B-1 through B-28

Test Pits 1 through 72 (Test Pit 34 was omitted)

Appendix C: Laboratory Test Results and Calculations

REFERENCES

1. California Division of Mines and Geological Survey, 1998, Seismic Hazard Zone Report 045 for the Prado Dam 7.5 Minute Quadrangle, California.

2. California Division of Mines and Geological Survey, 2003, Earthquake Fault Zones, Prado Dam Quadrangle, May 1, 2003.

3. City of Chino General Plan, Safety Element, 2010, Final Report.

4. http://geotracker.waterboards.ca.gov

5. Standards Specifications for Public Works Construction, 2018, Public Works Standard, Inc.

6. US Army Corps of Engineers, Laboratory Soils Testing, Engineering Manual EM 1110-2-1906, dated 8/26/86.

7. US Army Corps of Engineers, Geotechnical Investigations, Engineering Manual EM 1110-1-1804, dated 1/01/2001.

8. US Army Corps of Engineers, Settlement Analysis, Engineering Manual EM 1110-1-1904, dated 9/30/1990.

9. US Army Corps of Engineers, Bearing Capacity of Soils, Engineering Manual EM 1110-1-1905, dated 10/30/1992.

10. US Army Corps of Engineers, Slope Stability, Engineering Manual EM 1110-2-1902, dated 10/31/2003.

11. US Army Corps of Engineers, Groundwater Hydrology, Engineering Manual EM 1110-2-1421, dated 02/28/1999.

12. United States Geological Survey, 2006, Geology Map of the San Bernardino & Santa Ana 30' X 60' Quadrangles, California, Version 1.0, compiled by Douglas M. Morton et al, 2006.

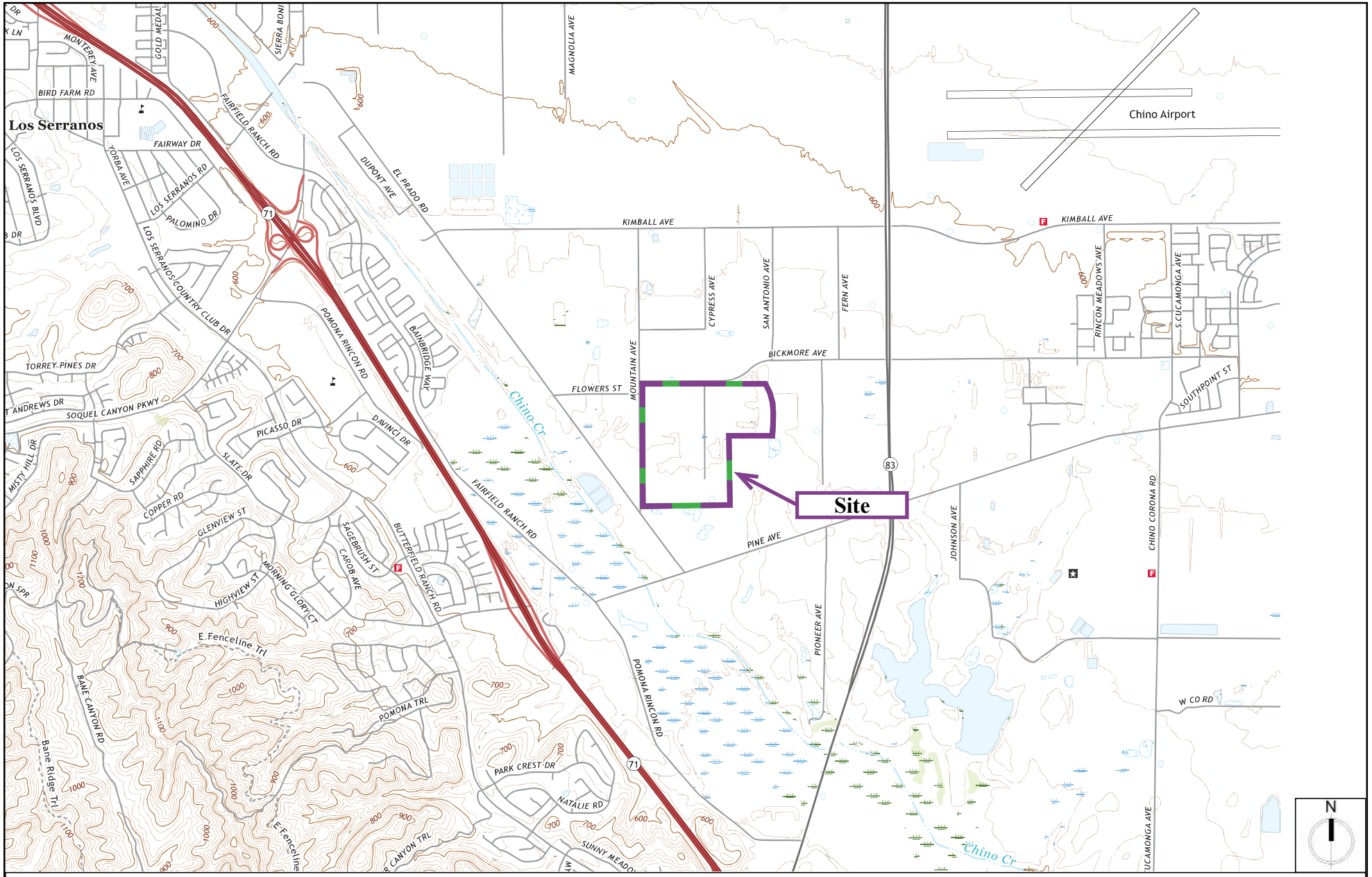
13. United States Geological Survey, 2015, Prado Dam Quadrangle, 7.5-Minute Series (Topographic) map Quadrangle, California.

14. USGS, U. S. Seismic Design Maps, Web Site http://earthquake.usgs.gov/designmaps/us/application.php.

15. USGS, Earthquake Hazards Program, Unified Hazard Tool, Web Site http://earthquake.usgs.gov/hazards/interactive/.

APPENDIX A

Maps and Drawings

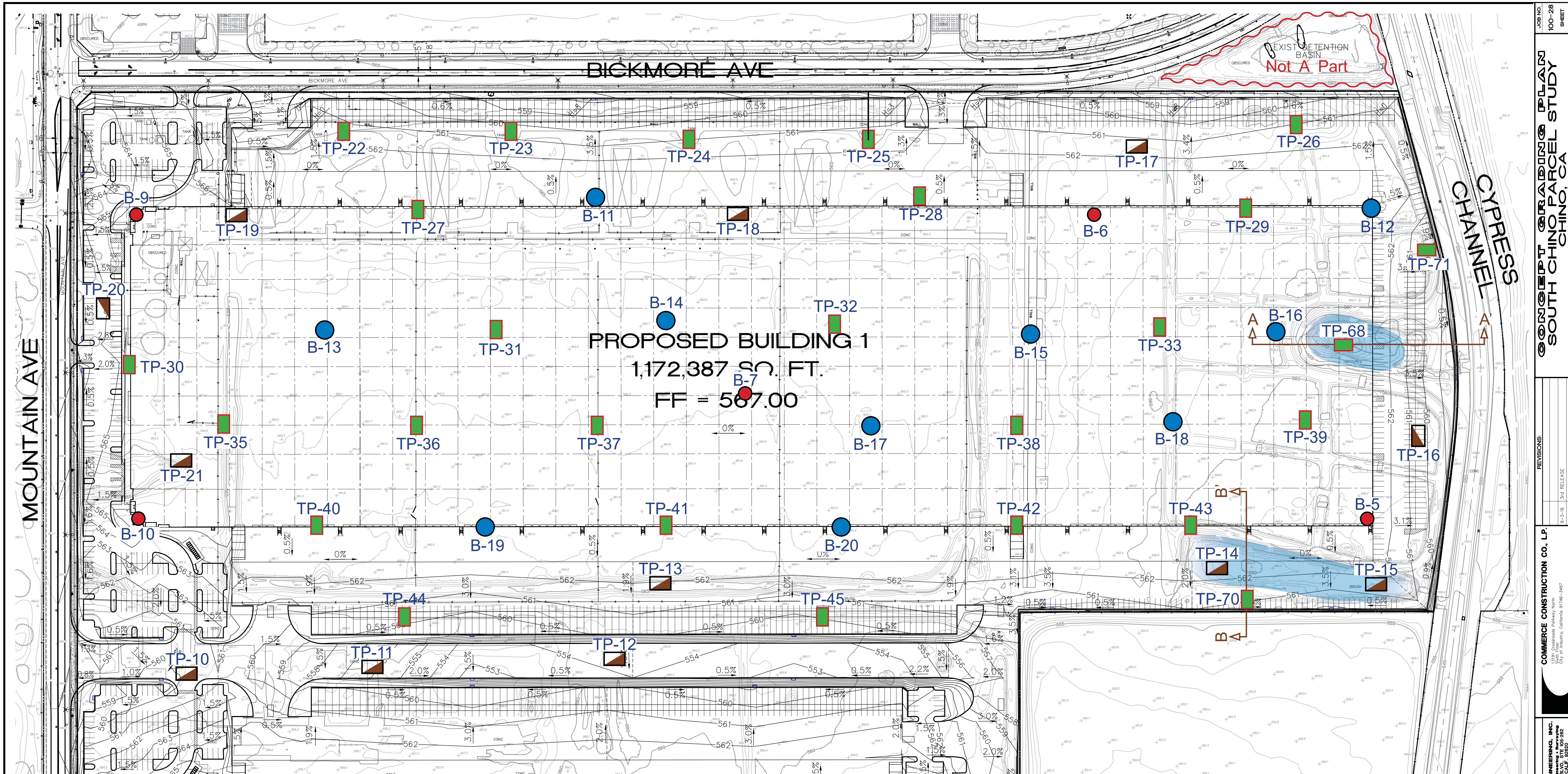


Reference: USGS Topographic Map, Prado Dam Quadrangle, California, 7.5 Minute Series 2018 - Contour Interval 20 feet, NAVD of 1988

0 1/2 1 Mile

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.:	Drawing Title:	Figure:
OC Prado Construction Level Study	**18-0817**	**Vicinity Map**	**A-1**
	Date: **October 2018**		



Legend

TP-72	B-28	Approximate Location of Field Exploration Points For Construction Level Study
TP-21	B-10	Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17

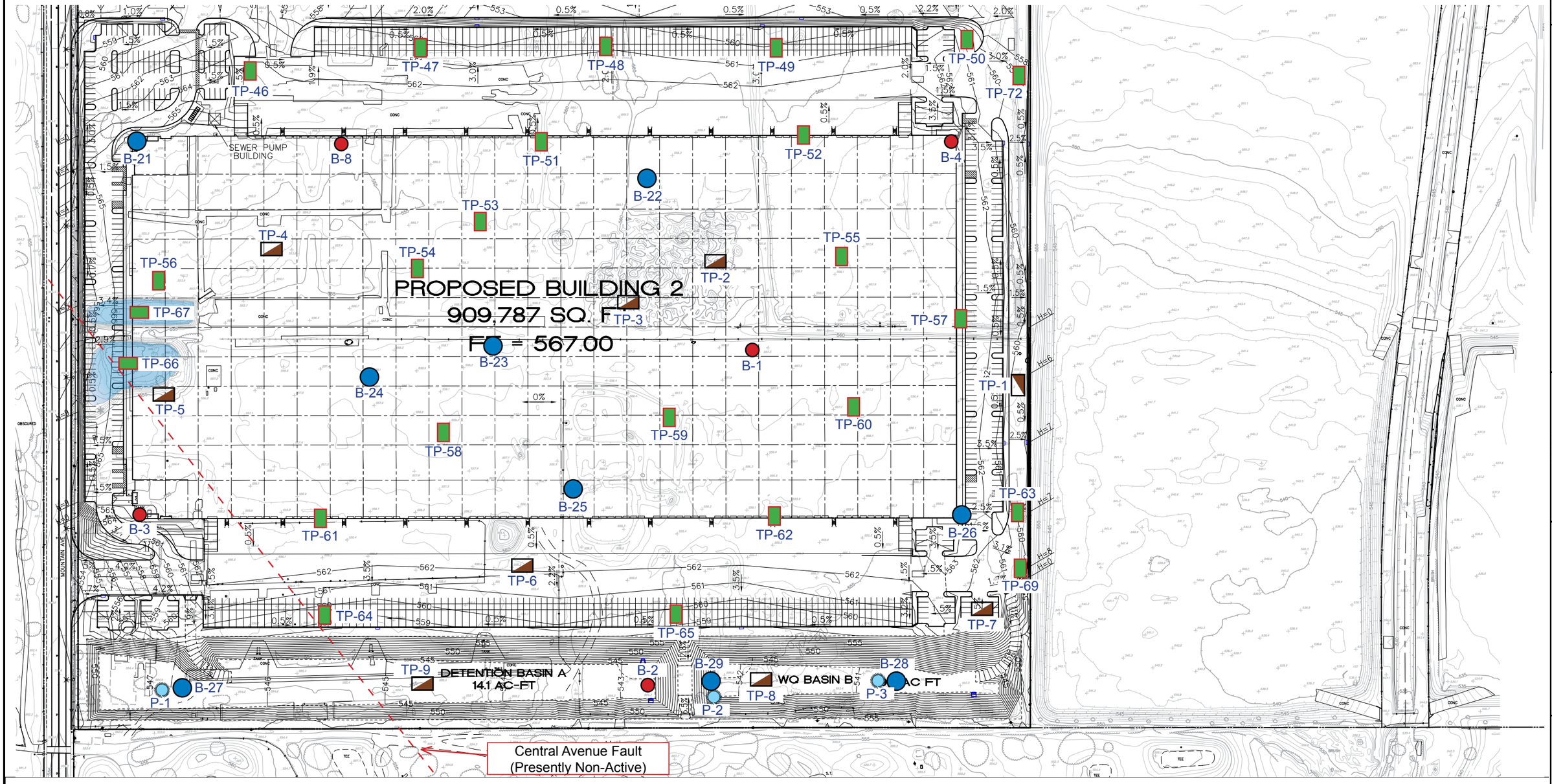
Existing Water Pond

B — B' Geotechnical Cross Section

N

0 250 500'

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Field Exploration Points	Figure: A-2a



Legend

TP-72 B-28 — Approximate Location of Field Exploration Points For Construction Level Study

P-3 — Approximate Location of Percolation Test

TP-21 B-10 — Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17

Existing Water Pond

CONCEPT GRADING PLAN
SOUTH CHINO PARCEL STUDY
CHINO, CA
STORM DRAIN PUMP OPTION

JOB NO. 100-28
SHEET 1 of 1

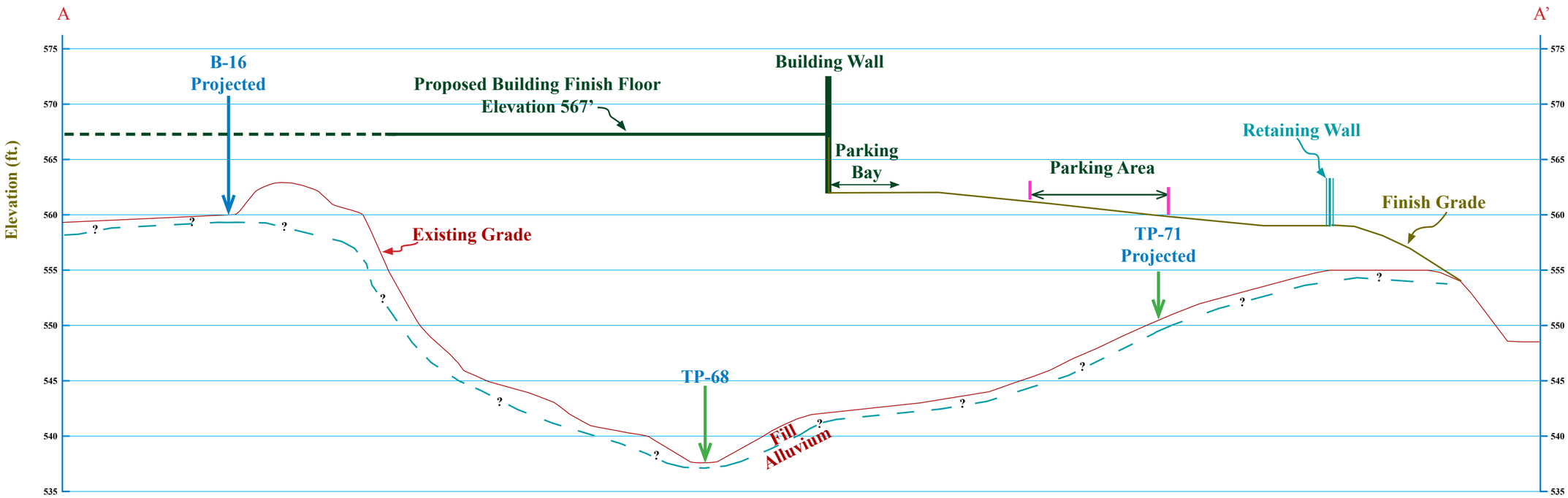
REVISIONS
5-3-18 3rd RELEASE
5-24-18 2nd RELEASE
5-27-18 1st RELEASE

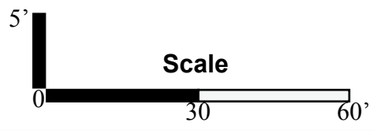
COMMERCE CONSTRUCTION CO., L.P.
1331 Columbia Parkway North
Suite 210
Cincinnati, California 91746-3497
Telephone: (562) 699-2453
License No. 723302

PREPARED BY:
PBLA ENGINEERING, INC.
3990 RUBIDOUX BLVD., SUITE 20
RIVERSIDE, CALIFORNIA 92509
(951) 684-4900 / (951) 684-4901 FAX

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Field Exploration Points	Figure: A-2b

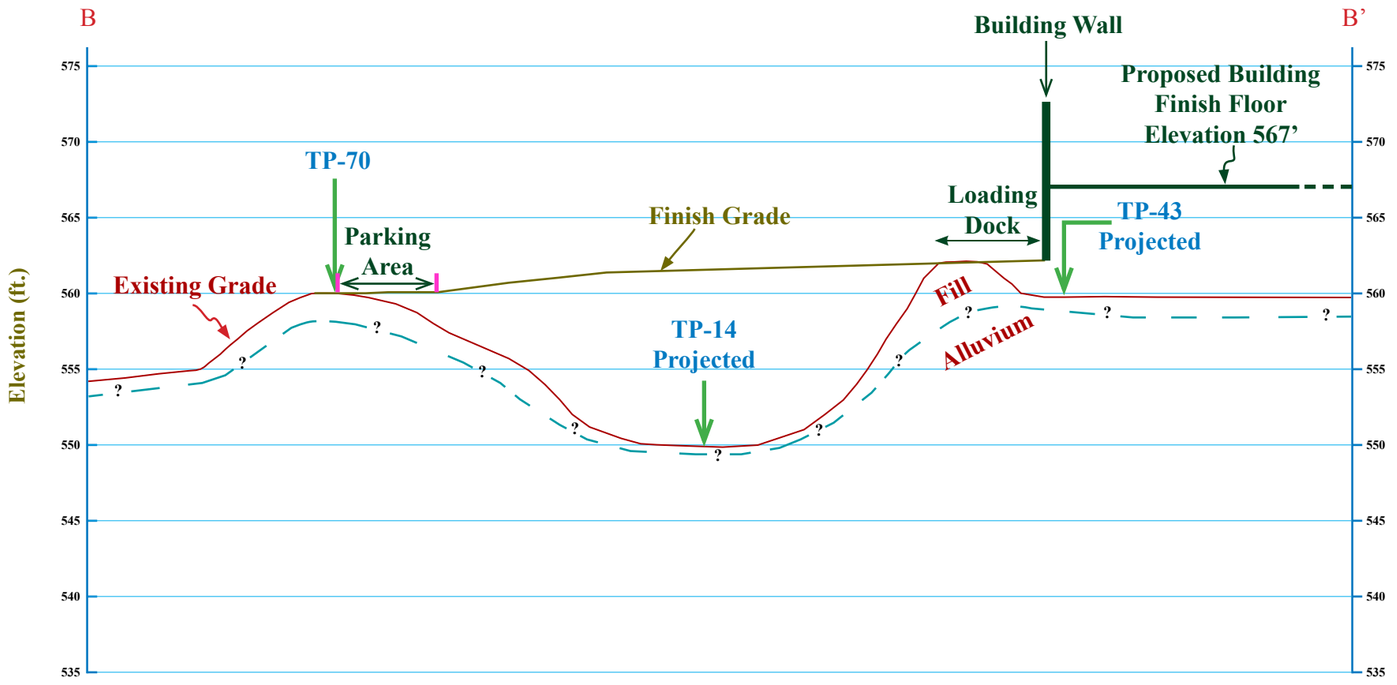
W ⟵ ⟶ E

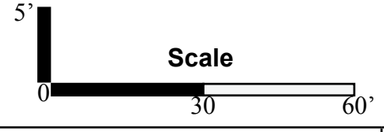




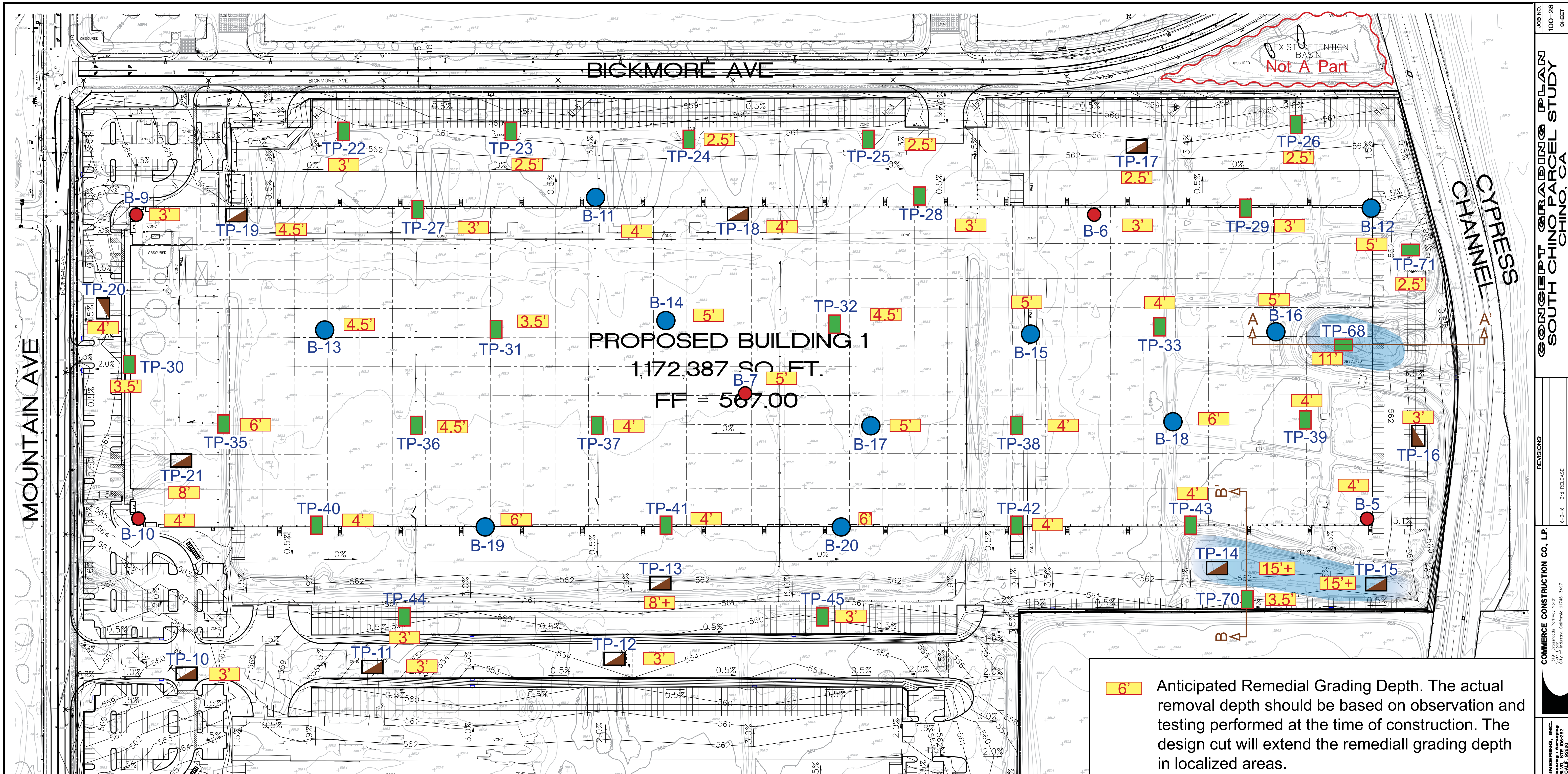
KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Geotechnical Cross Section A-A'	Figure: A-2c

S ⟷ N





KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Geotechnical Cross Section B-B'	Figure: A-2d



Legend

TP-72 B-28 Approximate Location of Field Exploration Points For Construction Level Study

TP-21 B-10 Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17

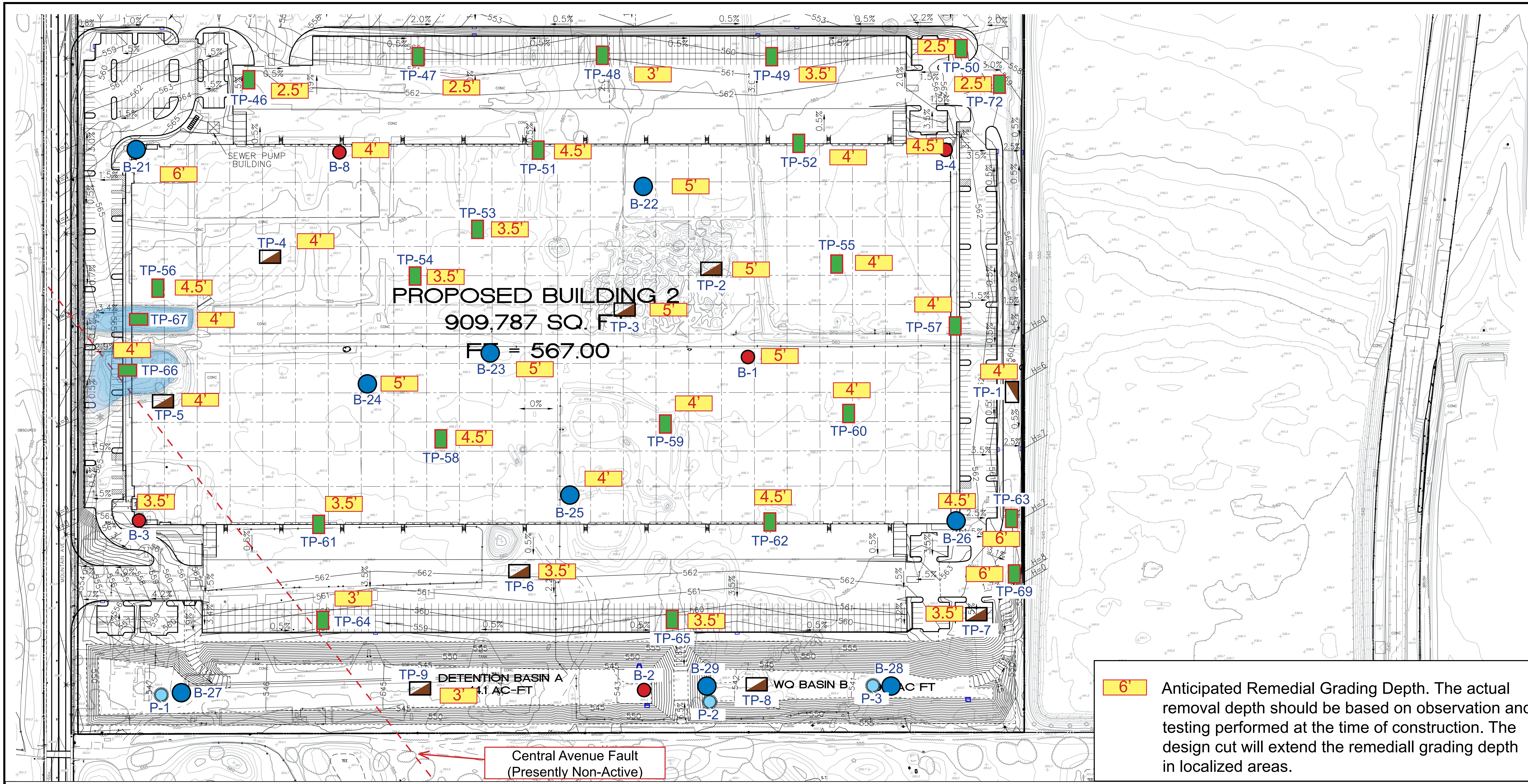
Existing Water Pond

B B' Geotechnical Cross Section

N

0 250 500'

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Preliminary Remedial Grading Map	Figure: A-2e



Legend

TP-72	B-28	Approximate Location of Field Exploration Points For Construction Level Study
TP-21	B-10	Approximate Location of Field Exploration Points Performed For Feasibility Study on 5/17/17 & 5/22/17

P-3 Approximate Location of Percolation Test

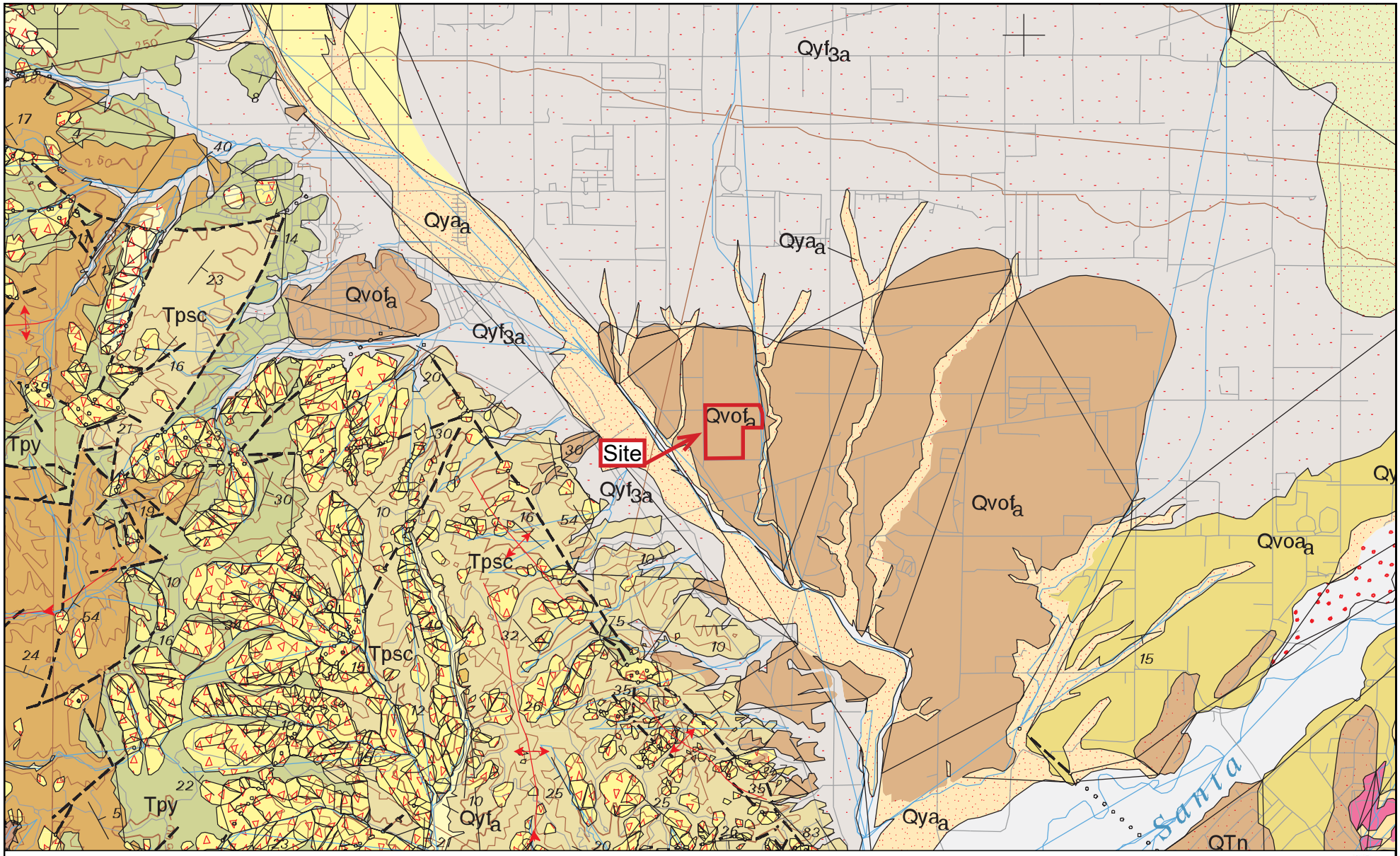
Existing Water Pond

N

0 250 500'

KOURY ENGINEERING & TESTING, INC.

Project Name: OC Prado Construction Level Study	**Project No.:** 18-0817	**Date:** October 2018
Drawing Title: Preliminary Remedial Grading Map	**Figure:** A-2f	



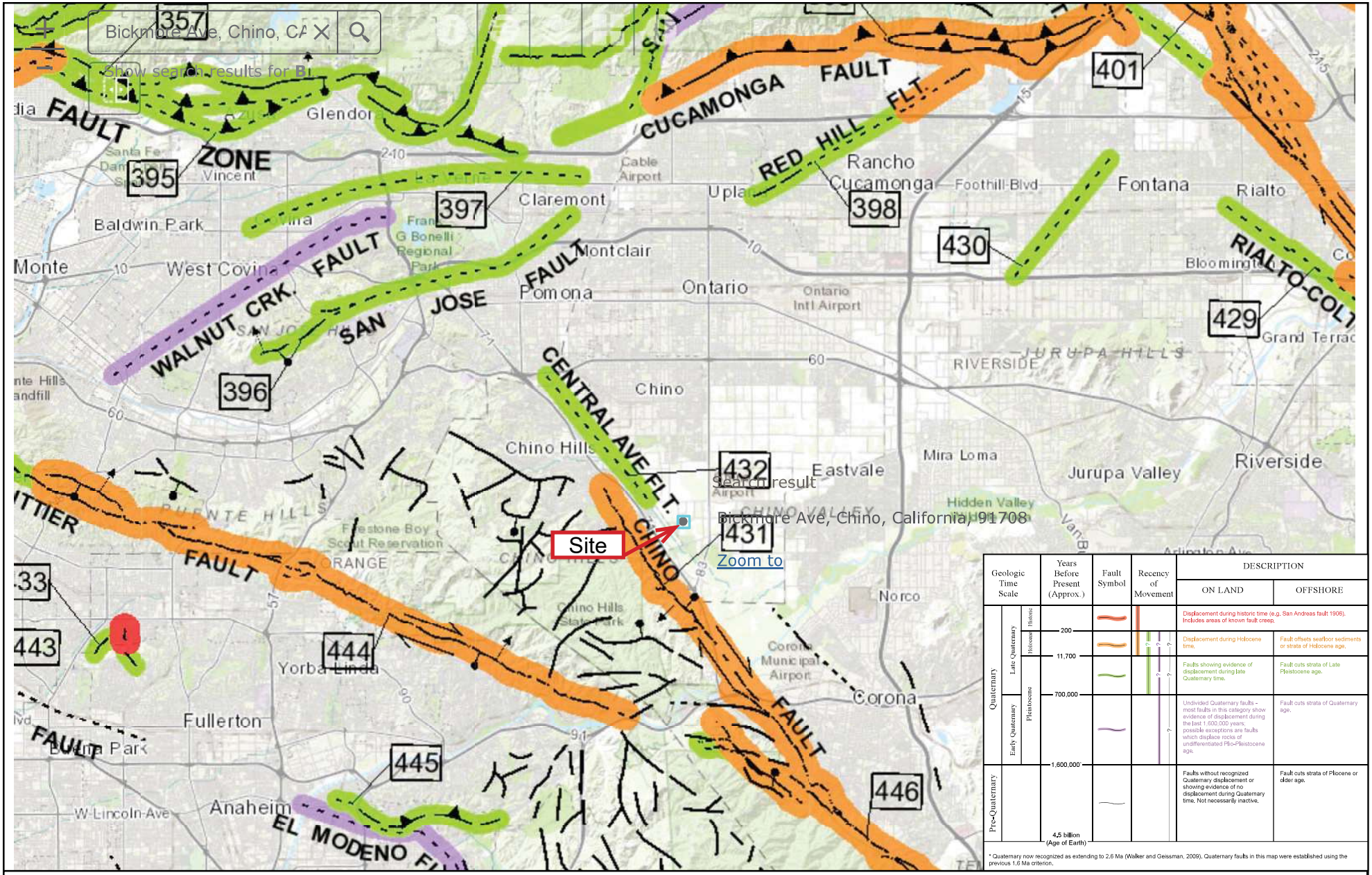
LEGEND

Qya **Young alluvial-valley deposits**

Qvof **Very old alluvial-fan deposits**

Reference: Geologic Map of the San Bernardino & Santa Ana 30´x60´ Quadrangle California-Version 1.0 Compiled by Douglas M. Morton and Fred K. Miller, 2006

KOURY ENGINEERING & TESTING, INC.	Project Name: **OC Prado Construction Level Study**	Project No.: **18-0817** Date: **October 2018**	Drawing Title: **Geology Map**	Figure: **A-3**



Reference: Fault Activity Map of California (2010) - California Geological Survey
Department of Conservation Web Site @ http://maps.conservation.ca.gov/cgs/fam/ - See Figure A-4a, for explanation

0 4 Mile

N

KOURY ENGINEERING & TESTING, INC.	Project Name: **OC Prado Construction Level Study**	Project No.: **18-0817** Date: **October 2018**	Drawing Title: **Fault Map**	Figure: **A-4**

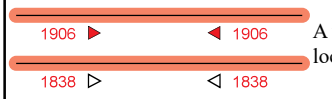
EXPLANATION

Fault traces on land are indicated by solid lines where well located, by dashed lines where approximately located or inferred, and by dotted lines where concealed by younger rocks or by lakes or bays. Fault traces are queried where continuation or existence is uncertain. Concealed faults in the Great Valley are based on maps of selected subsurface horizons, so locations shown are approximate and may indicate structural trend only. All offshore faults based on seismic reflection profile records are shown as solid lines where well defined, dashed where inferred, queried where uncertain.

FAULT CLASSIFICATION COLOR CODE (Indicating Recency of Movement)

Fault along which historic (last 200 years) displacement has occurred and is associated with one or more of the following:

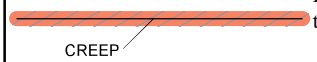
(a) a recorded earthquake with surface rupture. (Also included are some well-defined surface breaks caused by ground shaking during earthquakes, e.g. extensive ground breakage, not on the White Wolf fault, caused by the Arvin-Tehachapi earthquake of 1952). The date of the associated earthquake is indicated. Where repeated surface ruptures on the same fault have occurred, only the date of the latest movement may be indicated, especially if earlier reports are not well documented as to location of ground breaks.
(b) fault creep slippage - slow ground displacement usually without accompanying earthquakes.
(c) displaced survey lines.



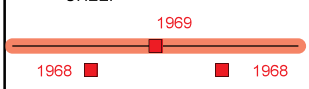
A triangle to the right or left of the date indicates termination point of observed surface displacement. Solid red triangle indicates known location of rupture termination point. Open black triangle indicates uncertain or estimated location of rupture termination point.

Date bracketed by triangles indicates local fault break.

No triangle by date indicates an intermediate point along fault break.



Fault that exhibits fault creep slippage. Hachures indicate linear extent of fault creep. Annotation (creep with leader) indicates representative locations where fault creep has been observed and recorded.

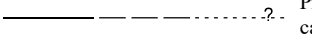


Square on fault indicates where fault creep slippage has occured that has been triggered by an earthquake on some other fault. Date of causative earthquake indicated. Squares to right and left of date indicate termi- nal points between which triggered creep slippage has occurred (creep either continuous or intermittent between these end points).

Holocene fault displacement (during past 11,700 years) without historic record. Geomorphic evidence for Holocene faulting includes sag ponds, scarps showing little erosion, or the following features in Holocene age deposits: offset stream courses, linear scarps, shutter ridges, and triangular faceted spurs. Recency of faulting offshore is based on the interpreted age of the youngest strata displaced by faulting.

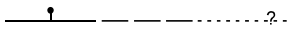
Late Quaternary fault displacement (during past 700,000 years). Geomorphic evidence similar to that described for Holocene faults except features are less distinct. Faulting may be younger, but lack of younger overlying deposits precludes more accurate age classification.

Quaternary fault (age undifferentiated). Most faults of this category show evidence of displacement some- time during the past 1.6 million years; possible exceptions are faults which displace rocks of undifferenti- ated Plio-Pleistocene age. Unnumbered Quaternary faults were based on Fault Map of California, 1975. See Bulletin 201, Appendix D for source data.

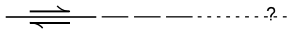


Pre-Quaternary fault (older that 1.6 million years) or fault without recognized Quaternary displacement. Some faults are shown in this category because the source of mapping used was of reconnaissnce nature, or was not done with the object of dating fault displacements.

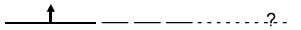
ADDITIONAL FAULT SYMBOLS



Bar and ball on downthrown side (relative or apparent).



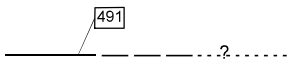
Arrows along fault indicate relative or apparent direction of lateral movement.



Arrow on fault indicates direction of dip.

Low angle fault (barbs on upper plate). Fault surface generally dips less than 45° but locally may have been subsequently steepened. On offshore faults, barbs simply indicate a reverse fault regardless of steepness of dip

OTHER SYMBOLS



Numbers refer to annotations listed in the appendices of the accompanying report. Annotations include fault name, age of fault displacement, and pertinent references including Earthquake Fault Zone maps where a fault has been zoned by the Alquist-Priolo Earthquake Fault Zoning Act. This Act requires the State Geolo- gist to delineate zones to encompass faults with Holocene displacement.

Structural discontinuity (offshore) separating differing Neogene structural domains. May indicate disconti- nuities between basement rocks.

Brawley Seismic Zone, a linear zone of seismicity locally up to 10 km wide associated with the releasing step between the Imperial and San Andreas faults

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado Construction Level Study	Project No.: 18-0817 Date: October 2018	Drawing Title: Fault Map Legend	Figure: A-4a

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 10/1/2018 at 6:40:48 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.:	Drawing Title:	Figure:
OC Prado Construction Level Study	18-0817	Flood Map	A-5
	Date: October 2018		

USGS Design Maps Summary Report

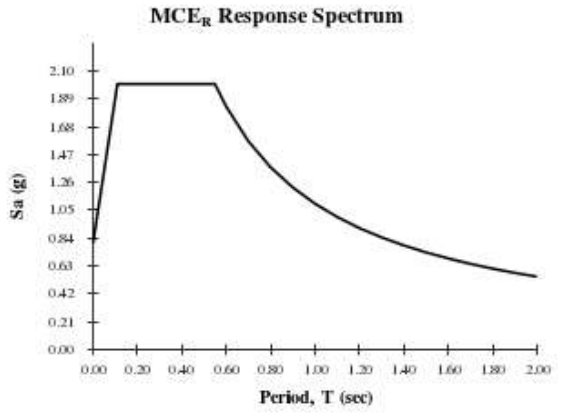
User–Specified Input

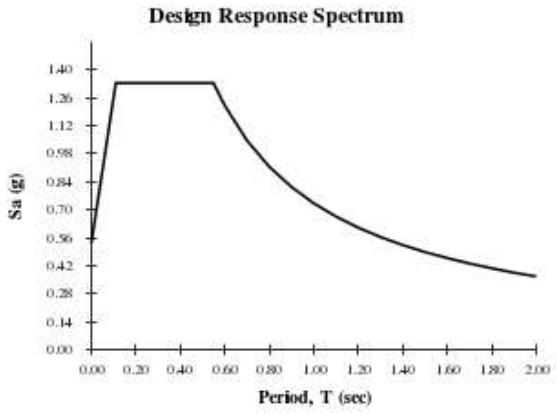
Report Title	OC Prado - Construction Level Study Mon October 1, 2018 23:17:17 UTC
Building Code Reference Document	ASCE 7-10 Standard (which utilizes USGS hazard data available in 2008)
Site Coordinates	33.95716°N, 117.66298°W
Site Soil Classification	Site Class D – "Stiff Soil"
Risk Category	I/II/III

USGS–Provided Output

S_S =	2.001 g	S_{MS} =	2.001 g	S_{DS} =	1.334 g
S_1 =	0.732 g	S_{M1} =	1.099 g	S_{D1} =	0.732 g

For information on how the SS and S1 values above have been calculated from probabilistic (risk-targeted) and deterministic ground motions in the direction of maximum horizontal response, please return to the application and select the "2009 NEHRP" building code reference document.





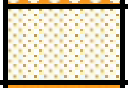
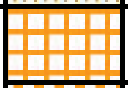
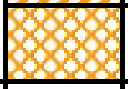
For PGA_M, T_L, C_{RS}, and C_{R1} values, please view the detailed report.

APPENDIX B

Field Exploratory Boring and Test Pit Logs

KEY TO LOGS

SOILS CLASSIFICATION

MAJOR DIVISIONS			GRAPHIC LOG	USCS SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVELS MORE THAN 50% OF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE	CLEAN GRAVELS LESS THAN 5% FINES		GW	WELL-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES MORE THAN 12% FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES
	SANDS 50% OR MORE OF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE	CLEAN SANDS LESS THAN 5% FINES		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
		SANDS WITH FINES MORE THAN 12% FINES		SM	SILTY SANDS, SAND-SILT MIXTURES
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES
FINE GRAINED SOILS 50% OR MORE OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS LIQUID LIMIT IS LESS THAN 50			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS LIQUID LIMIT IS 50 OR MORE			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR GRAVELLY ELASTIC SILTS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT AND OTHER HIGHLY ORGANIC SOILS

GRAIN SIZES

SILT AND CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		
SIEVE SIZES	#200	#40	#10	#4	3/4"	3"	12"

KEY TO LOGS (continued)

SPT/CD BLOW COUNTS VS. CONSISTENCY/DENSITY					
FINE-GRAINED SOILS (SILTS, CLAYS, etc.)			**GRANULAR SOILS (SANDS, GRAVELS, etc.)**		
CONSISTENCY	***BLOWS/FOOT**		**RELATIVE DENSITY**	***BLOWS/FOOT**	
	SPT	**CD**		**SPT**	**CD**
SOFT	0-4	0-4	VERY LOOSE	0-4	0-8
FIRM	5-8	5-9	LOOSE	5-10	9-18
STIFF	9-15	10-18	MEDIUM DENSE	11-30	19-54
VERY STIFF	16-30	19-39	DENSE	31-50	55-90
HARD	over 30	over 39	VERY DENSE	over 50	over 90

* CONVERSION BETWEEN CALIFORNIA DRIVE SAMPLERS (CD) AND STANDARD PENETRATION TEST (SPT) BLOW COUNT HAS BEEN CALCULATED USING "FOUNDATION ENGINEERING HAND BOOK" BY H.Y. FANG. (**VALUES ARE FOR 140 Lbs HAMMER WEIGHT ONLY**)

DESCRIPTIVE ADJECTIVE VS. PERCENTAGE	
DESCRIPTIVE ADJECTIVE	**PERCENTAGE REQUIREMENT**
TRACE	1 - 10%
LITTLE	10 - 20%
SOME	20 - 35%
AND	35 - 50%

*THE FOLLOWING "DESCRIPTIVE TERMINOLOGY/ RANGES OF MOISTURE CONTENTS" HAVE BEEN USED FOR MOISTURE CLASSIFICATION IN THE LOGS.

APPROXIMATE MOISTURE CONTENT DEFINITION	
DEFINITION	**DESCRIPTION**
DRY	Dry to the touch; no observable moisture
SLIGHTLY MOIST	Some moisture but still a dry appearance
MOIST	Damp, but no visible water
VERY MOIST	Enough moisture to wet the hands
WET	Almost saturated; visible free water

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : B-1
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	21.9			0		**Fill:** **Sandy Lean CLAY,** dry wood chips at the surface	#200 Wash Fines = 73%
2	15.2		3 7 11		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, very stiff, moist, brown with white inclusions	#200 Wash Fines = 50% PP = 4 tsf
3	23.0	95	4 16 16	5			#200 Wash Fines = 66% PP = 4.5 tsf
4	17.8		3 6 10			**Older ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 51% PP = 4.0 tsf
5	25.7	104	2 7 18	10	SM	**Silty SAND;** layers of sandy silt, medium dense, moist to very moist, yellowish brown and pale brown	#200 Wash Fines = 43%
6	25.7		3 5 8	15	CL/CH	**Lean to Fat CLAY;** stiff, moist, olive brown	#200 Wash Fines = 85% PP = 3.5 tsf
7	21.6	108	3 9 18	20	CL	**Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 69% PP = 3.5-4 tsf
8	19.4		6 10 17	25			#200 Wash Fines = 70% PP = 3.5-4 tsf
9	34.7	92	6 15 20	30	CH	**Fat CLAY;** very stiff, moist to very moist, pale brown with some yellowish brown	#200 Wash Fines = 87% PP=3.2-3.5 tsf
10	22.7		7 15 15	35	CL	**Sandy Lean CLAY;** very stiff, moist to very moist, light olive brown with some green	#200 Wash Fines = 61% PP = 3.5 tsf
				40			

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-1
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
11	20.1		15 33 50/6"	40	CL	Layers of sandy silt	#200 Wash Fines = 50% PP = 4.5 tsf
12	28.8		7 21 33	45	CH	**Fat CLAY;** hard, moist to very moist, yellowish brown	#200 Wash Fines = 90% PP = 3.5 tsf
13	29.2	97	12 17 27	50			#200 Wash Fines = 88% PP = 4-4.5 tsf
14	21.0	111	11 22 42	55	SM	**Silty SAND;** layers of sandy silt, very dense, moist, light olive brown	#200 Wash Fines = 44%
15	20.3		12 24 50/6"	60	CL	**Sandy Lean CLAY**; very stiff, moist, yellowish brown	#200 Wash Fines = 54% PP = 4.5 tsf
					ML	**Sandy SILT;** layers of silty sand, hard, yellowish brown	
16	18.6	109	25 44 50/6"	65	SP-SM	**Poorly Graded SAND with SILT;** very dense, wet, light olive brown	#200 Wash Fines = 12%
17	18.8	109	13 26 28	70			#200 Wash Fines = 6%
				75		End of Boring @ 71' 6" Groundwater encountered @ 32' 6"	
				80			

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-2
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	17.0			0				**Fill:** **Sandy Lean CLAY;** trace of gravel, dark brown	#200 Wash Fines = 71%
2	16.5		5 7 9				CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist to very moist, concretions, brown with some white	#200 Wash Fines = 85% PP = 4.5 tsf
3	21.8	107	2 5 6	5					#200 Wash Fines = 81% PP=2.5-2.7 tsf
4	23.7		3 3 4					**Older ALLUVIUM:** **Sandy Lean CLAY;** firm, very moist, brown with some white	#200 Wash Fines = 64% PP = 2.5 tsf
5	36.4	87	3 5 12	10			CH	**Fat CLAY;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 78% PP = 2.5-3 tsf
6	20.7		2 6 18	15			CL	**Sandy Lean CLAY;** stiff to very stiff, moist to very moist, olive brown with some yellowish brown	#200 Wash Fines = 50% PP = 2-2.7 tsf
7	22.8	109	8 14 14	20				**Lean CLAY with SAND;** very stiff, very moist, olive gray with some yellowish brown	#200 Wash Fines = 78% PP = 3.5 tsf
8	24.4		8 5 6	25				**Sandy Lean CLAY;** stiff, very moist, light olive brown	#200 Wash Fines = 73% PP = 2.5-3.5 tsf
9	16.3		10 20 36	30			SM	**Silty SAND;** layers of clayey sand, fine, dense, moist, yellowish brown	#200 Wash Fines = 35%
10	32.7		8 9 15	35			ML	**SILT;** layers of lean clay (2-3" thick), very stiff, moist, light olive brown	#200 Wash Fines = 88% PP = 1.5-2.5 tsf
				40			CL		

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-2

Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	21.2		5 9 17	40			CL	**Sandy Lean CLAY;** very stiff, moist to very moist, caliche, light olive brown	#200 Wash Fines = 51% PP = 4.2 tsf
12	22.4		8 12 14	45					#200 Wash Fines = 63% PP = 2.7 tsf
								End of Boring @ 46' 6" Groundwater encountered @ 31'	
				50					
				55					
				60					
				65					
				70					
				75					
				80					

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-3

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	17.6			0				**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, moist, black	#200 Wash Fines = 73%
2	21.8		6 11 24						
				5			CL	**ALLUVIUM:** **Sandy Lean CLAY;** some concretions, very stiff, moist, light	#200 Wash Fines = 74%
3	26.2	102	7 15 23					**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff to very stiff, moist, light olive brown with white inclusions	#200 Wash Fines = 72% PP = 4.5 tsf
4	20.8		3 5 9						#200 Wash Fines = 58% PP = 3-4 tsf
5	30.6	95	7 11 19	10			CH	**Fat CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 85% PP = 4.5 tsf
6	15.9		3 7 7	15			CL/CH	**Lean to Fat CLAY;** some concretions, stiff, moist to very moist, pale yellow to light olive brown	#200 Wash Fines = 85% PP = 3 - 3.5 tsf
7	18.4	113	6 13 19	20			CL	**Sandy Lean CLAY;** very stiff, moist, light olive brown	#200 Wash Fines = 50% PP = 4-4.5 tsf
								End of Boring @ 21' 6" No groundwater encountered	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-4
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/17/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	19.6			0				**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, moist to very moist, very dark brown	#200 Wash Fines = 70%
2	21.5		4 4 4				CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, yellowish brown with some white specs	#200 Wash Fines = 63%
3	18.3	113	6 10 12	5			SC	**Clayey SAND;** moist, mottled brown and yellowish brown	#200 Wash Fines = 38%
							SM	**Silty SAND;** fine, moist, yellowish brown	
4	30.9		2 4 7				CH	**OLDER ALLUVIUM:** **Fat CLAY with SAND;** some concretions and calcium carbonate, stiff, moist to very moist, light olive brown	#200 Wash Fines = 81% PP = 3.5 tsf
5	23.6	106	7 9 14	10			CL/CH	**Sandy Lean to Fat CLAY;** very stiff, moist to very moist, green to grayish brown with white specs	#200 Wash Fines = 72% PP=3.5-4.5 tsf
6	27.3		3 4 7	15			CH	**Fat CLAY with SAND;** very stiff, moist, light olive brown	#200 Wash Fines = 84% PP = 3-4 tsf
7	16.2	122	3 14 25	20			CL	**Sandy Lean CLAY;** very stiff, moist, yellowish brown	#200 Wash Fines = 64% PP = >4.5 tsf
				25				End of Boring @ 21' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-5

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.3			0				**FILL:** **Sandy Lean CLAY;** moist, dark yellowish brown	#200 Wash Fines = 65%
2	11.5		9 7 9				**CL**	**ALLUVIUM:** **Sandy Lean CLAY;** trace of subrounded gravel, stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 51% PP = 3.5 4.5 tsf
3	11.9	126	5 13 17	5			**SC**	**Clayey SAND;** trace of gravel, moist, yellowish brown	#200 Wash Fines = 39% PP = 4.5 tsf
4	33.0		7 13 18					**OLDER ALLUVIUM**	#200 Wash Fines = 75% PP = 4.5 tsf
5	41.3	78	7 13 15	10			**CH**	**Fat CLAY with SAND;** trace of concretions, very stiff, moist to very moist, light olive brown	#200 Wash Fines = 85% PP = 4.5 tsf
6	34.4		3 3 5	15				soft to firm, greenish gray	#200 Wash Fines = 76% PP = 0.75 tsf
7	28.1	102	5 8 11	20			**CL/CH**	**Lean to Fat CLAY;** very stiff, moist to very moist, light olive brown	#200 Wash Fines = 85% PP = 3.5 tsf
				25				End of Boring @ 21' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-6

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	8.1			0				**FILL: Sandy Lean CLAY;** very stiff, dry, light olive brown	#200 Wash Fines = 74%
								ALLUVIUM:	
2	21.5	106	9 16 15				CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** few concretions, very stiff, moist, mottled white with dark yellowish brown	#200 Wash Fines = 77%
3	14.3		4 6 7	5				**Sandy Lean CLAY:** trace of gravel, layers of silty sand, stiff to very stiff, yellowish brown with white specs	#200 Wash Fines = 52% PP = 4.5 tsf
4	40.7	80	6 9 12					**Fat CLAY;** very stiff, moist to very moist, olive brown	#200 Wash Fines = 88% PP=3.5-3.8 tsf
5	26.2	72	4 5 6	10			CH	abundant concretions, calcium carbonate, stiff	#200 Wash Fines = 72% PP = 1.5-2.5 tsf
6	25.0	101	4 8 9	15				stiff	#200 Wash Fines = 85% PP = 1.5-2 tsf
7	25.0		4 7 13	20			CL	**Lean CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 70% PP = 2.5-3 tsf
				25				End of Boring @ 21' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-7

Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** few concretions, stiff, moist, dark yellowish brown with some white specs	
1	16.4	119	10 15 28				CL	**ALLUVIUM:** **Lean CLAY with SAND;** few concretions, very stiff, moist, dark yellowish brown with some white inclusions	#200 Wash Fines = 78% PP = >4.5 tsf
2	19.8		3 5 7	5				**OLDER ALLUVIUM:** **Lean CLAY with SAND;** few concretions, very stiff, moist to very moist, dark yellowish brown with some white specs	#200 Wash Fines = 76% PP=3.5-4.5 tsf
3	31.5	90	2 3 4					**Fat CLAY;** firm, very moist, pale yellow with some brown	#200 Wash Fines = 93% PP = 1.5-2.5 tsf
4	34.5		3 4 5	10				calcium carbonate, stiff, pale brown	#200 Wash Fines = 88%
5	29.8	95	5 6 9	15			CH	**Fat CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 81%
6	22.7		5 7 11	20					#200 Wash Fines = 82%
7	29.1	100	4 9 15	25				**Sandy Fat CLAY;** stiff, moist to very moist, mottled light olive brown and white	#200 Wash Fines = 63% PP = 2-2.5 tsf
8	24.0		22 12 15	30			CL	**Sandy Lean CLAY;** trace of gravel, stiff, moist to very moist, light olive brown	#200 Wash Fines = 65%
9	38.3	88	9 19 29	35			CH	**Fat CLAY with SAND;** small pockets of organic, stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 83% PP = 2-2.7 tsf
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-7

Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/18/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
10	23.5		7 16 27	40			ML	**Sandy SILT;** layers silty sand and lean clay with sand, stiff, moist, light olive brown	#200 Wash Fines = 69%
11	23.9	104	7 12 18	45			CH	**Fat CLAY with SAND;** thin lenses of sandy silt, stiff, moist to very moist, light yellowish brown	#200 Wash Fines = 77% PP = 2.5-3.5 tsf
12	21.1		9 15 30	50			CL	**Sandy Lean Clay;** very stiff, moist, light olive brown with some rusty brown	#200 Wash Fines = 63%
				55				End of Boring @ 51' 6" Groundwater encountered @ 28' 0"	
				60					
				65					
				70					
				75					
				80					

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-8

Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	18.9			0			CL	**FILL:** **Lean CLAY with SAND;** stiff, moist to very moist, very dark brown	#200 Wash Fines = 76%
2	18.4	111	7 8 12					**ALLUVIUM:** **Lean CLAY with SAND;** moist, stiff, very dark brown	Fines = 75% PP =1.5-2 tsf
3	15.5		5 7 15	5				**OLDER ALLUVIUM:** **Sandy Lean CLAY**; concretions, calcium carbonate, very stiff to hard, moist, light olive brown	#200 Wash Fines = 70%
4	16.4	108	7 10 16					**Lean CLAY with SAND;** stiff to very stiff, olive brown	Fines = 73% PP = 3-3.5 tsf
5	22.1		4 5 12	10			CH	**Sandy Fat CLAY;** very stiff, moist, pale yellow	#200 Wash Fines = 58%
							CL/CH	**Lean to Fat CLAY;** firm to stiff, moist to very moist, light olive brown with some white inclusions	
6	18.5	109	18 50/5"	15				**Lean to Fat CLAY with SAND;** few concretions, very stiff, moist, light olive brown with some white	#200 Wash Fines = 79% PP = 4.5 tsf
7	22.8		15 15 25	20			CL	**Sandy Lean CLAY with SAND;** few concretions, stiff to very stiff, moist to very moist, light olive brown with some white	#200 Wash Fines = 67%
8	33.9	93	9 16 41	25			CH	**Fat CLAY;** stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 88% PP = 2-2.5 tsf
9	21.4		36 29 20	30			CL/CH	**Lean to Fat CLAY;** concretions, white inclusion, stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 62%
10	22.6	111	18 45 50	35			SM	**Silty SAND;** fine, dense, moist, light olive brown	#200 Wash Fines = 21%
				40					

Groundwater ▽ Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-8

Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	16.0		7 12 13	40			SM	**Silty SAND;** fine to coarse, medium dense, moist, light olive brown	#200 Wash Fines = 15%
12	20.5			45				trace of gravel	#200 Wash Fines = 18%
								End of Boring @ 46' 6" Groundwater encountered @ 33'	
				50					
				55					
				60					
				65					
				70					
				75					
				80					

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-9

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL: Sandy Lean CLAY;** stiff, moist, very dark brown	
1	19.8	104	9 18 28					**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist to very moist, few concretions, olive brown	#200 Wash Fines = 79% PP = 3.5 tsf
							CH	**Fat CLAY;** very stiff, moist to very moist, pale yellow with light olive brown	
2	29.8		8 18 25	5					#200 Wash Fines = 88%
								OLDER ALLUVIUM:	
3	33.6	88	7 9 17					**Fat CLAY;** very stiff, moist to very moist, light olive brown	#200 Wash Fines = 85% PP = 3.0 tsf
4	32.9		7 17 22	10				**Sandy Fat CLAY;** thin layers of sandy lean clay, stiff, moist to very moist, light olive brown	#200 Wash Fines = 67% PP = 1.5 tsf
							CH	**Fat CLAY with SAND;** stiff, moist to very moist, light olive brown	
5	22.8		12 14 17	15					#200 Wash Fines = 75% PP = 2.5 tsf
								Fat CLAY; very stiff, moist, light olive brown with white	
6	44.6	79	9 16 26	20					#200 Wash Fines = 90% PP=3.5-4.5 tsf
								End of Boring @ 21' 6" No groundwater encountered	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-10

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 05/22/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.9			0				**FILL:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 75%
2	13.9	121	12 25 37					**Lean CLAY with SAND;** very stiff, moist, brown	#200 Wash Fines = 78% PP = 4.5 tsf
3	15.5		7 15 20	5			CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 67% PP = 2.5 tsf
								OLDER ALLUVIUM:	
4	23.3	102	10 15 19	10				**Lean CLAY;** very stiff, moist, olive brown	#200 Wash Fines = 86% PP=3.2-4.2 tsf
							CL/CH	**Lean to Fat CLAY;** very stiff, moist, light olive brown with white specs	
5	37.5		15 25 25	15			CH	**Fat CLAY;** firm to stiff, moist to very moist, pale yellow	#200 Wash Fines = 90% PP = 1.5 tsf
							CL/CH	**Lean to Fat CLAY with SAND;** stiff to very stiff, moist to very moist, light olive brown with green	
6	23.6	106	9 19 22	20					#200 Wash Fines = 81% PP = 2.5-3 tsf
								End of Boring @ 21' 6" No groundwater encountered	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-11
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	15.6			0			CL	**Fill:** **Sandy Lean CLAY;** slightly moist, brown	#200 Wash Fines = 64% PI = 52
2	16.8	104	3 12 18					**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, very pale brown	#200 Wash Fines = 69% PP = 4.5 tsf
3	19.2		6 8 12	5			CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, olive brown to pale brown inclusions	#200 Wash Fines = 72% PP = 4.5 tsf
4	26.5	97	7 7 10				CH	**Fat CLAY;** stiff, moist to very moist, pale brown with red specks	#200 Wash Fines = 92% PP = 1.7 - 2.2 tsf
5	21.7		6 6 8	10				concretions and soft zones	#200 Wash Fines = 97% PP = 2 - 4.5 tsf
6	27.5	124	1 5 10	15				olive brown	#200 Wash Fines = 76% PP = 1 - 1.2 tsf consolodation
7	27.5		4 6 7	20					#200 Wash Fines = 81% PP = 2.7 - 3.7 tsf
				25				End of Boring @ 21' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-12
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	7.4			0		**FILL:** **Sandy Lean CLAY;** trace of gravel, firm, slightly moist to moist, brown to dark brown	#200 Wash Fines = 71%
2	11.5		6 12 13				#200 Wash Fines = 67% PP = 4.5 tsf
3	11.6	118	8 25 38	5	CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark brown to yellowish brown	#200 Wash Fines = 72% PP = 4.5 tsf
4	18.0		4 4 6			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff, moist, yellowish brown	#200 Wash Fines = 57% PP = 3-3.5 tsf
5	38.0	84	6 9 9	10	CL/CH	**Lean to Fat CLAY with SAND;** firm to stiff, moist to very moist, grayish brown to yellowish brown	#200 Wash Fines = 82% PP = 3.7 tsf
6	28.9		2 2 2	15			#200 Wash Fines = 82% PP = 2.7-3.5 tsf
7	21.8	100	10 7 8	20	CL	**Sandy Lean CLAY;** stiff, moist, grayish brown with dark brown inclusions	#200 Wash Fines = 65% PP = 2.5-3.5 tsf
8	21.7		11 7 6	25		6" layer of silty sand with trace of gravel	#200 Wash Fines = 51% PP = 2.5 tsf
9	23.8		5 9 13	30		Very stiff	#200 Wash Fines = 65% PP = 3-3.5 tsf
				35		End of Boring @ 31' 6" No groundwater encountered	
				40			

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-13

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	10.2			0	⊠			**FILL:** **Sandy Lean CLAY;** concretions, stiff, moist, brown	#200 Wash Fines 72% PI = 47
2	11.7		8 9 15		⊠			**ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, very stiff, moist, brown with pale brown inclusioins	#200 Wash Fines = 66% PP = 4.5 tsf
3	17.2	107	12 33 50/4"	5	■		CL	**OLDER ALLUVIUM:** **Sandy Lean Clay;** abundant concretions, hard, pale brown with very pale brown	#200 Wash Fines = 71% PP = 4.5 tsf
4	22.1		4 5 8		⊠			olive brown	#200 Wash Fines = 63% PP = 4.5 tsf
5	13.0	116	5 12 16	10	■		SC	**Clayey SAND**; fine medium dense, moist, olive brown	#200 Wash Fines = 33% Consolidation
6	31.1		3 5 6	15	⊠		CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, light yellowish brown	#200 Wash Fines = 90% PP = 1.5-2.5 tsf
7	23.1	107	4 7 16	20	■				#200 Wash Fines = 70% PP = 2.5-3 tsf
				25				End of Boring @ 21' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-14

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	7.3			0		**FILL:** **Sandy Lean CLAY;** slightly moist, powdery, dark brown	#200 Wash Fines = 72%
2	7.7	114	14 16 17		CL	**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 72% PP = 4.5 tsf
3	18.6		6 8 13	5		**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, caliche stringers, moist, dark yellowish brown	#200 Wash Fines = 73% PP = 4.5 tsf
4	34.7	88	5 12 22				#200 Wash Fines = 90% PP = 4.5 tsf
5	39.2		4 6 7	10	CH	**Fat CLAY;** stiff to very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 89% PP = 2.5-3.5 tsf
6	26.7	98	6 7 10	15	CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist, dark yellowish brown with rusty pockets	#200 Wash Fines = 79% PP = 2-2.5 tsf Consolidation
				20		End of Boring @ 16' 6" No groundwater encountered	
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-15

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	11.8			0	CL	**FILL:** **Sandy Lean CLAY;** fragments, debris, rock, some organics, concretions, firm to stiff, slightly moist, dark brown	#200 Wash Fines = 67%
2	13.5		3 4 5			**ALLUVIUM:** **Sandy Lean CLAY;** firm to stiff, moist, brown	#200 Wash Fines = 72% PP = 4.5 tsf
3	16.1	118	8 10 10	5	CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions,very stiff, moist, pale brown	#200 Wash Fines = 63% PP = 4.5 tsf Consolidation
4	29.7		3 4 7		CH	**Fat CLAY with SAND;** stiff, moist to very moist, light olive brown	#200 Wash Fines = 82% PP = 4.5 tsf
5	33.9	90	8 15 17	10		**Fat CLAY;** little gravel/concretions, very stiff, light olive brown	#200 Wash Fines = 92% PP = 4.5 tsf Gravel = 14%
6	31.7		3 3 4	15		**Fat CLAY with SAND;** trace of concretions, stiff, moist to very moist, olive brown	#200 Wash Fines = 86% PP = 2-3 tsf Consolidation
7	29.1	96	4 7 10	20			#200 Wash Fines = 85% PP = 2.5-3 tsf
				25		End of boring @ 21' 6" No groundwater encountered	
				30			
				35			
				40			

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-16

Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	7.2			0				**FILL:** **Lean CLAY with SAND;** slightly moist, brown	#200 Wash Fines = 76%
2	14.8	121	10 8 8				CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, trace of concretions, stiff, moist, dark yellowish brown	#200 Wash Fines = 69% PP = 4.5 tsf
3	18.3		4 5 6	5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, olive brown with pale brown	#200 Wash Fines = 64% PP = 4.5 tsf
4	37.7	97	4 6 11				CH	**Fat CLAY;** stiff, moist to very moist, olive with mottled dark brown	#200 Wash Fines = 88% PP = 4-4.5 tsf Consolidation
5	35.1		2 4 7	10					#200 Wash Fines = 92% PP = 3.5-4.5 tsf
6	21.5	110	7 13 15	15			CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, olive with mottled dark brown	#200 Wash Fines = 82% PP = 4.5 tsf Consolidation
7	26.1		4 5 8	20				**Lean to Fat CLAY;** stiff, moist, light olive brown	#200 Wash Fines = 86% PP= 3.5 -4 tsf
8	18.6	114	5 15 20	25			CL	**Sandy Lean CLAY;** trace of gravel, very stiff, moist, light olive brown with reddish brown	#200 Wash Fines = 63% PP = 4.5 tsf Consolidation
9	18.2		5 11 14	30			SC	**Clayey SAND;** layers of sandy clay, concretions, medium dense, moist, light olive brown	#200 Wash Fines = 46%
10	22.2	103	12 28 50	35					#200 Wash Fines = 34%
				40					

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. :18-0817
Project Name : OC Prado

Boring No. : B-16
Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/29/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	16.0		7 26 40	40			SC	**Clayey Sand;** layers of sandy clay, concretions, medium dense, moist, light olive brown	#200 Wash Fines 40%
							SP-SM		
12	10.0	134	7 18 50	45				**Poorly Graded SAND with SILT and GRAVEL;** fine to coarse, very moist, grayish brown	#200 Wash Fines = 9%
13	23.3		31 50/6"	50					#200 Wash Fines = 9%
								End of Boring @ 51' 6" Groundwater encountered @ 44'	
				55					
				60					
				65					
				70					
				75					
				80					

Groundwater ▽ Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-17

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** stiff, slightly moist, very dark brown	
1	11.6	116	11 15 16				**CL**	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, very stiff, slightly moist to moist, olive brown with white inclustions	#200 Wash Fines = 81% PP = 4.5 tsf
2	13.3		5 6 7	5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, very pale brown with zones of olive brown	#200 Wash Fines = 66% PP = 4.5 tsf
3	24.0	103	6 12 17						#200 Wash Fines = 89% PP = 4.5 tsf
4	33.8		4 6 8	10			**CL/CH**	**Lean to Fat CLAY;** stiff to very stiff, moist to very moist, olive brown with white and reddish brown	#200 Wash Fines = 90% PP = 4.2-4.5 tsf
5	35.9	86	11 14 16	15					#200 Wash Fines = 91% PP = 4.5 tsf
								End of Boring @ 16' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-18

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	7.3			0	CL	**FILL:** **Lean CLAY with SAND;** slightly moist, crumbly, brown	#200 Wash Fines = 80% Corrosivity
2	7.8	113	17 22 23			**ALLUVIUM: Lean CLAY with SAND;** very stiff, slightly moist, dark yellowish brown	#200 Wash Fines = 80% PP = 4.5 tsf
3	14.0		5 5 7	5		**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, pale brown	#200 Wash Fines = 58%
4	4.3	111	11 24 14		SP-SM	**Poorly Graded SAND with SILT;** fine to coarse, medium dense, grayish brown with reddish brown	#200 Wash Fines = 11%
5	32.4		2 4 7	10	CH	**Fat CLAY;** stiff, moist to very moist, gray with reddish brown and white	#200 Wash Fines = 88% PP = 1.5-2.5 tsf
6	26.4	100	6 7 8	15	CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, olive brown	#200 Wash Fines = 83% PP = 2.3-2.6 tsf
7	20.1		4 8 12	20	CL	**Sandy Lean CLAY;** very stiff, moist to very moist, olive brown	#200 Wash Fines = 66% PP = 2.4 tsf
				25		End of Boring @ 21' 6" No groundwater encountered	
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-19

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	5.4			0		**FILL:** **Sandy Lean CLAY;** stiff, moist, dark brown	#200 Wash Fines = 76%
2	10.5	112	5 6 9		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 79% PP = 4.5 tsf
3	13.3		3 5 8	5		**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown with white inclusions	#200 Wash Fines = 70% PP = 4.5 tsf
4	29.8	93	7 13 17		CH	**Fat CLAY;** stiff to very stiff, moist to very moist, pale brown	#200 Wash Fines = 96% PP = 4.0-4.2 tsf
5	33.3		5 7 8	10			#200 Wash Fines = 90% PP = 4.5 tsf
6	22.1	109	6 12 12	15	CL	**Lean CLAY with SAND;** stiff to very stiff, moist, light olive brown	#200 Wash Fines = 84% PP = 4.5 tsf
				20		End of Boring @ 16' 6" No groundwater encountered	
				25			
				30			
				35			
				40			

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-20

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 08/30/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	9.4			0				**Fill:** **Lean CLAY with SAND;** crumbly, slightly moist, dark brown	#200 Wash Fines = 77%
2	9.4		9 10 11					**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, slightly moist, dark brown with white specks	Fines = 77%
3	11.6	119	20 28 33	5			CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff to hard, moist, dark brown with white specks	#200 Wash Fines = 69% PP = 4.5 tsf
4	19.3		4 7 12	10				**Lean CLAY with SAND;** trace of concretions, stiff, moist, brown with white specks	#200 Wash Fines = 84% PP = 4.5 tsf
5	28.9	94	9 11 13	15			CL/CH	**Lean to Fat CLAY with SAND;** stiff to very stiff, moist to very moist, light olive brown	#200 Wash Fines = 84% PP = 2.5-2.7 tsf
6	26.9		5 6 8	20				concretions	#200 Wash Fines = 78% PP = 1-1.5 tsf
				25				End of Boring @ 21' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-21
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	8.6		7 11 13	0	CL	**FILL:** **Lean CLAY with SAND;** trace of gravel, rootlets, crumbly, slightly moist, dark yellowish brown	#200 Wash Fines = 75% PP = 4.5 tsf E.I.=
2	10.2	108	12 22 25	5		**OLDER ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel/concretions, very stiff, moist, dark yellowish brown with white specks	#200 Wash Fines = 81% PP = 4.5 tsf
3	18.1		11 12 13			**Sandy Lean CLAY;** trace of gravel/concretions, stiff to very stiff, moist, brown with white inclusions	#200 Wash Fines = 74% PP =4.5 tsf
4	15.4	114	13 33 47	10			#200 Wash Fines = 61% PP = 4.5 tsf
5	24.6		12 18 33	15	CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, very stiff to hard, moist, yellowish brown	#200 Wash Fines = 75% PP = 4.5 tsf
6	20.9		7 10 15	20	CL	**Sandy Lean CLAY;** trace of concretions, very stiff, moist, dark yellowish brown with white specks	#200 Wash Fines = 63% PP = 4-4.5 tsf
7	31.6	89	5 10 15	25	CL/CH	**Sandy Lean to Fat CLAY;** very stiff, moist to very moist, brown with yellowish brown inclusions	#200 Wash Fines = 72% PP = 1.7-2.7 tsf
8	21.7		5 9 14	30			#200 Wash Fines = 73% PP = 4-4.5 tsf
						End of Boring @31.5' No groundwater encountered	

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-22
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	14.5			0				**Fill:** **Lean Clay with SAND;** trace of concretions, stiff, moist, dark brown	#200 Wash Fines = 78%
2	13.8	121	6 13 17					**ALLUVIUM: Lean CLAY with SAND;** very stiff, moist, brown with white specks	#200 Wash Fines =76% PP = 4.5 tsf
3	19.4		10 21 28	5			CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff to hard, pale brown with white	#200 Wash Fines = 73% PP = 4.5 tsf
4	20.5	105	9 10 12						#200 Wash Fines = 74% PP = 3.5-4 tsf
5	18.1		5 11 14	10					#200 Wash Fines = 50% PP = 4 - 4.5 tsf
6	34.7	88	6 12 18	15			CL/CH	**Lean to Fat CLAY;** trace of concretions, very stiff, moist to very moist, light olive brown	#200 Wash Fines = 86% PP = 3-4.5 tsf
7	22.5		4 5 6	20			CL	**Lean CLAY with SAND;** stiff, moist, very pale brown with white	#200 Wash Fines = 83% PP = 3 tsf
								Sandy Lean CLAY; trace of gravel, stiff to very stiff, moist, light olive brown	
8	22.2	105	4 5 12	25					#200 Wash Fines = 63% PP = 3-4 tsf
								End of Boring @ 26' 6" No groundwater encountered	
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-23

Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	7.8			0			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist, dark yellowish brown	#200 Wash Fines = 50%
2	16.3		4 7 9				CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of gravel, very stiff,moist, dark yellowish brown	#200 Wash Fines = 76% PP = 4.5 tsf EI = 107 Corrosivity
3	15.3	115	7 12 17	5				**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, very stiff, moist, dark yellowish brown with white specks	#200 Wash Fines = 79% PP = 4.5 tsf
4	23.9		5 8 12					**Lean to Fat CLAY;** concretions, very stiff, moist, light olive brown	#200 Wash Fines = 89% PP = 4.5 tsf
5	21.8	107	6 18 21	10				**Lean to Fat CLAY with SAND;** concretions, very stiff, moist, light olive brown	#200 Wash Fines = 79% PP = 4.0-4.5 tsf
6	35.8		2 3 6	15			CH	**Fat CLAY;** caliche stringers, concretions, firm to stiff, light olive brown	#200 Wash Fines = 93% PP = 3-3.5 tsf
				20				End of Boring @ 16' 6" No groundwater encountered	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-24
Sheet : 1 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1				0			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel and shale, crumbly slightly moist, dark yellowish brown	#200 Wash Fines = 50%
2	15.8	104	4 5 7					**Lean CLAY with SAND;** stiff, moist, dark brown	Fines = 77% PP = 3 - 4 tsf EI = 96
3	19.0		3 5 8	5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, light olive brown	#200 Wash Fines = 55% PP = 3-3.7 tsf
4	37.5	89	6 12 17				ML	**Silt with SAND;** concretions, very stiff, moist, light yellowish brown to olive brown	#200 Wash Fines = 79% PP = 4.5 tsf
5	33.3		3 4 9	10			CL/CH	**Lean to Fat CLAY;** trace of concretions, stiff, moist, olive brown	#200 Wash Fines = 83% PP = 4.5 tsf
6	21.9	108	6 13 19	15			CL	**Sandy Lean CLAY;** concretions, very stiff, moist to very moist, olive brown with white inclusions	#200 Wash Fines = 66% PP= 3.5 - 4 tsf Consolidation
7	29.6		4 7 10	20			CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, yellowish brown with olive inclusions	#200 Wash Fines = 87% PP= 2.5 - 3 tsf
8	20.1	108	7 14 18	25			CL	**Sandy Lean CLAY;** trace of concretions, caliche stringers, very stiff, moist, yellowish brown	#200 Wash Fines = 62% PP = 4.5 tsf
9	29.2	101	12 30 40	30			CL/CH	**Lean to Fat CLAY with SAND;** very stiff, moist, yellowish brown	#200 Wash Fines = 84% PP = 4 - 4.5 tsf Consolidation
10	31.2		7 13 16	35			ML	**Silt with SAND;** layers of silty sand, very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 76% PP = 1.2-3.5 tsf
				40			CL/CH	**Lean to Fat CLAY;** very stiff, moist, yellowish brown with reddish brown	

Groundwater ▽ Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-24

Sheet : 2 **of :** 2

Drilling Method : Hollow Stem 8" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
11	38.9	89	4 12 21	40			CL/CH	**Lean to Fat CLAY;** very stiff, moist, yellowish brown with reddish brown	#200 Wash Fines = 92% PP = 4.5 tsf
							SM	**Silty SAND;** layers of silt with sand, moist to very moist, yellowish brown	
12	14.0		23 28 28	45			SP/SM	**Poorly Graded SAND with SILT;** fine to coarse, dense to very dense, wet, reddish brown	#200 Wash Fines = 11%
				50				End of Boring @ 46' 6" Groundwater encountered @ 34' 6" Groundwater rose to 27' 6" at end of drilling	
				55					
				60					
				65					
				70					
				75					
				80					

Groundwater ▽ Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-25
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/04/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	7.1			0				**FILL:** **Sandy Lean CLAY;** trace of gravel and shale, crumbly slightly moist, dark grayish brown	#200 Wash Fines = 60%
2	14.5	117	6 10 15				CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, very dark brown	#200 Wash Fines = 84% PP = 4.5 tsf PI = 78
3	16.7		4 4 5	5				**OLDER ALLUVIUM:** **Lean CLAY with SAND;** carbonaceous stringers, trace of concretions stiff, moist to very moist, dark brown to very dark brown	#200 Wash Fines = 79% PP = 3 - 4.5 tsf
4	18.5	112	6 9 9				CL/CH	**Sandy Lean CLAY to Fat CLAY;** layers and pockets of concretions, stiff, moist, olive brown	#200 Wash Fines = 51% PP = 3 tsf
5	25.2	84	4 5 9	10					#200 Wash Fines = 70% PP = 2.5-2.75
6	23.5		3 7 10	15			CL	**Lean CLAY with SAND;** trace of concretions, very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 76% PP = 2.7-3.5 tsf
7	14.8	119	4 9 18	20			SC	**Clayey SAND;** layers of sandy clay, medium dense, moist, yellowish brown	#200 Wash Fines = 36% PP = 4.5 tsf
8	20.6		6 9 15	25			CL	**Sandy Lean CLAY;** caliche stringers, very stiff, moist, dark yellowish brown	#200 Wash Fines = 71% PP = 4 - 4.5 tsf
9	18.4	114	11 22 30	30				hard	#200 Wash Fines = 53% PP = 4.5 tsf
				35				End of Boring @ 31' 6" No groundwater encountered	
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-26
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/05/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	12.5			0		**FILL:** **Lean CLAY with SAND;** trace of gravel, stiff, moist, dark brown	#200 Wash Fines = 79% PP = 3 tsf
2	13.4		5 8 10		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark brown	#200 Wash Fines = 80% PP = 4.5 tsf
3	18.0	112	9 13 20	5		**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown	#200 Wash Fines = 67% PP = 4.5 tsf
4	24.5		3 4 5			**Lean to Fat CLAY with SAND;** trace of concretions, stiff, moist, light olive brown	#200 Wash Fines = 78% PP = 2.7-3.7 tsf
5	28.9	94	6 9 13	10	CL/CH		#200 Wash Fines = 82% PP = 4 - 4.2 tsf
6	26.7		3 4 5	15			#200 Wash Fines = 60% PP = 2.5 - 4 tsf
7	28.1	94	5 7 9	20		**Fat CLAY with SAND;** concretions, stiff, moist to very moist, pale yellow	#200 Wash Fines = 82% PP = 2 - 3 tsf
8	23.3		5 6 11	25	CH	light olive brown with pale brown inclusions	#200 Wash Fines = 76% PP = 2 - 3.5 tsf
9	34.4	90	10 18 23	30		**Fat CLAY;** concretions, very stiff, moist to very moist, light olive brown with brown	#200 Wash Fines = 90% PP = 4 - 4.5 tsf
				35		End of Boring @ 31' 6" Perched groundwater encountered @ 24'	
				40			

Groundwater ▽ Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-27
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/06/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL: Sandy Lean CLAY;** trace of gravel, stiff, moist, dark brown	
1	15.1		2 4 5				CL	**ALLUVIUM: Lean CLAY with SAND;** trace of concretions, stiff, moist, dark brown	#200 Wash Fines = 82% PP = 3.5-4.5 tsf
2	17.7		8 8 9	5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, very stiff, moist, very pale brown to white	#200 Wash Fines = 64% PP = 4.5 tsf
3	17.5		7 9 10						#200 Wash Fines = 59% PP = 4.5 tsf
4	16.0		6 9 13						#200 Wash Fines = 61%
5	18.9		5 7 8	10			ML	**Sandy Silt;** layers of silty sand, trace of concretions, stiff, moist, yellowish brown to olive brown	#200 Wash Fines = 60% PP = 2 - 2.5 tsf
6	29.7		3 5 11						#200 Wash Fines = 89% PP = 2.5 - 3 tsf
7	20.8		7 12 13	15					#200 Wash Fines = 71%
8	32.4		6 8 8					Layers of sandy lean clay	#200 Wash Fines = 74% PP = 2-2.5 tsf
9	40.0		3 4 7				CH	**Fat CLAY;** layers of silt, stiff, moist to very moist, light olive brown	#200 Wash Fines = 95% PP = 1.5-4 tsf
10	34.0		4 5 7	20					#200 Wash Fines = 97%
11	35.4		2 4 4				CL/CH	**Lean to Fat CLAY with SAND;** stiff, moist, olive brown	#200 Wash Fines = 75% PP = 2.5 tsf
12	25.4	100	5 7 10	25				**Sandy Lean to Fat CLAY;** lenses of fine silty sand, firm to stiff, moist, dark grayish brown	#200 Wash Fines = 53% PP = 2.5 - 3 tsf
13	33.2		3 3 4						#200 Wash Fines = 50%
14	22.2		7 9 12				ML	**Sandy Silt;** layers of sandy lean clay, very stiff, moist, dark olive gray with layers of olive brown	#200 Wash Fines = 53%
15	16.3		5 15 26	30			SM	**Silty SAND;** fine layers of sandy silt, dense, moist to very moist, dark yellowish brown	#200 Wash Fines = 32%
16	14.7	122	9 18 45						#200 Wash Fines = 39%
17	21.3		9 11 18	35			CL	**Sandy Lean CLAY;** layers of sandy silt and fine silty sand, very stiff, moist to very moist, dark yellowish brown	#200 Wash Fines = 50%
								End of Boring @ 35' 6" No groundwater encountered	
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 18-0817
Project Name : OC Prado

Boring No. : B-28
Sheet : 1 **of :** 1

Drilling Method : Hollow Stem 6" Auger
Sampling Method : Bulk - CD - SPT
Hammer Weight : 140 lbs **Drop Height :** 30"
Location : See Figure A-2

Ground Elevation:
Drilling Co. : Geoboden, Inc.
Date Drilled : 09/06/2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Soil Type (USCS)	Description	Additional Tests
1	8.0			0		**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist, brown	#200 Wash Fines = 67%
2	24.0	106	6 10 12			**ALLUVIUM: Sandy Lean CLAY;** concretions, stiff, moist, yellowish brown	Fines = 67% PP = 4.5 tsf
3	25.2		3 4 7	5	**CL**	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, stiff, moist, yellowish brown	#200 Wash Fines = 65% PP = 4-4.5 tsf
4	26.4	104	9 13 18			layer of fine silty sand	#200 Wash Fines = 58% PP = 4.5 tsf
5	32.9		6 7 8	10		**Lean to Fat CLAY with SAND;** layers of silt, concretions, stiff, moist to very moist, olive brown with yellowish brown	#200 Wash Fines = 74% PP = 1.5-3 tsf
6	25.7	101	8 9 10	15	**CL/CH**	**Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist to very moist, very pale brown to white	#200 Wash Fines = 50% PP = 1.5-1.8 tsf
7	23.3		5 7 7	20			#200 Wash Fines = 60% PP = 1.5 tsf
8	28.5		3 4 5			**Fat CLAY;** abundant concretions, stiff, very moist, very pale brown	#200 Wash Fines = 87% PP = 1-2 tsf
9	26.2		5 7 8	25		**Fat CLAY with SAND;** concretions, firm to stiff, very moist, very pale brown	#200 Wash Fines = 79% PP = 1-1.5 tsf
10	26.3		2 3 3		**CH**		#200 Wash Fines = 76% PP = 1.5 tsf
11	23.0		3 5 6	30			#200 Wash Fines = 78% PP = 1-1.5 tsf
				35		End of Boring @ 31' 6" No groundwater encountered	
				40			

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : TP-1

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:**	
1	18.2							**Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 82%
								ALLUVIUM:	
								Lean CLAY with SAND; stiff, moist, yellowish brown	
2	15.3			5			**CL**	**OLDER ALLUVIUM:**	#200 Wash Fines = 77%
3	25.4							**Lean CLAY with SAND;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 84% EI = 78
				10				End of Test Pit @ 9' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-2

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.2			0	⊠		SM	**FILL: Silty SAND;** fine, moist, pockets of sandy silt, and miscellaneous materials (asphalt, concrete, gravel, and boulders mixed in piles)	#200 Wash Fines = 31%
							SC	**Clayey SAND;** fine, loose, moist, dark brown	
2	17.8			5	⊠		CL	**ALLUVIUM:** **Lean CLAY with SAND**; stiff, moist, dark brown	#200 Wash Fines = 82%
3	16.7				⊠			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, yellowish brown	#200 Wash Fines = 80%
				10				End of Test Pit @ 7' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-3

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.6			0			SM	**FILL (Import):** **Silty SAND;** fine, trace of gravel, loose, moist, strong brown	#200 Wash Fines = 42%
2	17.5							**Lean CLAY with SAND**	#200 Wash Fines = 82%
								ALLUVIUM: **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	
3	16.0			5			CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark yellowish brown with some white, minor concretions	#200 Wash Fines = 76% EI = 62
				10				End of Boring 7' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-4

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	14.1			0	⊠		CL	**FILL:** **Sandy Lean CLAY;** stiff, moist, brown	#200 Wash Fines = 68%
2	18.3				⊠			**ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist to very moist, brown	#200 Wash Fines = 74% Corrosivity
3	14.8				⊠				#200 Wash Fines = 57%
4	40.2			5	⊠			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** firm, very moist, concretions, light olive brown to pale yellow with white	#200 Wash Fines = 83%
5	21.0				⊠			**Sandy Lean CLAY;** stiff, moist to very moist pale yellow with white	#200 Wash Fines = 53%
								End of Test Pit @ 7' 6" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-5

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** soft, moist, brown	
1	27.8				☒			**ALLUVIUM:** **Lean CLAY with SAND;** soft, very moist, dark brown	Fines = 81% EI = 50 LL = 39 PL = 19
2	19.1			5	☒		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff to very stiff, moist to very moist, concretions, dark yellowish brown	#200 Wash Fines= 68%
3	21.2				☒				#200 Wash Fines = 61%
				10				End of Test Pit @ 7' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-6

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	21.1			0	⊠		CL	**FILL: Sandy Lean CLAY;** very moist, dark brown	#200 Wash Fines = 70%
								ALLUVIUM: **Sandy Lean CLAY;** stiff, moist to very moist, dark yellowish brown	
				5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist to very moist, concretions, olive brown with white	
2	21.5				⊠				#200 Wash Fines = 64%
								End of Test Pit @ 7' 6" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-7

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	18.7			0				**Fill: Sandy Lean CLAY;** stiff, moist, dark yellowish brown	#200 Wash Fines = 68%
2	17.0							**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, concretions, dark yellowish brown	#200 Wash Fines = 86%
3	18.7								Fines = 83%
4	19.8			5			CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, to very stiff, moist to very moist, concretions, caliche, light olive brown with white	#200 Wash Fines = 80%
5	23.3							Max dry density; 115.3 pcf Optimum moisture 12.5%	LL = 51 PL = 21 EI = 59 #200 Wash Fines = 84%
				10				End of Test Pit @ 8' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-8

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL**: **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	
1	15.8						CL		Fines = 80%
								ALLUVIUM:	
2	18.2							**Lean CLAY with SAND;** stiff, moist to very moist, concretions, brown	#200 Wash Fines = 77%
3	25.2			5				**OLDER ALLUVIUM:**	#200 Wash Fines = 66%
								Fat CLAY with SAND; very stiff, very moist, abundant concretions, slightly porous, light yellowish brown	
				10			CH		
4	35.2							stiff — Max dry density; 112.2 pcf, Optimum moisture 14.3%	#200 Wash Fines = 77% LL = 68 PL = 22 EI = 90
5	39.6			15					Fines = 80%
								End of Test Pit @ 16'	
								Groundwater seepage encountered @ 15' 6"	
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-9

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	
1	15.6				⊠			**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 86%
2	18.5			5	⊠			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, calcium carbonate concretions, olive brown with white	#200 Wash Fines = 79%
3	19.0				⊠		CL		#200 Wash Fines = 78%
				10				**Sandy Lean CLAY;** trace of gravel, stiff, moist to very moist, light olive brown	
4	19.3				⊠				#200 Wash Fines = 59%
				15					
5	21.9				⊠				#200 Wash Fines = 75%
								End of Boring 16' 6" No groundwater encountered	
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-10

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	17.3			0	⊠		SC	**FILL:** **Clayey SAND;** fine, little gravel, dark yellowish brown	Fines = 33%
2	19.2				⊠			**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, stiff, moist, dark brown Maximum Dry Density :122.8 PCF @ 11.2% Moisture	#200 Wash Fines = 75% LL = 39 PL = 17
3	17.8				⊠		CL	**OLDER ALLUVIUM: Lean CLAY with SAND;** stiff, moist to very moist, concretions, dark brown	Fines = 80% #200 Wash Fines = 57%
4	19.1				⊠				
5	17.5			5	⊠			**Sandy Lean CLAY;** stiff, moist, concretions calcium carbonate, light olive brown with some white and yellowish brown	#200 Wash Fines = 64%
6	23.1				⊠		CH	**Fat CLAY;** stiff, moist to very moist, caliche and concretions, pale yellow with white	#200 Wash Fines = 85%
7	23.2			10	⊠		CL/CH	**Lean to Fat CLAY;** stiff, very moist, concretions, light olive brown	#200 Wash Fines = 61%
								End of Test Pit @12' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-11

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	8.6			0	⊠			**FILL:** **Silty SAND with GRAVEL;** fine to coarse, loose, brown	#200 Wash Fines = 12% Gravel = 38%
					⊠			**ALLUVIUM: Lean CLAY with SAND;** stiff, moist	
					⊠			**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, black	
				5			**CL**	**Lean CLAY with SAND;** stiff, moist, light brown	
				10				End of Test Pit @ 9' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-12

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL: Sandy Lean CLAY;** dark brown	
1	14.9				⊠		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 78%
2	17.1			5	⊠		CL/CH	**OLDER ALLUVIUM; Lean to Fat CLAY;** stiff to very stiff, moist to very moist, concretions, calcium carbonate, dark yellowish brown with some white	#200 Wash Fines = 52%
3	22.0				⊠		CH	**Fat CLAY;** stiff, very moist, concretions, calcium carbonate, light yellowish brown with white	#200 Wash Fines= 86%
				10				End Test Pit @ 8' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : TP-13

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	26.7			0			CL	**FILL:** **Lean CLAY with SAND;** stiff, very moist, shale fragments, yellowish brown	#200 Wash Fines = 59%
2	15.5			5				**Lean CLAY with SAND;** moist, dark brown (re-worked onsite alluvium)	#200 Wash Fines = 75%
				10				End of Test Pit @ 8' 0" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Boring No. : TP-14

Sheet : 1 **of :** 1

Drilling Method : Backhoe
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	33.3			0				**ALLUVIUM:** **Fat CLAY;** firm, very moist, slightly porous, greenish gray	#200 Wash Fines = 92% EI = 89
2	36.0			5			CH	**OLDER ALLUVIUM:** **Fat CLAY;** soft, wet, concretions, light gray	#200 Wash Fines = 74%
	31.9			10				Stiff to very stiff, greenish gray	#200 Wash Fines = 83%
	20.9			15			CL	**Lean CLAY;** stiff, very moist, greenish gray	Fines = 66%
				20				End of Test Pit 15' 6" No groundwater encountered	
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-15

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	18.2			0	⊠		CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff to very stiff, moist to very moist, dark grayish brown	#200 Wash Fines = 61%
2	31.0			5	⊠		CH	**OLDER ALLUVIUM:** **Fat CLAY;** stiff, moist to very moist, concretions, caliche, light olive brown with some white	#200 Wash Fines = 86% EI = 60
3	29.9			10	⊠				#200 Wash Fines = 86%
4	27.0				⊠		CL	**Sandy Lean CLAY;** lenses of silty sand, stiff, very moist, greenish gray with some white	#200 Wash Fines = 73%
5	44.0			15	⊠		CH	**Fat CLAY;** very stiff, shale-lime, very moist, greenish gray	#200 Wash Fines = 99%
								End of Test Pit 15' 6" Groundwater seepage encountered @ 10' 6"	
				20					
				25					
				30					
				35					
				40					

Bulk ⊠ CD ■ SPT ⊠

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-16

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	12.8			0	⊠		CL	**FILL:** **Sandy Lean CLAY;** tsoft to stiff, moist, dark yellowish brown	#200 Wash Fines = 58%
								ALLUVIUM: **Sandy Lean CLAY;** firm, moist, dark yellowish brown	
				5					
2	15.0				⊠			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 55%
3	15.7				⊠				#200 Wash Fines = 52%
				10				End of Test Pit @ 8' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

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Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-17

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL: Sandy Lean CLAY;** very stiff, moist, dark brown	
1	16.0							**ALLUVIUM:** **Lean CLAY with SAND;** stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 79%
2	23.3						CH	**OLDER ALLUVIUM:** **Sandy Fat CLAY;** stiff to very stiff, moist to very moist, concretions, light olive brown	Fines = 71% EI = 96
3	37.6			5				**Fat CLAY;** stiff to very stiff, moist, dark yellowish brown	#200 Wash Fines = 90%
								End of Test Pit @ 6' 0" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

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Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-18

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	17.8			0			CL	**FILL: Sandy Lean CLAY;** stiff, moist, concretions, olive brown	#200 Wash Fines = 59%
2	12.2							**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, dark yellowish brown	#200 Wash Fines = 72%
3	13.0							**OLDER ALLUVIUM: Sandy Lean CLAY;** very stiff, moist, concretions, yellowish brown	#200 Wash Fines = 65%
				5				End of Test Pit @ 4' 6" No groundwater encountered	
				10					
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-19

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	13.9			0				**FILL:**	#200 Wash Fines = 50%
2	17.1							**Sandy Lean CLAY;** trace of gravel, dark yellowish brown	Gravel = 11% Fines = 79% EI = 24
								ALLUVIUM: **Lean CLAY with SAND;** trace of gravel, stiff, moist, dark brown	
3	23.1			5			CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** stiff, very moist, yellowish brown	#200 Wash Fines = 80%
4	32.2							**Fat CLAY;** trace of gravel, stiff, very moist, dark yellowish brown	#200 Wash Fines = 93%
5	31.6								#200 Wash Fines = 94%
				10				End of Test Pit @ 9' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-20

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	14.7			0			CL	**FILL:** **Lean CLAY with SAND;** stiff, moist, brown	#200 Wash Fines = 78%
2	11.6							**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 74%
3	10.9			5			SM	**OLDER ALLUVIUM:** **Silty SAND;** fine to medium, moist, yellowish brown	#200 Wash Fines = 28%
4	19.2			10			CL	**Sandy Lean CLAY;** stiff, moist, light olive brown	#200 Wash Fines = 63%
								End of Test Pit @ 10' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Boring Log

KOURY ENGINEERING & TESTING, INC.

Project No. : 16-0899
Project Name : OC Prado

Test Pit No. : TP-21

Sheet : 1 **of :** 1

Exploration Method : Backhoe Excavation
Sampling Method : Bulk
Trenching Co.: Lourenco Backhoe, inc.
Location : See Figure A-2

Ground Elevation:
Date Excavated: 05-17-2017

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Blows per 6"	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			SM	**FILL:** (Stockpile) **Silty SAND;** fine, slightly moist, yellowish brown	
1	17.3			5			CL	**Sandy Lean CLAY;** trace of shale, stiff, moist to very moist, yellowish brown	#200 Wash Fines = 54%
2	18.9							**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	#200 Wash Fines = 76%
3	14.8			10				**OLDER ALLUVIUM:** **Lean CLAY with SAND;** hard, moist, dark yellowish brown with some light brown	#200 Wash Fines = 76%
								End of Test Pit @ 10' 6" No groundwater encountered	
				15					
				20					
				25					
				30					
				35					
				40					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 22

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0					
				1			CL	**FILL:** **Lean CLAY with SAND;** stiff to very stiff, moist, very dark brown	
1	16.3			2	⊠				#200 Wash Fines = 76% PP = 4.5 tsf
				3				**ALLUVIUM:** **Lean to fat CLAY with SAND;** very stiff, moist, very dark brown	
2	17.4				⊠				Fines = 83% PP = 4 tsf EI = 126
3	16.4	122		4	■		CL/CH		Fines = 81% PP = 3-3.5 tsf
4	18.8				⊠			**OLDER ALLUVIUM:** **Lean to FAT CLAY with SAND;** concretions, moist to very moist, stiff, mottled brown and pale brown	Fines = 80% PP = 3-3.5 tsf EI = 62
5	19.2			5	⊠				Fines = 80% PP = 2.5 tsf
6	30.6			6	⊠				Fines = 95% PP = 1-1.5 tsf
				7	⊠				#200 Wash Fines = 91% PP = 1.5-3 tsf
7	33.6				⊠				
8	41.4			8	⊠		CH	**Fat CLAY;** trace of concretions, firm to stiff, moist to very moist, dark grayish brown with red specks	Fines = 90% PP = 1 tsf
				9					
				10					
9	36.9			11	⊠				Fines = 87% PP = 1.2 tsf
				12				End of test pit @ 10' 9" No groundwater encountered Nuclear gauge density test data at 5.5' Dry density = 96 pcf Moisture content = 19.1%	

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Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 23

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY;** stiff, moist, very dark brown	
1	17.6			1				**ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of gravel, trace of concretions, stiff to hard, moist to very moist, very dark brown to dark yellowish brown with pale brown inclusions	Fines = 60% PP = 3.0 tsf EI = 97
2	19.4			2					Fines = 52% PP = 4.5 tsf
3	16.1			3				**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist, very pale brown with dark yellowish brown	#200 Wash Fines = 50% PP = 3.5 tsf EI = 107
4	18.2			4					Fines = 56% PP = 2.0 tsf
5	22.0	103		5					Fines = 76% PP = 4 - 4.5 tsf
6	25.9			6			CL/CH		Fines = 85% PP= 3.5 tsf
7	29.2			7				**Lean to Fat CLAY with SAND;** trace of concretions, medium to high plastic, stiff to very stiff, dark yellowish brown to light olive brown with white	Fines = 82% PP = 2.0 tsf
8	37.7			8					Fines = 82% PP = 2.0 tsf
				9					
				10					
				11				End of test pit @ 10' 9" No groundwater encountered	
				12				Nuclear gauge density test data at 5.5' Dry density = 96 pcf Moisture content =19.1%	

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 24

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, abundant concretions, stiff, moist, dark brown	
1	14.2			2				**ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist, dark brown	Fines = 58% PP = 2 tsf FI = 107
2	22.1			3					Fines = 50% PP = 2.5 tsf
3	19.5			4				**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist to very moist, yellowish brown with pale brown	Fines = 56% PP = 2 tsf
4	21.1	107		5					Fines = 71% PP = 2.7-4 tsf
5	21.0			6					Fines = 71% PP = 3-4.5 tsf
6	24.9			7			CL/CH	some olive brown	Fines = 71% PP = 2.5 tsf
7	35.3			8				**Lean to Fat CLAY with SAND;** trace of concretions, medium to high plastic, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	Fines = 84% PP = 2.5 tsf
8	31.0			9					Fines = 81% PP = 1.5 tsf
9	26.8			10					Fines = 79% PP = 3.75-4 tsf
				11					
				12				End of test pit @ 11' 5" No groundwater encountered Nuclear gauge density test data at 5' 2" Dry density = 99 pcf Moisture content = 22.3%	

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 25

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, trace concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
1	17.3			2			CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, stiff, moist, dark yellowish brown with pale brown inclusions	#200 Wash Fines = 68% PP = 2 tsf
2	21.8	100		3				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, medium plastic, stiff, moist, yellowish brown with pale brown	Fines = 58% PP = 3.7-4.5 tsf
3	17.3			4					Fines = 50% PP = 3.5-4.5 tsf
4	19.0			5					Fines = 58% PP = 2-3 tsf
5	24.5			6			CL/CH	**Sandy Lean to Fat CLAY;** concretions, medium to high plastic, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	#200 Wash Fines = 74% PP = 1.5 tsf
6	31.2			7				**Lean to Fat CLAY with SAND;** trace of concretions, medium to high plastic, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	#200 Wash Fines = 82% PP= 3 tsf
7	44.4			8					Fines = 92% PP = 1.5-1.7 tsf
				9				End of test pit @ 9' No groundwater encountered	
				10				Nuclear gauge density test data at 3' Dry density = 97 pcf Moisture content = 24.0%	
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 26

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log		Description	Additional Tests
1	13.4			0	⊠			**FILL:** **Lean CLAY with SAND;** mostly crumbly, moist, dark reddish brown	Fines = 80% PP = 2.5 tsf EI = 20
				1					
2	14.2			2	⊠				#200 Wash Fines = 81% PP = 2.5-4 tsf
3	14.2			3	⊠			trace of concretions, stiff, moist, very dark brown	Fines = 82% PP = 4-4.5 tsf
4	14.8	116			■			**OLDER ALLUVIUM:**	Fines = 79% PP = 4.5 tsf
5	15.7			4	⊠			**Lean CLAY with SAND;** stiff to very stiff, moist, dark yellowish brown	Fines = 79% PP = 4.5 tsf
6	39.4			5	⊠		**CL**	layer of fat clay	Fines = 66% EI= 74
7	21.2			6	⊠			**Sandy Lean CLAY;** trace of concretions, stiff to very stiff, moist, very dark brown	Fines = 68% PP = 3-3.5 tsf
8	20.1			7	⊠				#200 Wash Fines = 62% PP = 1.5-2 tsf
9	17.9			8	⊠				Fines = 51% PP= 2.5-3.5 tsf
10	14.6			9	⊠		**SC**	**Clayey SAND;** layers of sandy clay, medium dense/stiff, moist, dark yellowish brown	Fines = 40% PP = 4.5
11	14.4			10	⊠				Fines = 39% PP = 3.5-4.5
				11				End of test pit @ 10' No groundwater encountered	
				12				Nuclear gauge density test data at 3' Dry density = 111 pcf Moisture content = 13.3%	
								Nuclear gauge density test data at 4' 2" Dry density = 97 pcf Moisture content = 19.2%	

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 27

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk -CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, trace concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
1	37.1			2	⊠		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 72% PP = 2.5-3.5 tsf
2	15.9			3	⊠				Fines = 71% PP = 3.0 tsf
3	18.4	110		4	■				Fines = 65% PP = 4.5 tsf Corrosivity
4	20.9				⊠		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff, moist, yellowish brown with pale brown	Fines = 66% PP = 2.5 tsf EI = 144
5	20.2			5	⊠			yellowish brown to pale brown with olive brown	Fines = 68% PP = 2.7 tsf
6	9.2			6	⊠				Fines = 18% Gravel = 23%
7	7.5			7	⊠		SM	**Silty SAND with GRAVEL;** fine to coarse, very moist brownish gray	Fines = 12% Gravel = 29%
				8					
				9					
				10			CL	**Sandy Lean CLAY;** firm to stiff, very moist, yellowish brown	
8	23.9			11	⊠				Fines = 60 % PP = 1.5 tsf
				12				End of test pit @ 11' No groundwater encountered	
								Nuclear gauge density test data at 3.5' Dry density = 100 pcf Moisture content = 16.2%	

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 28

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, very stiff, slightly moist, dark yellowish brown	
1	16.5			2				**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, concretion, dark yellowish brown	Fines = 73% PP = 4.0 tsf
2	20.4			3			CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, stiff, moist, yellowish brown with pale brown	Fines = 71% PP = 2-2.5 tsf EI = 81
3	16.8			4					Fines = 58% PP = 2-2.5 tsf
4	13.4	115		5					PP = 4.5 tsf
5	17.6			6				**Sandy Lean CLAY;** concretions, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	Fines = 50% Fines = 56% PP = 2.5-3.5 tsf
6	33.1			7					Fines = 88% PP = 1.7 tsf
7	35.1			8			CH	**Fat CLAY;** trace of concretions, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	Fines = 92% PP = 1.5-4 tsf
				9					
7	45.0			10					#200 Wash Fines = 90% PP = 2.7-3.0 tsf
				11				End of test pit @ 10' 8" No groundwater encountered	
				12				Nuclear gauge density test data at 5' Dry density = 109 pcf Moisture content = 12.6%	
								Nuclear gauge density test data at 7' 2" Dry density = 86 pcf Moisture content = 31.3%	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 29

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace gravel, trace of concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
1	12.5			2				**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist to very moist, very dark brown	Fines = 81% PP = 3.5 tsf
2	15.9			3				**OLDER ALLUVIUM:** **Lean CLAY;** abundant concretions, medium plastic, stiff, moist, yellowish brown with pale brown	Fines = 76% PP = 2.7 tsf
3	20.4	98		5			CL	**Sandy Lean CLAY;** trace of concretions, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	Fines = 58% PP = 4 -4.5 tsf
4	17.3			7					Fines = 53% PP = 2.7-4 tsf
5	12.3			8			SM/SC	**Silty to Clayey SAND;** fine to medium, layers of sandy clay, trace of gravel, medium dense/stiff, moist, dark yellowish brown	Fines = 38%
6	14.6			9					Fines = 34%
7	41.1			10			CH	**Fat CLAY;** trace concretions, stiff, moist to very moist, olive brown	Fines = 88% PP = 2-3 tsf
8	43.2			11					Fines = 93% PP = 3.5-4.5 tsf
				12				End of test pit @ 11' 3" No groundwater encountered Nuclear gauge density test data at 4.5' Dry density = 98 pcf Moisture content = 19.6% Nuclear gauge density test data at 7.5' Dry density = 118 pcf Moisture content = 13.6%	

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 30

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, slightly moist to moist, dark yellowish brown	
1	15.7			2			CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, stiff, moist, dark brown	Fines = 85% PP = 2.5 tsf
2	16.8			3				dark yellowish brown	#200 Wash Fines = 85% PP = 2-3 tsf
3	15.9								Fines = 86% PP = 3.0 tsf
4	18.3			4				**OLDER ALLUVIUM: Lean CLAY with SAND;** concretions, stiff to very stiff, moist to very moist, dark brown with pale brown inclusions	EI = 48 Fines = 82% PP = 3.0 tsf
5	19.1	110		5			CL/CH	**Sandy Lean to Fat CLAY;** concretions, very stiff to hard, moist to very moist, yellowish brown to pale brown with olive brown	Fines = 69% PP = 4.5 tsf
6	20.3			6					Fines = 73% PP = 3-4.5 tsf
7	27.9			7					Fines = 64% PP= 2.0 tsf
8	35.7			8				**Lean to Fat CLAY with SAND;** concretions, firm to stiff, moist to very moist, dark yellowish brown with pale brown inclusions	#200 Wash Fines = 75% PP = 1.0 tsf
				9					
9	24.6			10				**Sandy Lean to Fat CLAY**; concretions, firm to stiff, moist to very moist, dark yellowish brown with pale brown inclusions	#200 Wash Fines = 50% PP = 1.7 tsf
10	14.0			11			SM	**Silty SAND;** fine to medium, moist, dark yellowish brown	#200 Wash Fines = 28 %
				12			CH	**Fat CLAY;** firm to stiff, moist, dark yellowish brown with reddish brown inclusions	
10	40.7			13					#200 Wash Fines = 85% PP = 1.7-2 tsf
								End of test pit @ 13' 2" No groundwater encountered Nuclear gauge density test data at 5.0' Dry density = 94 pcf Moisture content = 26.1%	

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 31

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, slightly moist, dark yellowish brown	
1	8.5			2				**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, slightly moist, hard, dark yellowish brown,	#200 Wash Fines = 72% PP = 4.5 tsf
2	11.7			3			CL		Fines = 74% PP = 4.5 tsf
3	16.1			4					Fines = 63% PP = 2-3 tsf
4	15.9	112							EI = 86 PP = 4.5 tsf
5	14.7			5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff to very stiff, moist, dark yellowish brown with pale brown and white inclusions	Fines = 60% PP = 3.5 tsf
6	18.7			6					#200 Wash Fines = 63% PP = 2-2.5 tsf
7	34.9			7			CH	**Fat CLAY;** trace of concretions, stiff to very stiff, moist to very moist, olive brown to light olive brown with pale yellow	Fines = 91% PP = 3.5-4.5 tsf
				8				End of test pit @ 8' No groundwater encountered Nuclear gauge density test data at 4.8' Dry density = 102 pcf Moisture content = 16.2%	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado Construction Level S.I.

Test Pit No. 32

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** hard, slightly moist, grayish brown	
1	4.2			1					Fines = 77% PP = 4.5 tsf
				2			CL	**ALLUVIUM:** **Lean CLAY with SAND;** hard, slightly moist, rootlets, dark yellowish brown	
2	8.3			3					#200 Wash Fines = 79% PP = 4.5 tsf EI = 61
				4					
3	19.8			5			CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** abundant concretions, very stiff, moist to very moist, yellowish brown with pale brown inclusions	Fines = 68% PP = 3-3.5 tsf
4	21.2			6					Fines = 65% PP = 4-4.5 tsf
				7				End of test pit @ 6' 3" No groundwater encountered	
				8					
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 33

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, stiff, slightly moist to moist, brown	
1	15.4			1				**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, brown	#200 Wash Fines = 75% PP = 4.5 tsf
2	17.9			2					
				3			CL		Fines = 59% PP = 4.5 tsf EI =63
				4				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, very stiff, moist, pale brown with white specks	
3	12.7			5					#200 Wash Fines = 54% PP = 4.5 tsf
4	15.7	110						layer of silty sand	Fines = 50%
				6					
5	8.1			7			SM	**Silty SAND;** fine to coarse, trace of gravel, moist, olive brown	#200 Wash Fines = 19%
				8			CH	**Fat CLAY;** moist to very moist, stiff, pale brown with white specks	
6	29.3			9					#200 Wash Fines = 96% PP = 3-3.5 tsf
								End of test pit @ 9' No groundwater encountered	
				10					
				11					
				12					

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 35

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** stiff to very stiff, moist dark brown pale brown inclusions, several concretions	
1	12.9			2				**ALLUVIUM:** **Sandy Lean CLAY;** hard, slightly moist, rootlets dark yellowish brown	Fines = 72% PP = 4.5 tsf
2	13.7			3					Fines = 65% PP = 3-4 tsf
							CL		Fines = 79% PP = 4.5 tsf
3	16.5			4					Fines = 69% PP = 4.5 tsf
				5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff to very stiff, moist, yellowish brown to dark yellowish brown and brown inclusions	
4	16.6								Fines = 58% PP = 2.0 tsf
5	18.1			6					Fines = 52% PP = 4.5 tsf
6	15.6	116		7				pale brown and white inclusions	Fines = 56% PP = 4.5 tsf
							CL/CH	**Lean to Fat CLAY with SAND**; abundant concretions, stiff to very stiff, moist to very moist, very pale brown	
7	20.9			8					Fines = 78% PP = 2-4.5 tsf
				9				End of test pit @ 8' 3" No groundwater encountered	
				10				Nuclear gauge density test data at 6.5' Dry density = 101 pcf Moisture content = 20.9%	
				11					
				12					
				13					

Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 36

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, slightly moist to moist, very dark brown	
1	8.1			2			CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel, slightly moist to moist, very dark brown	Fines = 73% PP = 4.5 tsf
2	10.6			3					Fines = 72% PP = 4.5 tsf
3	10.2			4					Fines = 74% PP = 4.5 tsf
4	10.8	118		5			CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** slightly moist to moist, stiff to very stiff, mottled dark brown and white, concretions	Fines = 75% PP = 4.5 tsf
5	27.2			6					Fines = 83% PP= 4.5 tsf
6	32.8			7					Fines =82 % PP = 4.5 tsf
				8				End of test pit @ 8' No groundwater encountered Nuclear gauge density test data at 4.5' Dry density = 108 pcf Moisture content = 11.8%	
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 37

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-13-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	7.7			0–1	⊠		CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist, brown	#200 Wash Fines = 68% PP = 4.5 tsf
2	12.9			1–2	⊠		CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel**,** very stiff, moist, dark yellowish brown	#200 Wash Fines = 74% PP = 4.5 tsf
3	22.2			2–3	⊠		CL/CH	**Lean to Fat CLAY with SAND;** trace of gravel, very stiff, moist, dark yellowish brown	Fines = 70% PP = 2.5-3.5 tsf EI = 105
4	17.5	101		3–4	■		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, slightly moist to moist, mottled dark brown and white	#200 Wash Fines = 72% PP = 4.5 tsf
5	28.1			4–7	⊠		CL/CH	**Lean to Fat CLAY;** stiff, moist to very moist, dark olive brown to dark yellowish brown	#200 Wash Fines = 91% PP= 2-4 tsf
				7–12				End of test pit @ 7' No groundwater encountered Nuclear gauge density test data at 2' Dry density = 111 pcf Moisture content = 16.2% Nuclear gauge density test data at 4' Dry density = 100 pcf Moisture content = 21.0%	

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado Construction Level S.I.

Test Pit No. 38

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, stiff, dry to slightly moist, dark brown	
1	12.2			2	⊠		CL	**OLD ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, stiff to very stiff, moist, very dark brown	Fines = 75% PP = 4 tsf
2	16.1			4	⊠		CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, trace of gravel, very stiff, moist, brown with pale brown inclusions	Fines = 51% PP = 4.5 tsf
3	16.7			6	⊠			slightly darker, olive brown	Fines = 50% PP = 2-3.5 tsf
								End of test pit @ 6' No groundwater encountered	
				7					
				8					
				9					
				10					
				11					
				12					
				13					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado Construction Level S.I.

Test Pit No. 39

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, dry to slightly moist, brown	
1	9.3			1	⊠				#200 Wash Fines = 73% PP = 4.5 tsf
2	13.8			2	⊠		CL	**ALLUVIUM:** **Sandy Lean CLAY;** stiff, moist, dark yellowish brown with dark brown	Fines = 72% PP = 4 tsf
3	17.1	116		3	■				Fines = 60% PP = 4.5 tsf Consolidation
4	13.5			4	⊠				Fines = 57% PP = 4.5 tsf
				5				End of test pit @ 6' No groundwater encountered	
				6					
				7					
				8					
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 40

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** crumbly**,** slightly moist, brown	
1	10.3			1			CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of rootlets, slightly moist to moist, very stiff to hard, dark brown to very dark brown	Fines = 77% PP = 4.5 tsf
2	10.8			2				**Lean to Fat CLAY with SAND**; trace of rootlets, slightly moist to moist, very stiff to hard, dark brown to very dark brown	Fines 78% PP = 4.5 tsf
3	10.7	117		3					Fines 79% PP = 4.5 tsf
4	11.5							Maximum density, Direct shear	Fines = 77% PP = 4.5 tsf El = 162
5	14.9			4					Fines = 72% PP = 4.5 tsf
6	17.1	96		5				**OLDER ALLUVIUM:**	Fines = 74% PP = 4.5 tsf
7	17.7						CL/CH	**Sandy Lean to Fat CLAY;** trace of concretions, very stiff to hard, moist, dark yellowish brown with white and pale brown inclusions	Fines = 62% PP = 4.5 tsf
8	24.8			6					Fines = 73% PP = 3-4.5 tsf
				7				**Lean to Fat CLAY with SAND;** concretions, very moist, stiff, dark yellowish brown	
9	30.7			8					Fines = 77% PP = 2.7-3.5 tsf
				9				End of test pit @ 8' 8" No groundwater encountered	
				10				Nuclear gauge density test data at 3' Dry density = 106 pcf Moisture content = 13.7%	
				11				Nuclear gauge density test data at 4' 8" Dry density = 99 pcf Moisture content = 16.2%	
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 41

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-13-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	10.0			0–1			CL	**FILL:** **Lean CLAY with SAND;** trace of gravel and rootlets, crumbly, dry to slightly moist, brown	#200 Wash Fines = 80% PP = 4.5 tsf
2	12.8			1–3			CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel and concretions, crumbly, slightly moist, dark yellowish brown with white inclusions	#200 Wash Fines = 80% PP = 4.5 tsf
3	14.1			3–4			CL	**OLDER ALLUVIUM: Sandy Lean CLAY;** abundant concretions, crumbly, mottled brown and pale brown	Fines = 65% PP = 4.5 tsf
4	17.7			4–5			CL/CH	**Lean to Fat CLAY with SAND;** abundant concretions, very stiff, moist, dark yellowish brown, pale brown with white inclusions	#200 Wash Fines = 79% PP = 4-4.5 tsf
5	27.8			5–6			CL/CH		Fines = 82% PP = 2-4.5 tsf
				6–12				End of test pit @ 6' 6" No groundwater encountered Nuclear gauge density test data at 3' Dry density = 109pcf Moisture content = 14.7% Nuclear gauge density test data at 5' Dry density = 93 pcf Moisture content = 21.2%	

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 42

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, dry to slightly moist, yellowish brown	
1	9.5			2				**ALLUVIUM:** **Sandy Lean Clay;** rootlets, trace of concretions and gravel, very stiff, slightly moist to moist, dark yellowish brown	#200 Wash Fines = 72% PP = 4.5 tsf
2	12.8			3			CL		Fines = 65% PP = 4.5 tsf EI = 62
3	18.6			5				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, crumbly, stiff to very stiff, moist, pale brown to brown	#200 Wash Fines = 57% PP = 2.75-4 tsf
4	6.3			7			SM	**Silty SAND;** fine to medium, moist, clay inclusions, dark yellowish brown	#200 Wash Fines = 10%
				8				End of test pit @ 8' 2" No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 43

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist, brown	
				1					
				2				**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions**,** stiff, moist, dark yellowish brown	
1	20.4			3	⊠		CL		Fines = 67% PP = 2.5-3.5 tsf
2	17.2			4	⊠			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel and concretions, stiff, moist, pale brown to yellowish brown	Fines = 51% PP = 2.5-3.5 tsf
3	16.9			5					Fines = 50% PP = 2.5 tsf
				6	⊠		CH	**Fat CLAY with SAND;** concretions, moist to very moist, olive brown	
4	29.3			7	⊠				Fines = 80% PP = 4.5 tsf
				8				End of test pit @ 7' 6" No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 44

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-13-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	10.8			0–1	⊠			**FILL:** **Sandy Lean CLAY;** trace of concretions**,** crumbly, stiff, slightly moist, very dark brown	Fines = 74% PP = 3.5 tsf
								ALLUVIUM: **Lean CLAY with SAND:** trace of concretions, very stiff, moist, very dark brown with white inclusions	
2	15.8			2	⊠				Fines = 75% PP = 3-3.7 tsf
3	15.1			3	⊠		CL	**Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown with white inclusions	Fines = 73% PP = 3.3-4.5 tsf EI = 57
4	16.6			4	⊠			**OLDER ALLUVIUM:** **Sandy Lean CLAY**; abundant concretions, very stiff, moist, dark yellowish brown with white inclusions	Fines = 70% PP = 2.5-3.5 tsf
5	15.0			5	⊠				Fines = 51% PP = 4.5 tsf
6	16.4			6	⊠			mostly light yellowish brown and pale brown	Fines = 52% PP = 4.5 tsf
				7–12				End of test pit @ 6' 6" No groundwater encountered Nuclear gauge density test data at 2' Dry density = 106 pcf Moisture content = 17.7% Nuclear gauge density test data at 4' Dry density = 101 pcf Moisture content = 20.0%	

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 45

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.0			0–1			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, very stiff, slightly moist to moist, gray and dark brown	Fines = 74% PP = 4.5 tsf
2	14.7			1–2				**ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, very stiff, moist, dark brown to dark reddish brown	Fines = 76% PP = 3.5-4.5 tsf
3	15.1			2–3					Fines = 75% PP = 4.5 tsf
4	18.5			3–4				**Sandy Lean CLAY;** trace of concretions, stiff, moist, dark brown to dark reddish brown	Fines = 72% PP = 2.5-3.5 tsf
5	22.1			4–5			CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of gravel and concretions, stiff to very stiff, moist to very moist, dark yellowish brown with pale brown inclusions	Fines = 66% PP = 2.5-3 tsf
6	22.4			5–6					Fines = 74% PP= 2.5-4.5 tsf
7	26.8			6–7				**Lean to Fat CLAY;** trace of concretions, stiff, moist to very moist, light olive brown	Fines =78% PP = 2-2.5 tsf
				7–8				End of test pit @ 8' No groundwater encountered	
				8–9				Nuclear gauge density test data at 18" Dry density = 117 pcf Moisture content = 14.2%	
				9–10				Nuclear gauge density test data at 4' Dry density =102 pcf Moisture content = 19.9%	
				10–11					
				11–12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 46

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, slightly moist to moist, brown	
1	13.2			1				**ALLUVIUM:** **Lean CLAY with SAND;** concretions, stiff to very stiff, moist, stiff, dark brown	Fines = 81% PP = 4.5 tsf
2	18.9			2					Fines = 68% PP = 4.5 tsf
				3			CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist, yellowish brown with pale brown	
3	22.3			4				olive brown and white inclusions	Fines = 71% PP = 3.2-3.7 tsf
4	18.4			5				mostly pale brown to very pale brown	Fines = 66% PP = 4.5 tsf
5	15.1			6					Fines = 50% PP = 4.5 tsf
				7					
				8				End of test pit @ 8' No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 47

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY**; trace of organics, crumbly, slightly moist to moist, brown	
1	31.4			2	⊠			**ALLUVIUM:** **Sandy Lean CLAY;** trace of organics, stiff to very stiff, moist, very dark brown	Fines = 68% PP = 2-3 tsf
2	18.7			3	⊠				Fines = 76% PP = 4 tsf
3	17.1			4	⊠		CL	**Lean CLAY with SAND;** very stiff, moist, dark yellowish brown	Fines = 79% PP = 2.5 tsf
4	14.6			6	⊠			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, yellowish brown with pale brown	Fines = 73% PP = 3.7-4 tsf
5	14.2			7	⊠				Fines = 50% PP = 2.0 tsf
6	22.1			8	⊠		CL/CH	**Lean to Fat CLAY with SAND;** concretions**,** very stiff, moist to very moist, very pale brown	Fines = 82% PP = 3.5-4 tsf
				9				End of test pit @ 8' 6" No groundwater encountered	
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 48

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly**,** very stiff, slightly moist to moist, very dark brown	
1	13.5			2			CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of gravel and concretions**,** very stiff, moist, dark yellowish brown	#200 Wash Fines = 75% PP = 4.5 tsf EI = 64
2	16.3			3					Fines = 73% PP = 2.5-4.5 tsf
3	14.3			4			CL/CH	**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions, stiff, moist, pale brown to very pale brown	Fines = 59% PP = 3 tsf
4	23.3			6					#200 Wash Fines = 74% PP = 3.5 - 4 tsf
				7				End of test pit @ 6' 6" No groundwater encountered	

Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 49

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-10-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, rootlets, crumbly, slightly moist, dark brown	
1	13.9			1	☒		CL	**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, trace of gravel, rootlets, stiff to very stiff, moist, dark brown	#200 Wash Fines = 74% PP = 3-4.5 tsf
2	13.8			2	☒				Fines = 71% PP = 4.5 tsf
				3					
3	19.2			4	☒		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** abundant concretions, stiff, moist, yellowish brown to pale brown	#200 Wash Fines = 58% PP= 2.5-3.5 tsf
4	17.3			5	☒				Fines = 54% PP = 2-2.5 tsf
				6				**Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist to very moist, pale brown to very pale brown	
5	23.9			7					#200 Wash Fines = 79% PP = 3.5-4.5 tsf
				8				End of test pit @ 8' No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 50

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
1	11.2			0				**FILL:** **Lean CLAY with SAND;** very stiff, slightly moist, dark yellowish brown	Fines = 76% PP = 4.5 tsf
2	11.9			1				**ALLUVIUM:** **Sandy Lean CLAY;** very stiff, slightly moist to moist, very dark brown	Fines = 71% PP = 4.5 tsf
3	16.4			2			CL		Fines = 73% PP = 3.0 tsf EI = 71
4	16.7			3				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown, medium plasticity	#200 Wash Fines = 57% PP = 2.2 tsf
5	19.4			4					Fines = 56% PP = 2.5-3.5 tsf
6	22.4			5			CL/CH	**Sandy Lean to Fat CLAY;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown and white	#200 Wash Fines = 69% PP = 3-3.7 tsf
				6				End of test pit @ 5' 6" No groundwater encountered	
				7				Nuclear gauge density test data at 2' Dry density = 102 pcf Moisture content = 20.3%	
				8				Nuclear gauge density test data at 3' Dry density = 105 pcf Moisture content = 18.7%	
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 51

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, moist, brown	
1	17.8			1	⊠		CL	**ALLUVIUM:** **Lean CLAY with SAND;** abundant concretions, stiff to very stiff, moist, very dark brown	Fines = 63% PP = 3-3.7 tsf
2	19.0			2	⊠				Fines = 57% PP = 2-3.5 tsf
3	19.7			3	⊠			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	Fines = 59% PP = 3.5 tsf
4	23.4			4	⊠		CL/CH	**Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, moist to very moist, very pale brown	Fines = 80% PP = 2-3 tsf
5	16.7	105		5	■				Fines = 77% PP = 4.5 tsf
5	21.6			6	⊠				Fines = 81% PP = 2-2.7 tsf
6	23.4			7	⊠				Fines = 80% PP = 2.5-4 tsf
7	19.0			8	⊠				Fines = 77% PP = 1.5-2 tsf
				9				End of test pit @ 8' 6" No groundwater encountered	
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 52

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0					
1	9.3			1	⊠			**FILL:** **Lean CLAY with SAND;** rootlets, hard, slightly moist, very dark brown	#200 Wash Fines = 83% PP = 4.5 tsf
				2				**ALLUVIUM:** **Lean CLAY with SAND;** rootlets carbonate, slightly moist, hard, dark brown with white specks	
2	10.6				⊠				#200 Wash Fines = 82%
3	15.3			3	⊠				Fines = 81% PP = 4.5 tsf
4	13.8	99		4	■		CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** small trace of concretions, very stiff to hard, moist, dark brown, pale brown	Fines = 82% PP = 4.5 tsf
				5					
5	16.0			6	⊠				Fines = 76%
6	16.6			7	⊠			**Sandy Lean CLAY;** trace of gravel, concretions, carbonate, very stiff to hard, moist to very moist, brown to pale brown	Fines = 60% PP = 3-4.5 tsf
				8			SM	**SAND with SILT and GRAVEL;** fine to coarse, sub rounded gravel, moist, brown	
7	6.5			9	⊠				Fines = 11% Gravel = 28%
				10				End of test pit @ 9' No groundwater encountered	
				11				Nuclear gauge density test data at 2.5" Dry density = 103 pcf Moisture content =13.1%	
				12				Nuclear gauge density test data at 6' Dry density = 101 pcf Moisture content = 22.4%	

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 53

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL: Sandy Lean CLAY;** crumbly, slightly moist, yellowish brown	
1	17.4			1	☒		CL	**ALLUVIUM:** **Sandy Lean CLAY;** concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 65% PP = 3.5-4.5 tsf
2	16.5			2	☒				Fines = 57% PP= 4.0 tsf
3	20.8			3	☒		CL/CH		Fines = 63% PP = 4.0 tsf EI = 50
4	19.7			4	☒			**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** abundant concretions, very stiff, moist, pale brown	Fines = 63% PP = 4.0 tsf
5	22.7			5	☒				Fines = 61% PP = 2.5-3.5 tsf
6	22.3			6	☒				Fines = 70% PP = 4.0 tsf
				7				End of test pit @ 6' 6" No groundwater encountered	
				8				Nuclear gauge density test data at 2' Dry density = 111 pcf Moisture content = 17.0%	
				9				Nuclear gauge density test data at 4' Dry density = 99 pcf Moisture content = 19.7%	
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 54

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** stiff, slightly moist to moist, dark yellowish brown	
1	17.1	107		1	■		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark yellowish brown	#200 Wash Fines = 88% PP = 4.5 tsf
2	22.4			2	⊠				#200 Wash Fines = 81% PP = 2.5-3.5 tsf
3	24.7			3	⊠		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** abundant concretions, stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 76% PP = 4.5 tsf
4	25.6			4	⊠				Fines = 84% PP= 2.5-3 tsf
5	26.2			5	⊠			**Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, light olive brown with pale brown inclusions	#200 Wash Fines = 68% PP = 2.7-4 tsf
6	26.5			6	⊠				Fines = 72% PP = 2-3 tsf
				7				End of test pit @ 7' 6" No groundwater encountered	
				8				Nuclear gauge density test data at 18" Dry density = 110 pcf Moisture content = 16.5%	
				9					
				10				Nuclear gauge density test data at 4' Dry density = 96 pcf Moisture content = 26.3%	
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 55

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist, dark brown	
1	13.7			1	☒		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of gravel, stiff to very stiff, moist, very dark brown	Fines = 79% PP = 2.5-4 tsf
2	15.3			2	☒				Fines = 80% PP = 3.2-3.7 tsf EI = 111
3	15.3			3	☒				Fines = 80% PP = 3-3.5 tsf
4	16.5			4	☒				Fines = 78% PP = 3-3.5 tsf
5	22.7			5	☒			**OLDER ALLUVIUM:** **Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, yellowish brown with pale brown inclusions	Fines = 73% PP = 3-3.5 tsf
				6				End of test pit @ 5' 6" No groundwater encountered Nuclear gauge density test data at 2' Dry density = 105 pcf Moisture content = 11.0% Nuclear gauge density test data at 5' Dry density = 100 pcf Moisture content = 26.5%	
				7					
				8					
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 56

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, stiff, slightly moist, dark brown	
1	13.2			1	☒		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff to very stiff, moist, dark brown	Fines = 75% PP = 3.5-4.5 tsf
2	15.9			3	☒				#200 Wash Fines = 85% PP = 2.5-4.5 tsf
3	19.7			5	☒		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** concretions, very stiff, moist, dark yellowish brown with pale brown	Fines = 90% PP = 2.5-3 tsf
4	27.1			6	☒				Fines = 90% PP = 3.0 tsf
5	22.4			8	☒				Fines = 87% PP = 3.2-3.5 tsf
6	23.5			9	☒				Fines = 85% PP = 2.5-3 tsf
								End of test pit @ 9' No groundwater encountered	

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 57

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** crumbly, slightly moist to moist, dark brown	
1	15.7			1			CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, very dark brown	Fines = 86% PP = 3.5 tsf
2	17.7			2					Fines = 85% PP = 2.7-4.5 tsf
3	23.1			3			CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, moist, dark yellowish brown with pale brown inclusions	Fines = 85% PP = 2-3.5 tsf
4	23.4			4					Fines = 81% PP = 3-3.5 tsf
				5				End of test pit @ 4' 6" No groundwater encountered	
				6				Nuclear gauge density test data at 2' Dry density = 106 pcf Moisture content = 19.4%	
				7				Nuclear gauge density test data at 4' Dry density = 86 pcf Moisture content = 29.6%	
				8					
				9					
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 58

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of travel, slightly moist to moist, stiff, brown	
1	20.2			1			CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of gravel, moist, stiff, dark brown	#200 Wash Fines = 67% PP = 3.5-4 tsf
2	14.9			3					Fines = 78% PP = 3.5-4.5 tsf EI = 59
3	21.3			5			CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** concretions, stiff to very stiff, moist, dark yellowish brown with pale brown	Fines = 84% PP = 3.5 tsf
4	21.2			6					Fines = 89% PP = 2.5-3.5 tsf
5	23.2			8					Fines = 90% PP = 2.5-4 tsf
6	23.4			9				**Lean to Fat CLAY with SAND;** stiff, moist, dark yellowish brown with dark brown inclusions	#200 Wash Fines = 77% PP = 4.5 tsf
				10				End of test pit @ 9' 6" No groundwater encountered	
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 59

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** trace of wood, stiff, moist, dark brown	
1	16.4			1	⊠				Fines = 87% PP = 2.5 tsf
				2			**CL**	**ALLUVIUM:** **Lean CLAY;** stiff, moist, very dark brown	
2				3					EI = 88
				4	⊠				
				5					
3	23.7			6	⊠		**CL/CH**	**OLDER ALLUVIUM:** **Lean to Fat CLAY;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown	Fines = 85% PP = 2.5-3 tsf
4	26.5			7	⊠				Fines 87% PP = 2.5-3 tsf
				8				End of test pit @ 7' No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 60

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Lean CLAY with SAND,** stiff, moist, dark brown	
1	15.9			1	⊠		CL/CH	**ALLUVIUM:** **Lean to Fat CLAY;** very stiff, moist very dark brown	Fines = 86% PP = 4.0 tsf
2	22.3			2	⊠				Fines 89% PP = 1.5-4 tsf EI = 102
				3					
3	23.4			4	⊠			**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions stiff, moist, dark yellowish brown with pale brown	Fines = 83% PP = 1.7-2.5 tsf
4	25.8			5	⊠				#200 Wash Fines = 78% PP = 2.5-3 tsf
				6					
				7			CH	**Fat CLAY with SAND;** stiff, moist to very moist, dark yellowish brown with pale brown	
5	31.0			8	⊠				#200 Wash Fines = 81% PP = 2-2.5 tsf
				9				End of test pit @ 8' 3" No groundwater encountered	
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 61

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist to moist, dark yellowish brown	
1	15			1				**ALLUVIUM:** **Lean CLAY with SAND;** concretions, stiff, moist, dark yellowish brown	#200 Wash Fines = 79% PP = 4.0 tsf
2	16.4			2			CL		Fines = 74% PP = 2.5-4 tsf
3	14.8			3				**OLDER ALLUVIUM:** **Sandy Lean CLAY;** abundant concretions, stiff, moist, yellowish brown and pale brown	Fines = 50% PP = 2.0 tsf
4	13.7			4					Fines = 50% PP = 2.5-3.5 tsf
				5					
				6					
				7			CL/CH	**Sandy Lean to Fat CLAY;** abundant concretions, stiff to very stiff, moist, olive brown	
5	21.6			8					Fines = 56% PP = 3.0 tsf
				9				End of test pit @ 9' No groundwater encountered	
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 62

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-06-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** stiff, moist, dark brown	
1	18.5			1	☒		CL	**ALLUVIUM:** **Lean CLAY with SAND;** very stiff, moist, dark brown	#200 Wash Fines = 82% PP = 2.2-3 tsf
2	15.1			3	☒			**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark brown	Fines = 72% PP = 3-3.2 tsf
3	25.9			5	☒		CL/CH	**Lean to Fat CLAY with SAND;** trace of concretions, stiff, moist, dark yellowish brown	#200 Wash Fines = 86% PP = 3-3.5 tsf
4	27.6			7	☒				Fines = 85%
5	30.3			8	☒				Fines = 94% PP = 3.0 tsf
6	20.2			10	☒		CL	**Sandy Lean CLAY;** stiff, moist, light olive brown to brown	#200 Wash Fines = 64% PP = 3.0 tsf
				11				End of test pit @ 10' 4" No groundwater encountered	
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 63

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** crumbly, slightly moist to to moist, dark brown	
1	14.0			1 2 3			**CL**	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, very dark brown	#200 Wash Fines = 86% PP = 3.5 tsf
				4 5					
2	20.5			6			**CL/CH**	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown with pale brown	#200 Wash Fines = 69% PP = 3.5 tsf
				7 8 9 10 11 12				End of test pit @ 6' 6" No groundwater encountered Nuclear gauge density test data at 2.5" Dry density = 98 pcf Moisture content = 15.7% Nuclear gauge density test data at 6' Dry density = 89 pcf Moisture content = 23.3%	

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 64

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist to moist, brown	
1	15.9			1	⊠				Fines = 75% PP = 2.5-2.7 tsf
2	21.5			2	⊠			**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark brown	Fines = 80% PP = 3.7-4.5
3	20.1			3	⊠				Fines = 67% PP = 3-4.5 tsf
4	16.6			4	⊠		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** concretions, very stiff, moist, dark yellowish brown	Fines = 71% PP = 4.5 tsf
5	15.5			5	⊠				Fines = 57% PP= 4.5 tsf
6	14.4			6	⊠			abundant concretions	Fines 50% PP = 4.5 tsf
7	18.0			7	⊠				Fines = 50% PP = 4.5 tsf
				8				End of test pit @ 7' 6" No groundwater encountered Nuclear gauge density test data at 2' Dry density = 99 pcf Moisture content = 21.3%	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 65

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** crumbly, dry to slightly moist, dark brown	
1	7.7			1	☒			**ALLUVIUM:** **Lean CLAY with SAND;** trace of organics, stiff to very stiff, slightly moist to moist, very dark brown	Fines = 86% PP = 4.5 tsf
2	8.4			2	☒		CL		Fines 84% PP = 4.5 tsf
3	9.3	113		3	■			**Sandy Lean CLAY;** concretions, caliche stringers, very stiff, slightly moist, mottled dark yellowish brown with white inclusions	Fines = 71% PP = 4.5 tsf
4	21.6			4					
5	17.4	114		5	☒			**Lean to Fat CLAY with SAND;** trace concretions, very stiff, moist, dark yellowish brown and pale brown	Fines = 80% PP = 4-4.5 tsf
6	24.0			6	☒		CL/CH	**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** trace of concretions, very stiff, moist, dark yellowish brown	Fines = 82% PP = 2.7-3 tsf EI = 99
7	20.9			7	☒			**Sandy Lean CLAY;** trace of concretions, very stiff, moist, dark yellowish brown with pale brown and white inclusions	Fines = 72% PP = 4-4.5 tsf
8	19.7			8	☒		CL		Fines = 63% PP = 4-4.5 tsf
				9				End of test pit @ 8' 6" No groundwater encountered Nuclear gauge density test data at 18" Dry density = 109 pcf Moisture content = 7.9%	
				10					
				11					
				12					

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 66

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** slightly moist to moist, dark olive gray	
1	20.9			1	⊠			**ALLUVIUM:** **Sandy Lean CLAY;** trace of concretions, stiff to very stiff, moist to very mois,t olive brown	Fines = 74% PP = 3-3.5 tsf
				2					
2	15.9			3	⊠		CL	**OLDER ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, very stiff, moist, olive brown with pale brown	Fines = 79% PP = 4.5 tsf
				4					
3	18.2			5	⊠			**Sandy Lean CLAY;** stiff to very stiff, moist, dark yellowish brown	Fines = 60% PP = 4-4.5 tsf
				6					
4	18.1				⊠		SC	**Clayey SAND;** fine, layers of sandy lean clay, moist to very moist, yellowish brown with gray inclusions	Fines = 40%
5	18.6			7	⊠				Fines = 44%
				8				End of test pit @ 7' 6" No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 67

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0			CL	**FILL:** **Sandy Lean CLAY;** trace of gravel, soft, slightly moist, grayish brown (pond surface sediments)	
1	27.0			1				**ALLUVIUM:** **Sandy Lean to Fat CLAY;** trace of organics, stiff to very stiff, moist, very dark brown	Fines = 74% PP = 3.5-4 tsf
2	17.0			2					Fines 70% PP = 3-4 tsf
3	19.9	115		3			CL/CH	**OLDER ALLUVIUM;** **Sandy Lean to Fat CLAY;** trace concretions, stiff to very stiff, moist to very moist, medium to high plasticity, dark olive gray	Fines = 66% PP = 3.2-3.7 tsf Consolidation
4	22.0			4					Fines = 69% PP = 3-4 tsf
5	24.3			5					Fines = 70%
				6					
				7					
				8				End of test pit @ 8' 6" No groundwater encountered	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 68

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-07-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				Pond surface containing trash	
				1				One foot of sediment, very soft, bluish gray	
1	31.9			2	☒			**Lean to Fat CLAY;** firm, moist ot very moist, dark olive brown to dark gray	Fines = 91% PP = 1-1.5 tsf
1	29.3			3	☒			**ALLUVIUM:** **Lean to Fat CLAY with SAND;** soft, very moist to wet, olive gray with rusty strike	Fines = 77% PP = .5-.75 tsf
2	22.4			4	☒			**Sandy Lean to Fat Clay;** stiff to very stiff, moist to very moist, olive gray with rusty strike and white specks	Fines = 70% PP = 2-4 tsf
3	31.8			5	☒		CL/CH	**Lean to Fat CLAY;** stiff to very stiff, moist to very moist, olive gray	Fines = 90% PP = 1.5-2 tsf
4	33.4	93		6	■			**Lean to Fat CLAY with SAND;** firm to stiff, moist to very moist, grayish brown to brownish gray	Fines = 80% PP = 1.2-1.7 tsf
5	36.5	88		7					Fines = 71% PP = 1.0-1.5 tsf Consolidation
				8					
4	37.8			9	☒			**Lean to Fat CLAY;** stiff, moist to very moist, olive gray	Fines = 97% PP = 2.5-4.5 tsf
				10					
5	30.5			11	☒			**Silt;** trace of sand, stiff, moist, dark olive gray	Fines = 92% PP = 2.5-4 tsf
				12			ML		
				13				cementation at 13.5 feet	
6	28.2			14	☒		SM	**Silty SAND;** fine to medium, wet, dark olive gray	Fines = 13%
								End of test pit @ 14' 6" Water seeping in sand lenses at 3', groundwater at 13' Hole filled with water to 2' of ground surface after one day	

▽ Bulk ☒ CD ■ SPT ☒

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 69

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-12-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Lean CLAY with SAND;** trace concretions, very stiff, slightly moist to moist, dark brown	
1	13.4			1	⊠				Fines = 86% PP = 4-4.5 tsf
				2			CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace concretions, very stiff, moist, very dark brown	
2	15.7			3	⊠				Fines 84% PP = 3-3.5 tsf
				4					
3	16.0			5	⊠				Fines = 78% PP = 2.5 tsf
				6				**OLDER ALLUVIUM:** **Sandy Lean to Fat Clay;** concretions, stiff, moist, dark yellowish brown with pale brown inclusions	
4	21.7				⊠				Fines = 64% PP = 1.5-3 tsf
				7			CL/CH	**Lean to Fat Clay;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown inclusions	
5	31.1			8	⊠				Fines = 85% PP = 2.0 tsf
				9			CH	**Fat Clay;** concretions, stiff, moist to very moist, dark yellowish brown with pale brown inclusions	
6	39.6			10	⊠				Fines = 98% PP = 4.5 tsf
				11				End of test pit @ 10' No groundwater encountered	
				12				Nuclear gauge density test data at 4' Dry density = 91 pcf Moisture content = 18.4%	

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 70

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, stiff, slightly moist to moist, brown	
1	14.9			1	⊠		CL	**ALLUVIUM:** **Lean CLAY with SAND;** stiff, moist, dark yellowish brown	Fines = 76% PP = 2-2.5 tsf
2	15.0	108		2	■		CL/CH	**Sandy Lean to Fat CLAY;** concretions, slightly moist, dark yellowish brown with pale brown	Fines = 73% PP = 3.7-4 tsf
3	18.1			3	⊠				Fines = 74% PP = 2.5-3.5 tsf EI = 160
3	12.0				⊠				Fines = 57%
4	15.3			4	⊠		CL	**OLDER ALLUVIUM:** **Sandy Lean CLAY;** very stiff, moist, dark yellowish brown	Fines = 52% PP = 4.0 tsf
5	14.9			5	⊠				Fines = 50% PP = 3.5 tsf
				6				End of test pit @ 4' 6" No groundwater encountered	
				7				Nuclear gauge density test data at 2' Dry density = 106 pcf Moisture content = 14.7%	
				8				Nuclear gauge density test data at 5' Dry density = 105 pcf Moisture content = 14.1%	
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 71

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** crumbly, slightly moist to moist, brown	
1	10.7			1	⊠		CL	**ALLUVIUM:** **Sandy Lean CLAY**; concretions, very stiff, moist, dark brown	Fines = 64% PP = 4.5 tsf
2	14.2			2	⊠				Fines = 59% PP = 3-3.5 tsf EI = 45
3	14.5	119		3	■			dark yellowish brown	Fines = 54% PP = 3.5-4.5 tsf
				4				End of test pit @ 4' 2" No groundwater encountered Nuclear gauge density test data at 3.5' Dry density = 116 pcf Moisture content = 13.1%	
				5					
				6					
				7					
				8					
				9					
				10					
				11					
				12					

▽ Bulk ⊠ CD ■ SPT ⊠

Test Pit Log

KOURY ENGINEERING & TESTING, INC.

Project No. 18-0817
Project Name : OC Prado

Test Pit No. 72

Sheet : 1 **Of :** 1

Exploration Method : Backhoe
Sampling Method : Bulk - CD
Trenching Co: Bill Bastedo Backhoe Service
Location : See Figure A-2

Ground Elevation:
Date Excavated : 09-11-2018

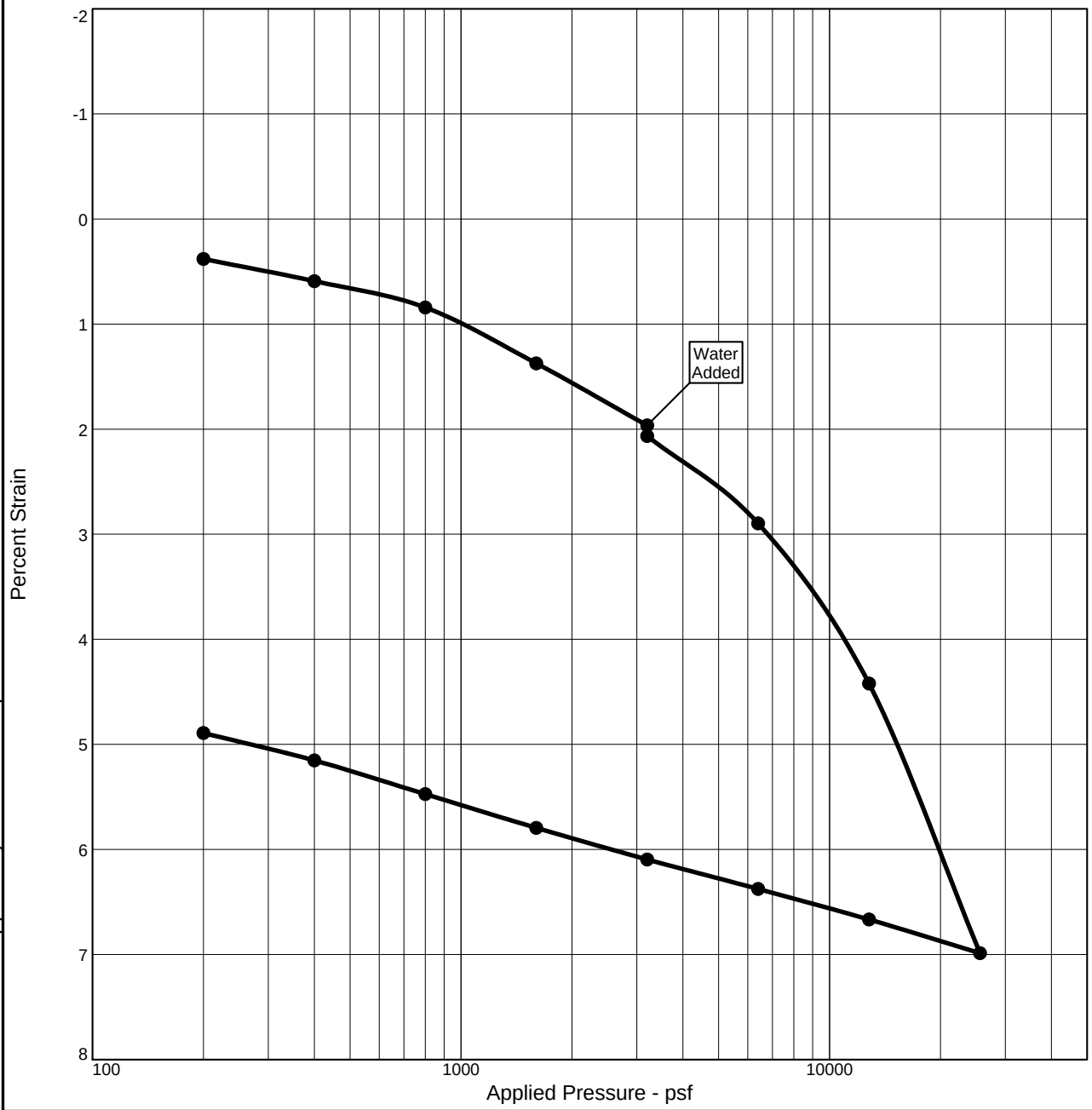
Sample No.	Moisture Content (%)	Dry Unit Weight (pcf)	Equivalent SPT	Depth (ft)	Sample Location	Graphic Log	Soil Type (USCS)	Description	Additional Tests
				0				**FILL:** **Sandy Lean CLAY;** trace of gravel, crumbly, soft, slightly moist to moist, dark brown	
1	15.4			1			CL	**ALLUVIUM:** **Lean CLAY with SAND;** trace of concretions, very stiff, moist, very dark brown	Fines = 78% PP = 2.5-3.5 tsf
2	16.1			2				**Sandy Lean CLAY;** trace of concretions, very stiff, moist, dark brown	Fines = 73% PP = 2.2-2.7 tsf
3	20.0			3				**OLDER ALLUVIUM:** **Lean to Fat CLAY with SAND;** concretions, stiff to very stiff, moist to very moist, dark yellowish brown with pale brown	Fines = 79% PP = 2.5-3 tsf
4	19.1	103		4			CL/CH	**Sandy Lean to Fat CLAY;** concretions, stiff to very stiff, moist to very moist, yellowish brown	Fines = 54% PP = 3.5-4 tsf
5	18.1			5					Fines = 50% PP = 2-2.5 tsf
				6				End of test pit @ 6' 3" No groundwater encountered Nuclear gauge density test data at 3' Dry density = 105 pcf Moisture content = 19.1%	
				7					
				8					
				9					
				10					
				11					
				12					

Bulk ☒ CD ■ SPT ☒

APPENDIX C

Laboratory Test Results & Calculations

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
85.0 %	17.6 %	108.1			2.7		10206	0.14	0.02		0.1	0.560

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Gray Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B13 @ 11' **Sample Number:** 2018-249

Remarks:
Lab #5345.

Koury Engineering & Testing, Inc.

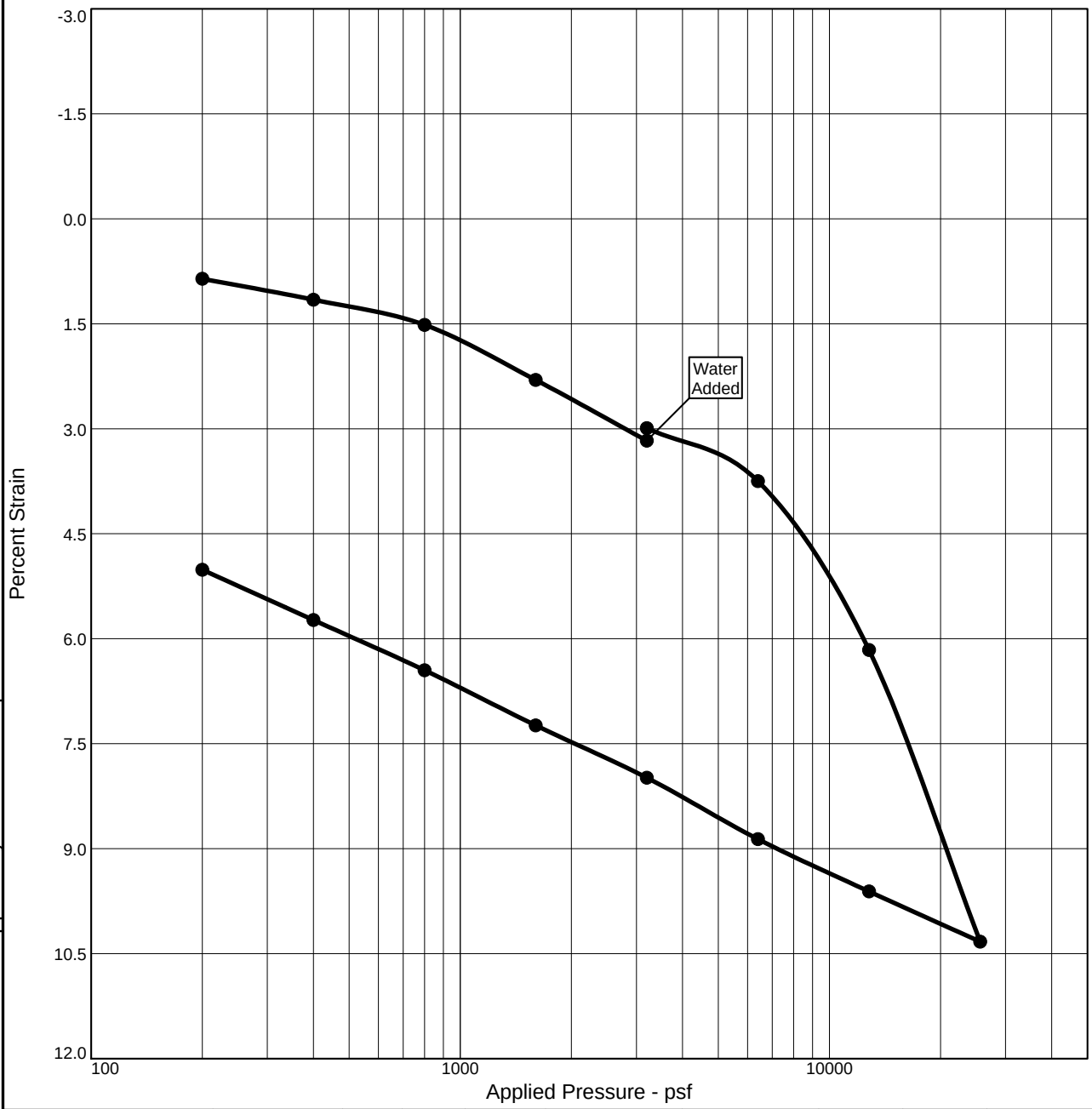
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
95.6 %	28.1 %	93.9			2.7		9395	0.25	0.05	0.795

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Olive Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B14 @ 15' **Sample Number:** 2018-249

Remarks:
Lab #5349.

Koury Engineering & Testing, Inc.

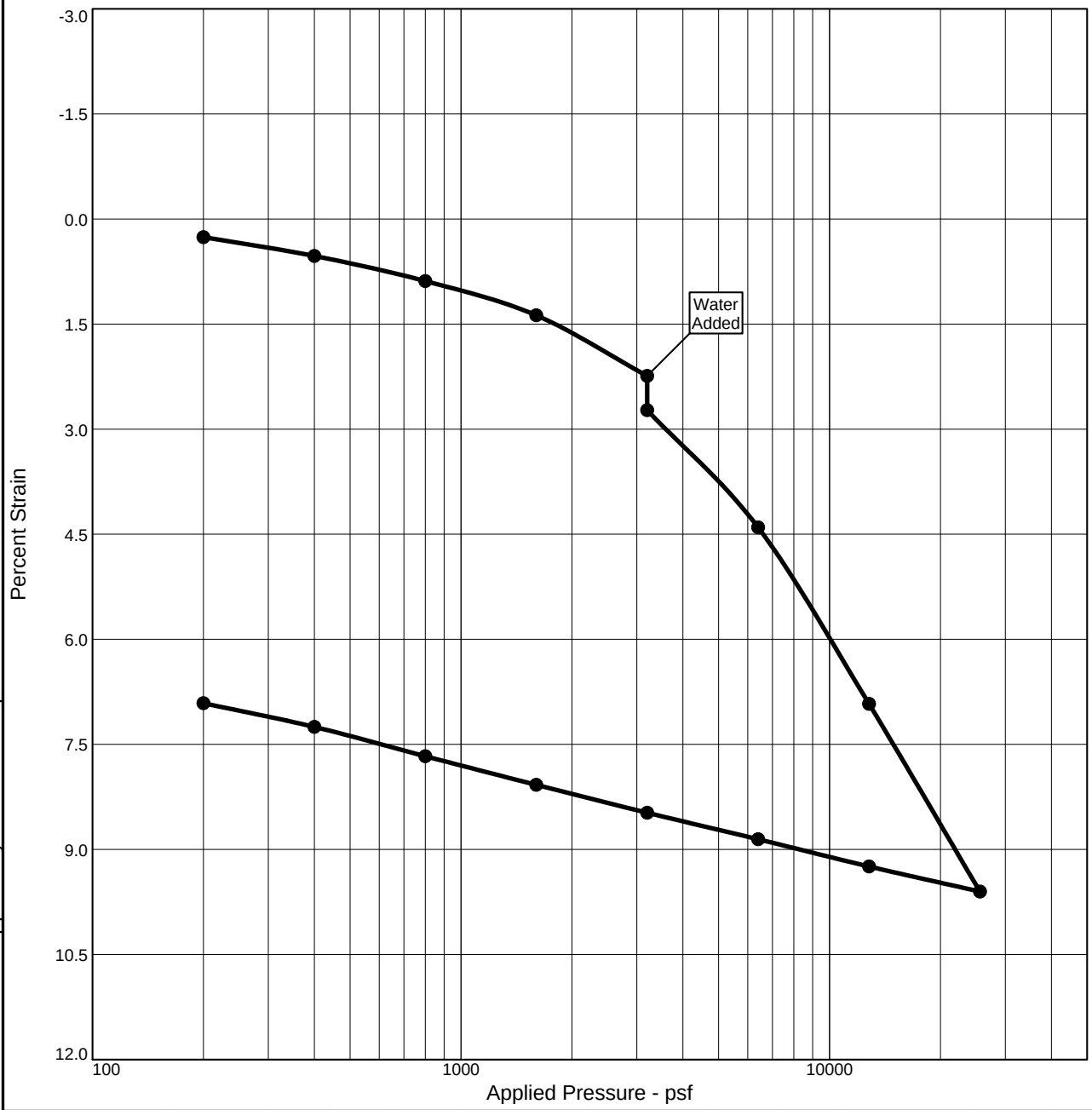
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
79.0 %	17.9 %	104.5			2.7		6908	0.15	0.02		0.5	0.613

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Yellowish Brown to Light Olive Brown Silt/Sand Mixture	Observed as: ML/SM	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B15 @ 5' **Sample Number:** 2018-249

Remarks:

Lab #5318.

Koury Engineering & Testing, Inc.

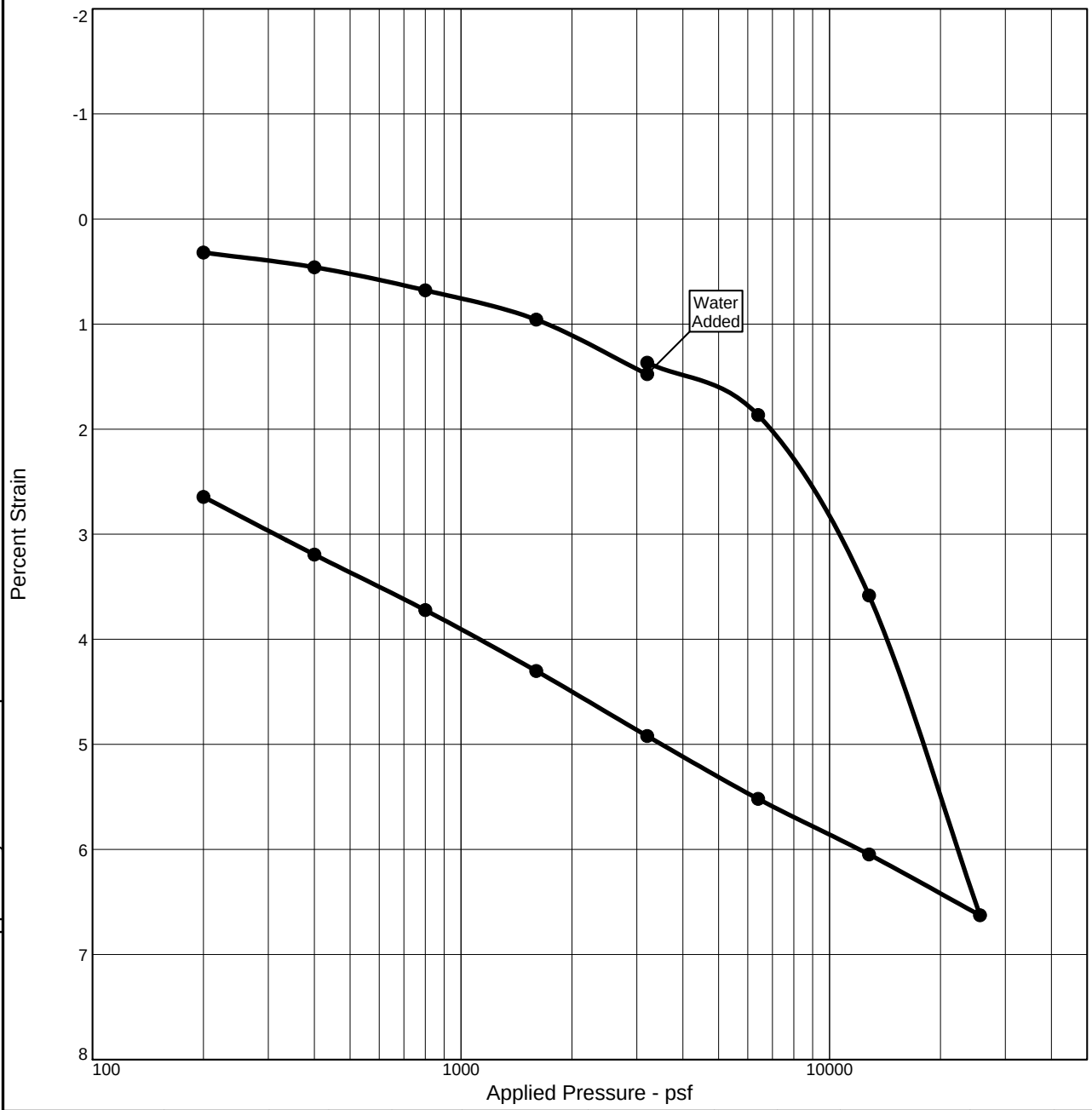
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
98.2 %	37.0 %	83.5			2.7		9483	0.21	0.04	725	0.1	1.018

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Grayish Brown to Dark Grayish Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B16 @ 8' **Sample Number:** 2018-249

Remarks:

Lab #5318.

Koury Engineering & Testing, Inc.

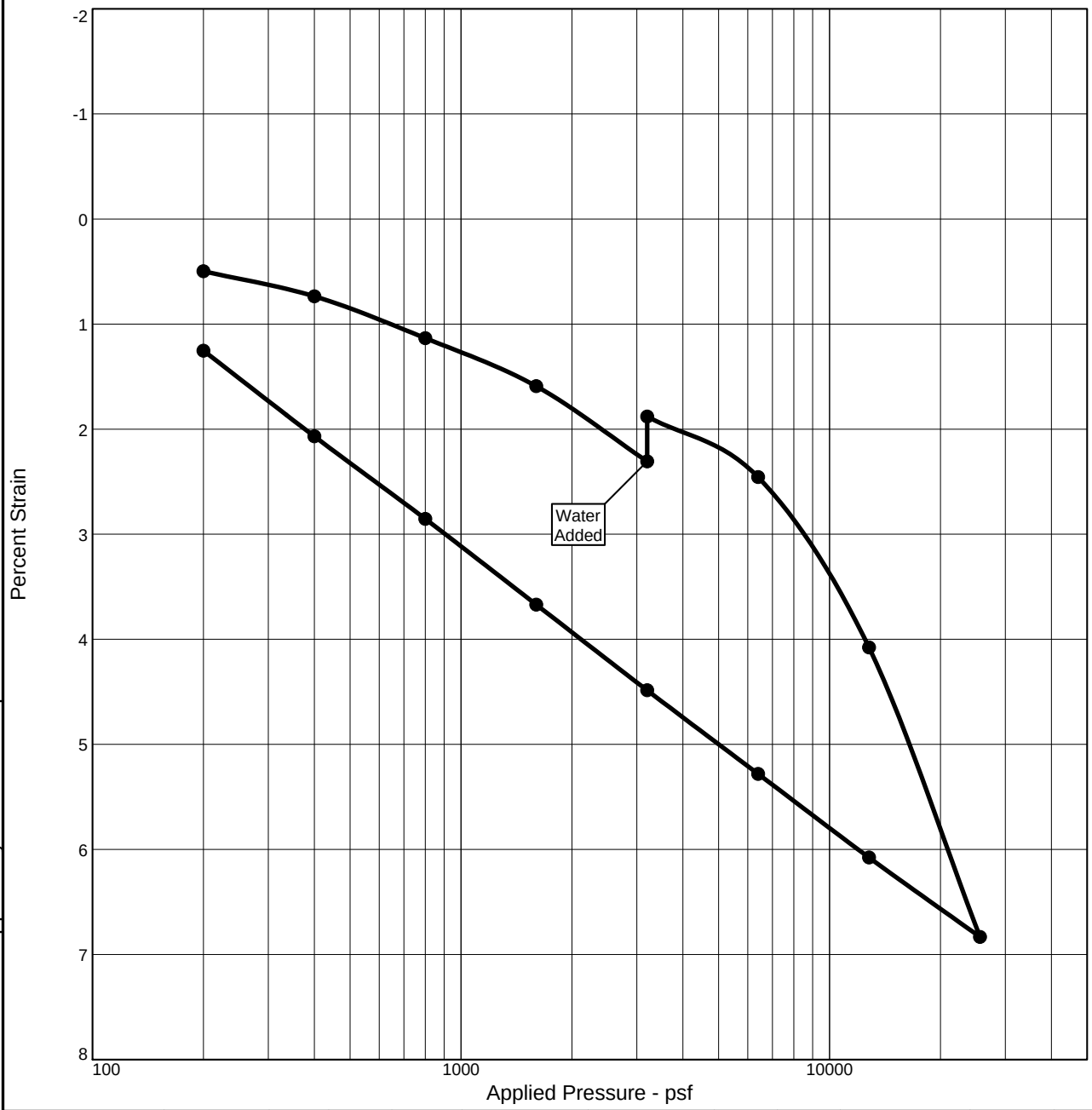
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
96.7 %	21.8 %	104.9			2.7		9373	0.15	0.04	2538	0.4	0.607

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Brown to Grayish Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B16 @ 15' **Sample Number:** 2018-249

Remarks:
Lab #5315.

Koury Engineering & Testing, Inc.

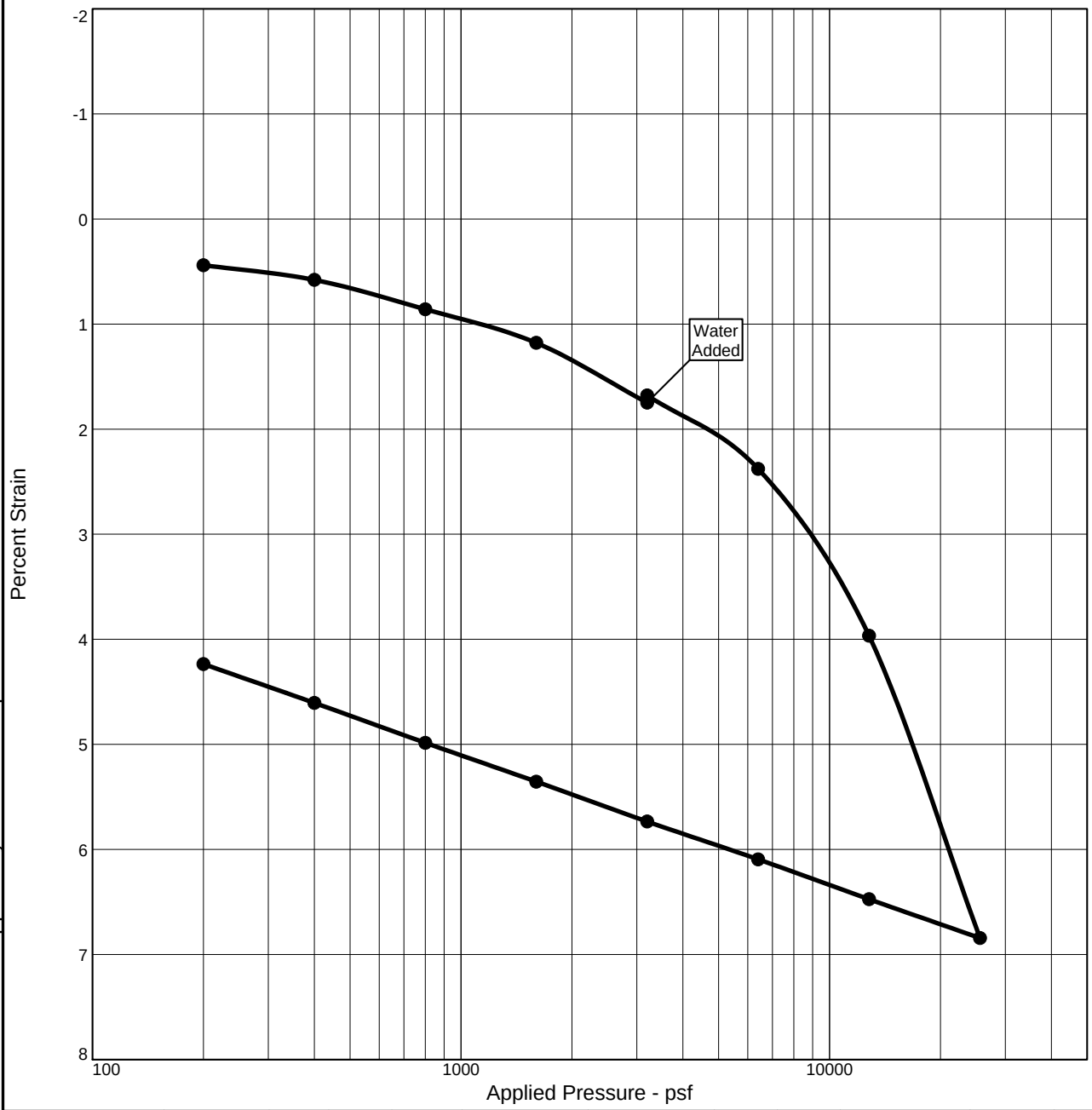
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
89.8 %	19.4 %	106.5			2.7		9951	0.15	0.02	245	0.1	0.583

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B16 @ 25' **Sample Number:** 2018-249

Remarks:
Lab #5308.

Koury Engineering & Testing, Inc.

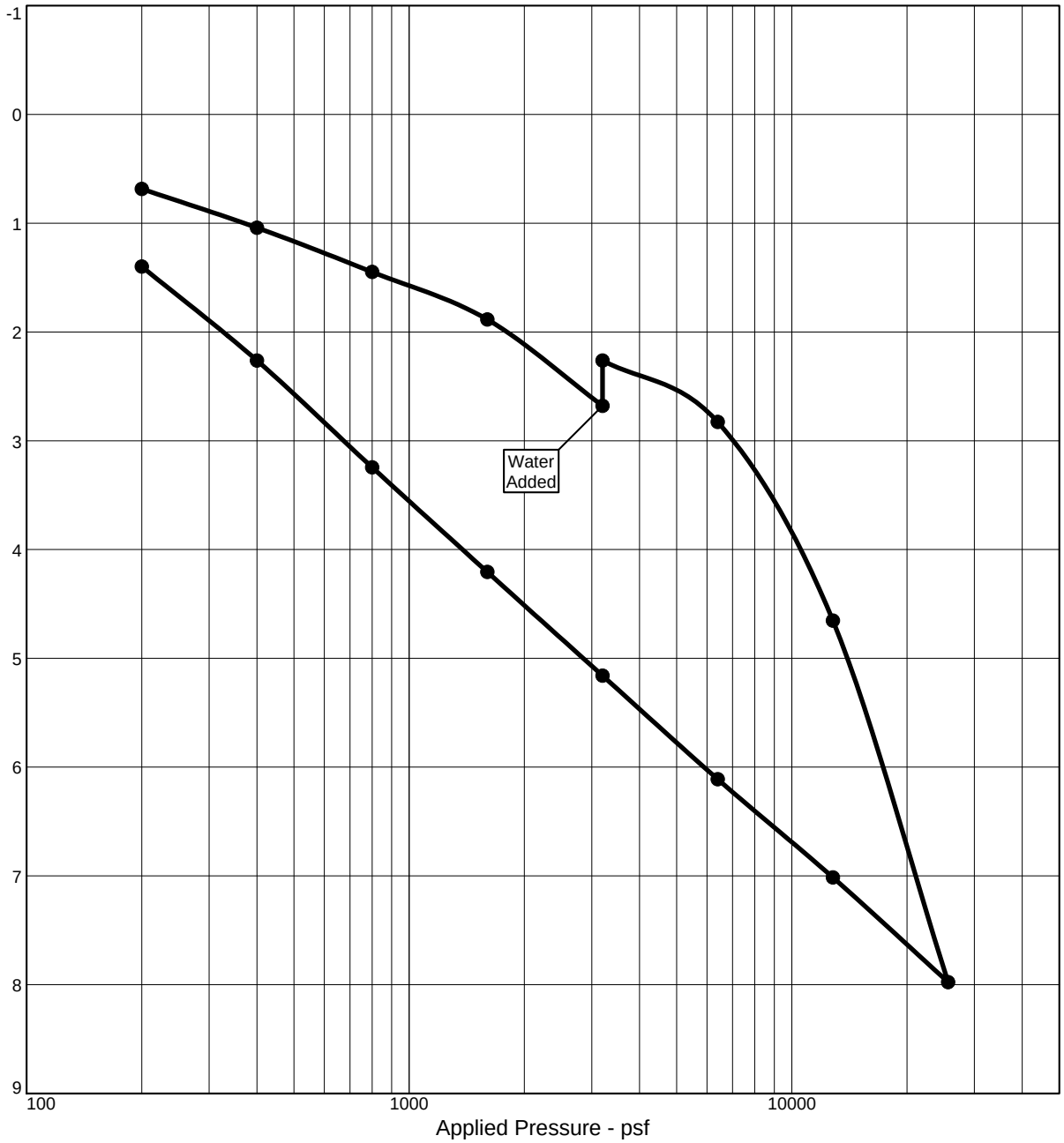
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_r	Initial Void Ratio
Saturation	Moisture									
97.4 %	23.1 %	102.7			2.7		9616	0.18	0.05	0.641

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Olive Brown Silty Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B24 @ 16' **Sample Number:** 2018-249

Remarks:
Lab #5372.

Koury Engineering & Testing, Inc.

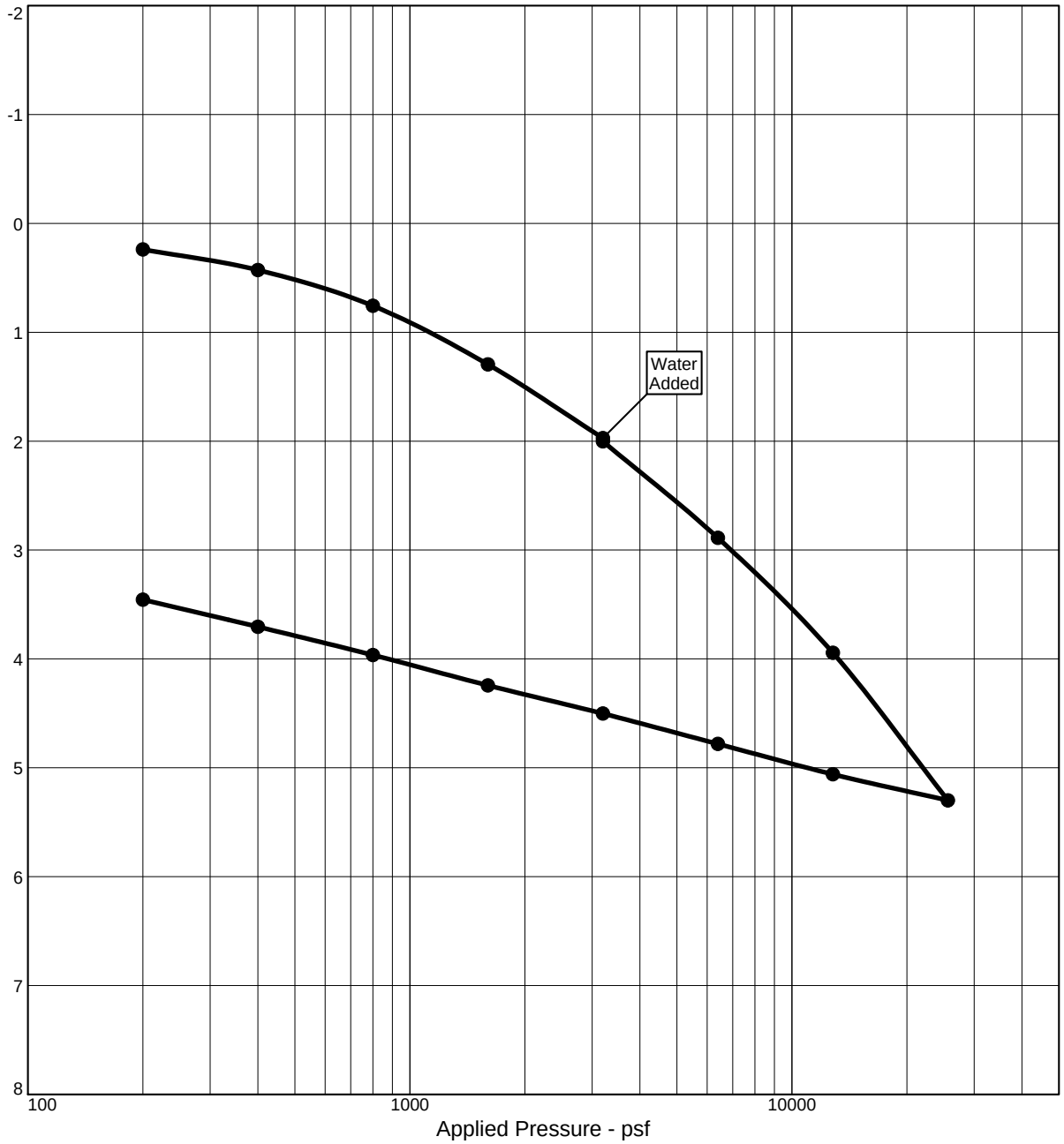
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
82.3 %	19.6 %	102.6			2.7		13086	0.07	0.01		0.0	0.643

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Yellowish Brown Silty Sand	Observed as: SM	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: B24 @ 30' **Sample Number:** 2018-249

Remarks:
Lab #5349.

Koury Engineering & Testing, Inc.

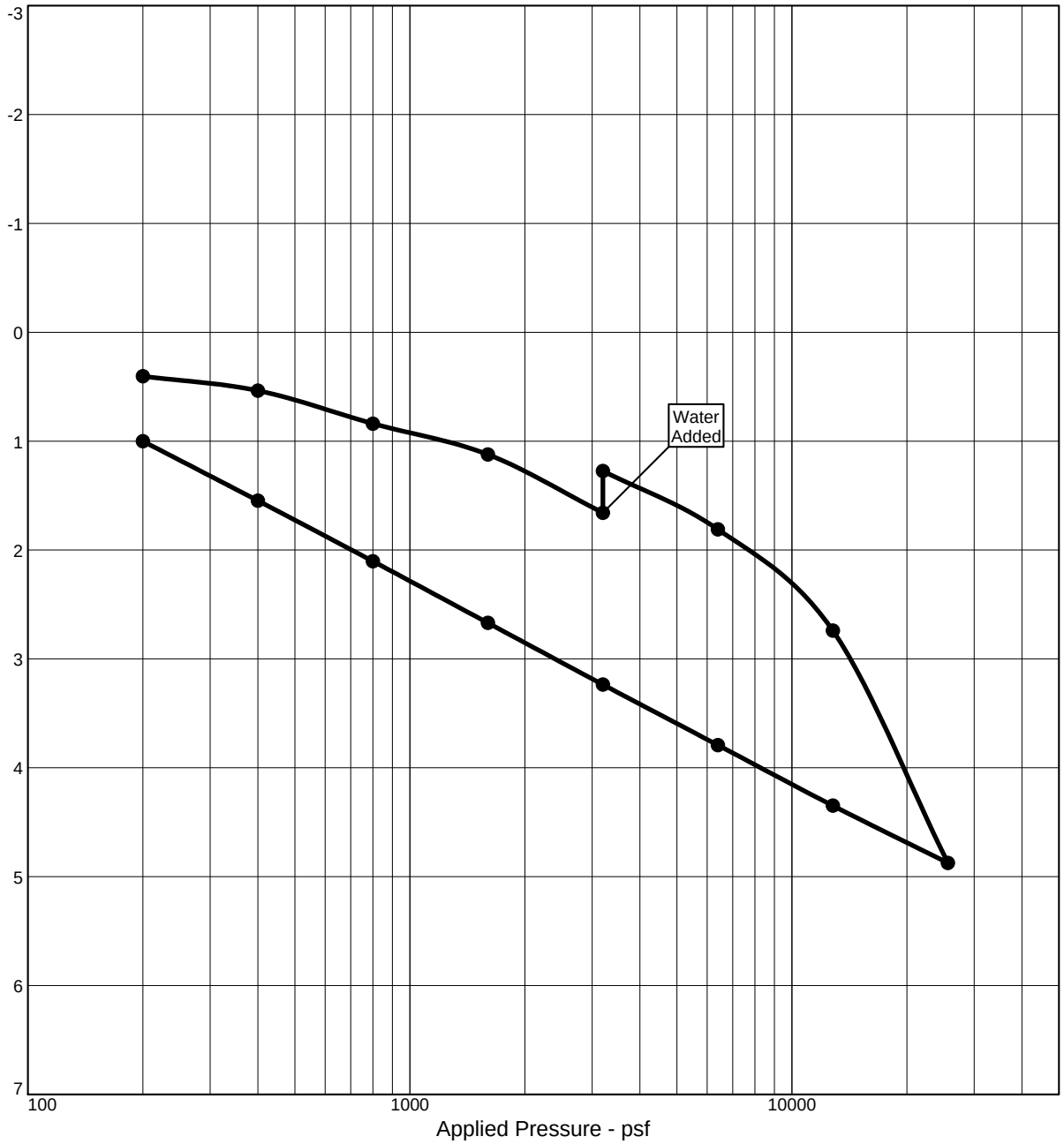
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
98.3 %	18.2 %	112.5			2.7		11881	0.11	0.03	2247	0.4	0.499

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Dark Yellowish Brown Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: TP39 @ 4' - 4.5' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:

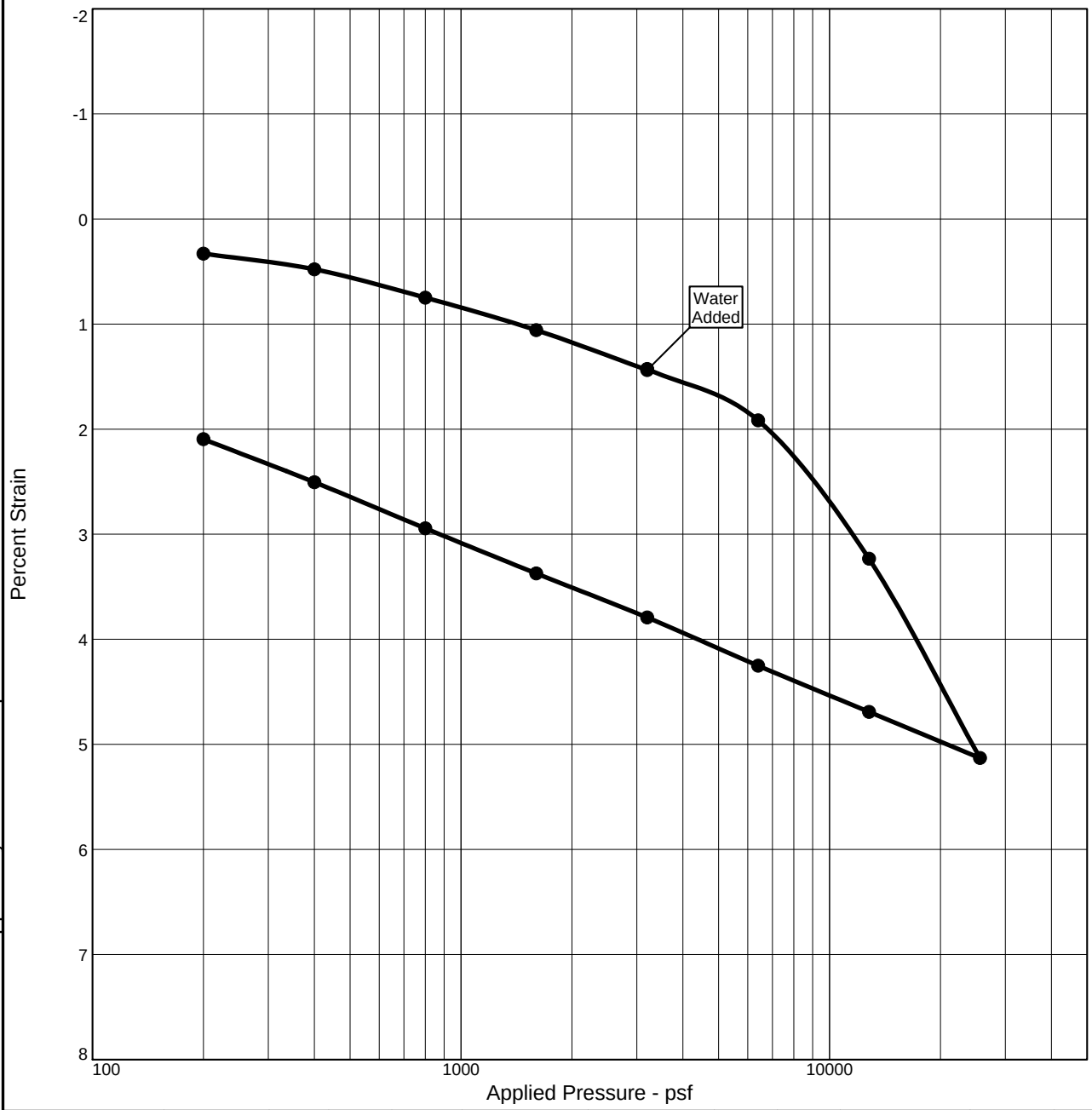
Lab #5308.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
96.9 %	18.3 %	111.7			2.7		8421	0.10	0.02	46	0.0	0.509

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Dark Greenish Gray Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: TP67 @ 5' **Sample Number:** 2018-249

Remarks:

Lab #5315.

Koury Engineering & Testing, Inc.

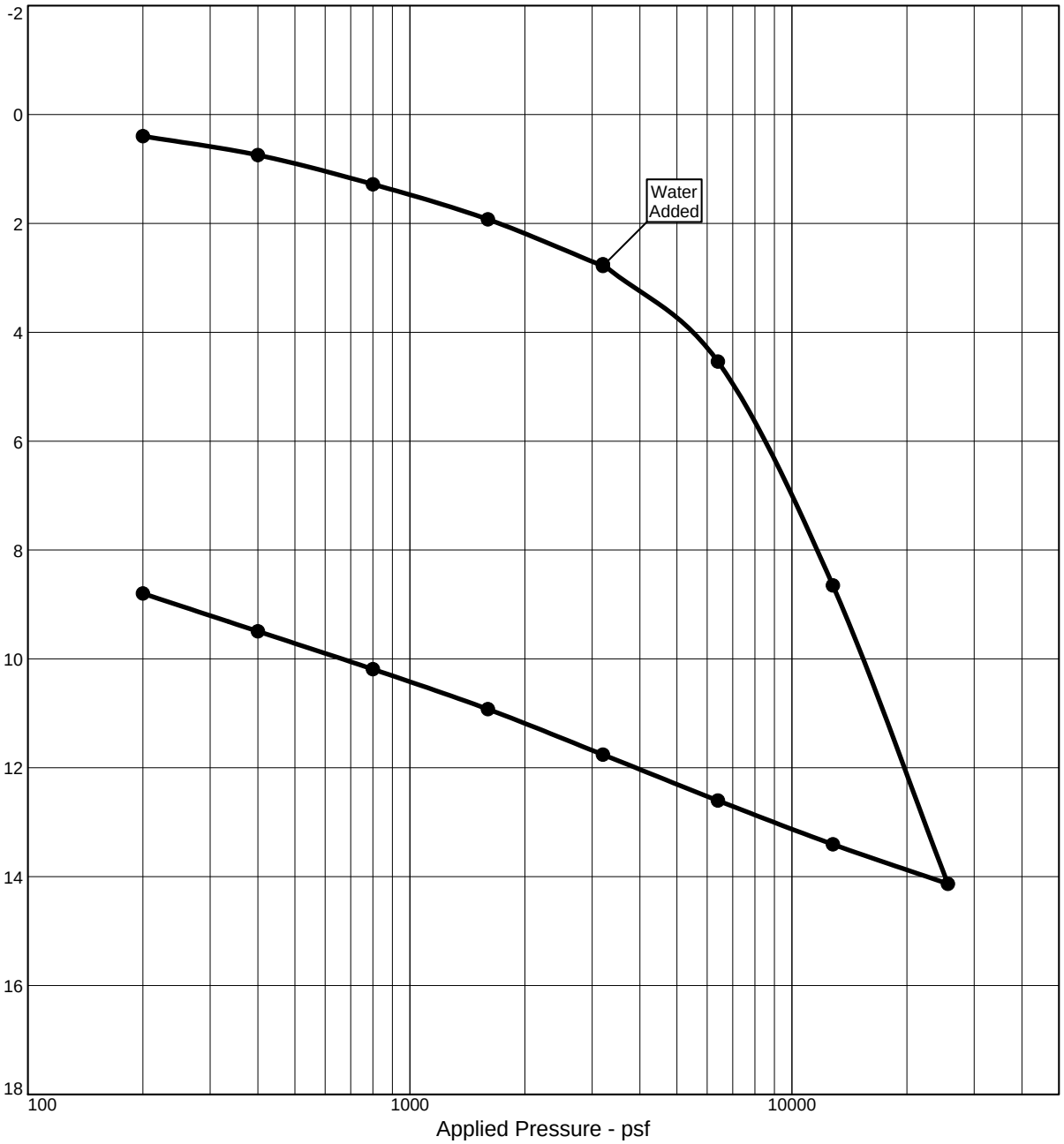
Chino, CA

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural Sat.	Natural Moist.	Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
99.0 %	32.9 %	88.9			2.7		8065	0.35	0.05	38	0.0	0.896

MATERIAL DESCRIPTION	USCS	AASHTO
Observed as: Light Olive Gray Sandy Clay	Observed as: CL	

Project No. 18-0817 **Client:**

Project: OC Prado - Construction Level

Location: TP68 @ 6' - 6.5' **Sample Number:** 2018-249

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:

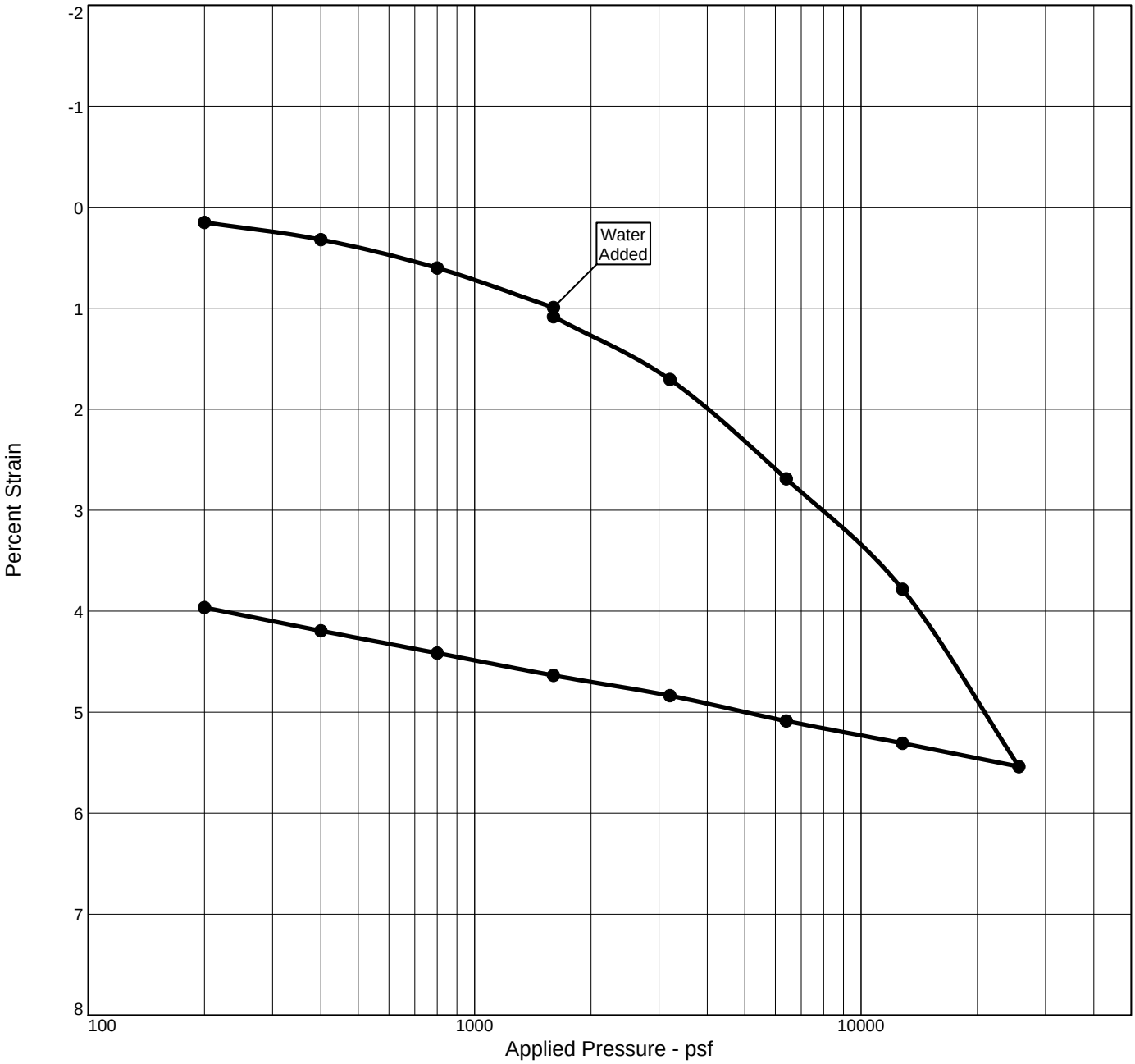
Lab #5318.

Figure

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Clpse. %	e_o
Sat.	Moist.											
86.0 %	18.1 %	107.5			2.7		3409	0.05	0.01		0.1	0.569

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Yellowish Brown Silty Sand	SM	

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 11' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

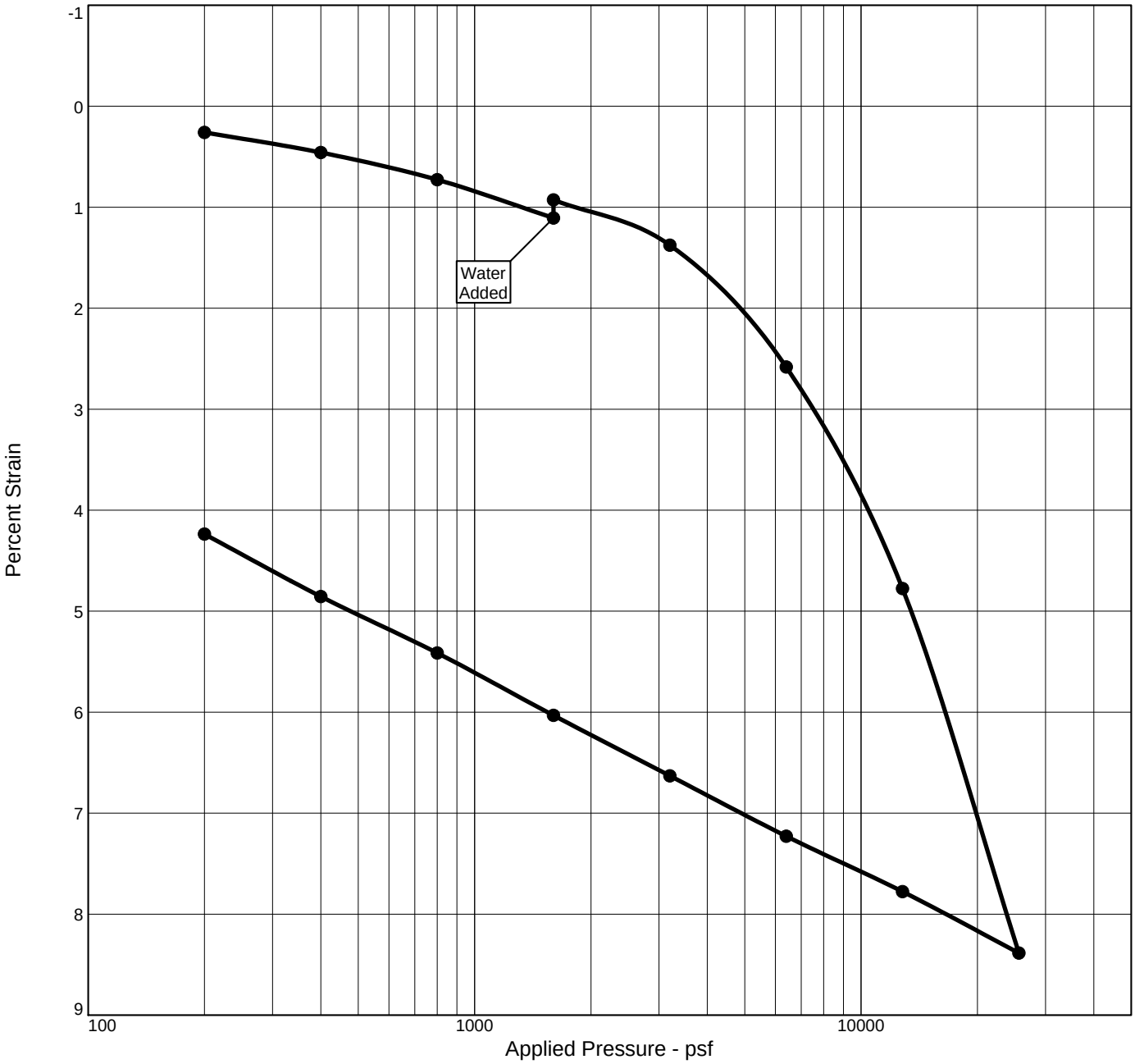
Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
96.0 %	22.8 %	102.7			2.7		7535	0.20	0.03	674	0.2	0.641

MATERIAL DESCRIPTION	USCS	AASHTO
Olive Brown Clay	CL	

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 21' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

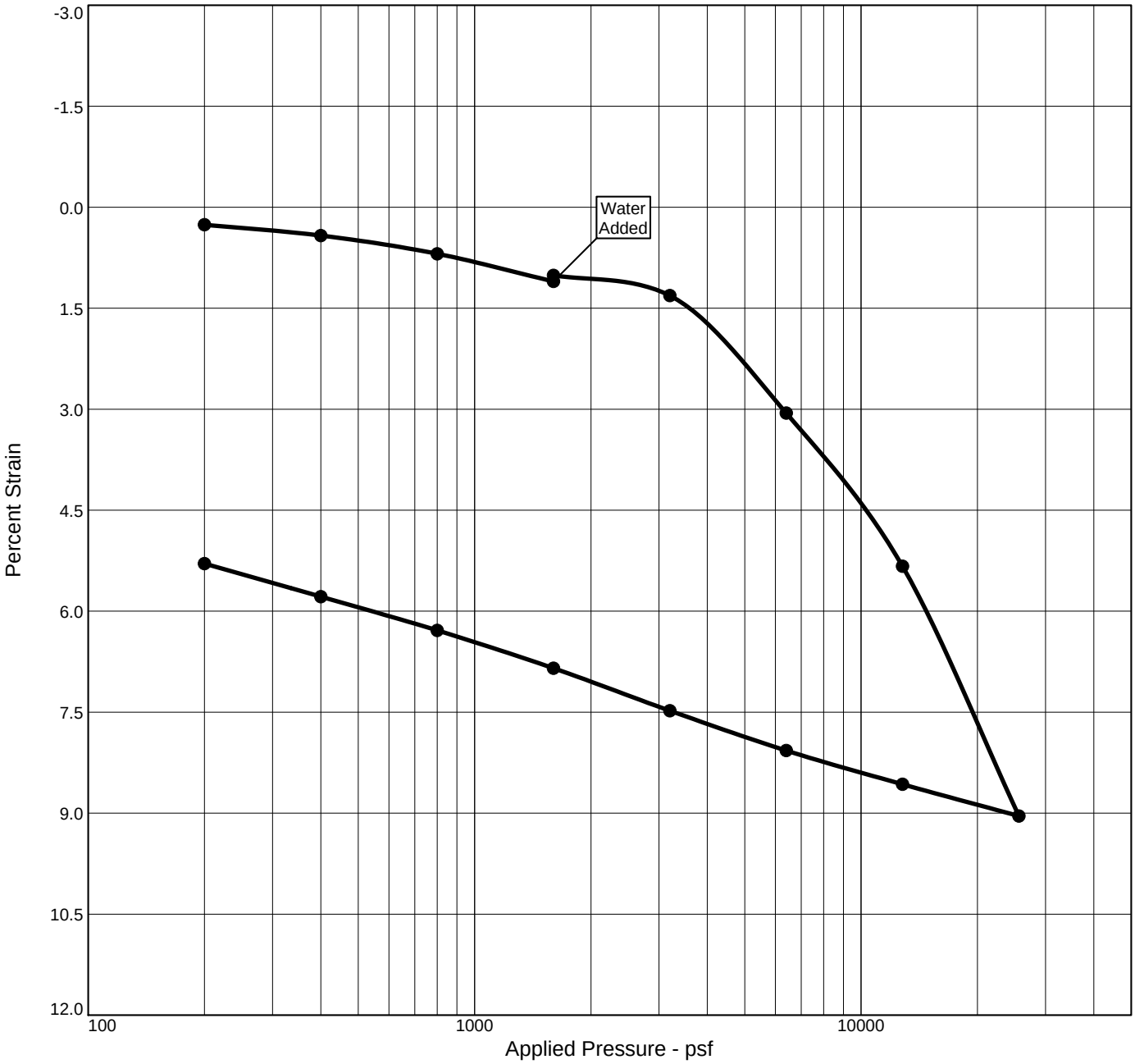
Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
99.5 %	33.7 %	88.0			2.7		3550	0.13	0.03	794	0.1	0.914

MATERIAL DESCRIPTION	USCS	AASHTO
Dark Yellowish Brown Clay	CL	

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 31' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

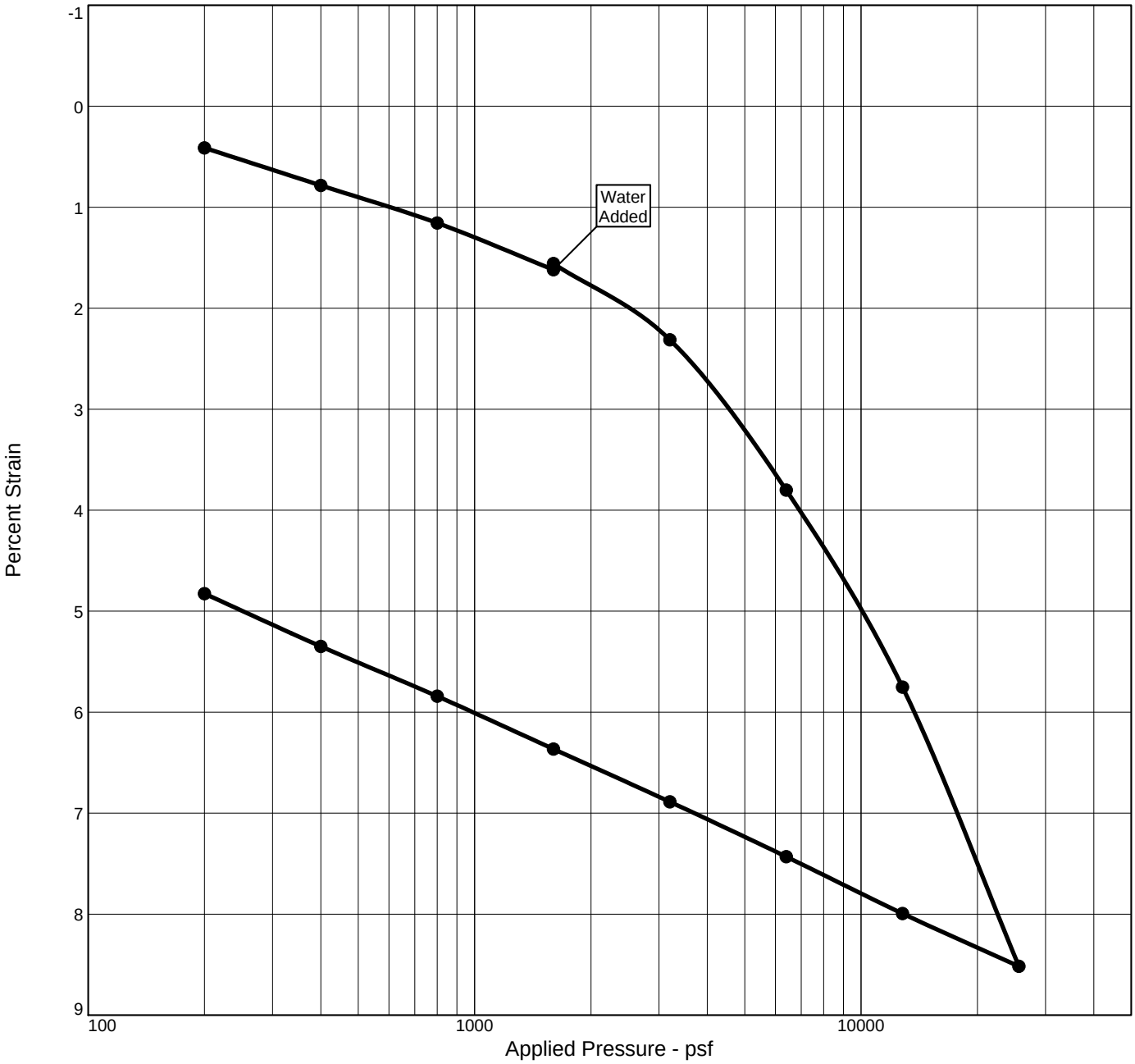
Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:** _____

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (psf)	P_c (psf)	C_c	C_s	Swell Press. (psf)	Swell %	e_o
Sat.	Moist.											
76.7 %	22.7 %	93.6			2.7		3655	0.10	0.03	95	0.1	0.800

MATERIAL DESCRIPTION	USCS	AASHTO
Light Olive Brown Silty Clay with Gravel		

Project No. 16-0899 **Client:**

Project: OC Prado

Location: B1 @ 6' **Sample Number:** 4458 Series

Koury Engineering & Testing, Inc.

Chino, CA

Remarks:
Lab #4458 Series.

Figure

Tested By: Mathew F. Perry **Checked By:** _____

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	B13 @ 0' - 4'		TP59 @ 3.5' - 4'		B11 @ 0' - 4'		TP32 @ 3.8' - 4.3'	
USCS Symbol	CL		CL		CL		CL	
Normal Load (psf)	144		144		144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	739.170		717.130		750.900		739.930	
Wt. of ring (gr)	367.46		364.15		366.62		367.49	
Wt. Specimen (gr)	371.710		352.980		384.280		372.440	
Specimen diameter (in)	4.010		4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479		81.479	
Init. Spec. height (in)	1.0025	N/A	0.9995	N/A	1.0005	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0467	N/A	0.0875	N/A	0.0516	N/A	0.0610
Adjusted Spec.height(in)	1.00	0.9558	1.00	0.9120	1.00	0.9489	1.00	0.9415
" " (cm)	2.546	2.428	2.539	2.316	2.541	2.410	2.546	2.391
Specimen Volume (cm^3)	207.475		206.854		207.061		207.475	
Moist Density (pcf)	111.85		106.53		115.86		112.07	
MOISTURE CONTENT								
Wt. moist soil+tare(gr)	124.55	124.55	126.16	126.16	388.88	388.88	342.36	342.36
Wt. dry soil+tare(gr)	113.05	113.05	111.08	111.08	370.92	370.92	330.03	330.03
Wt. of tare(gr)	19.64	19.64	17.33	17.33	225.18	225.18	236.00	236.00
Wt. dry soil (gr)	93.41	93.41	93.75	93.75	145.74	145.74	94.03	94.03
Wt. of water (gr)	11.50	11.50	15.08	15.08	17.96	17.96	12.33	12.33
M/C (%)	12.31	12.31	16.09	16.09	12.32	12.32	13.11	13.11
DRY DENSITY (pcf)	99.6		91.8		103.2		99.1	
% Saturation* (48%-52%)	48.0		51.9		52.5		50.5	
*Assumes Gs =	2.7		2.7		2.7		2.7	
EXPANSION INDEX =	47		88		52		61	
Potential Expansion *(per ASTM 4829-08)*	Low		Medium		Medium		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: MFP	Lab:
OC Prado - Construction Level	Date: 9/12/18	QA:	5283

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP71 @ 2.5' - 3'		TP33 @ 2.5' - 3'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	751.350		730.990	
Wt. of ring (gr)	366.60		367.49	
Wt. Specimen (gr)	384.750		363.500	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0450	N/A	0.0628
Adjusted Spec.height(in)	1.00	0.9555	1.00	0.9397
" " (cm)	2.541	2.427	2.546	2.387
Specimen Volume (cm^3)	207.061		207.475	
Moist Density (pcf)	116.00		109.38	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	146.14	146.14	133.08	133.08
Wt. dry soil+tare(gr)	131.70	131.70	117.55	117.55
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	131.70	131.70	117.55	117.55
Wt. of water (gr)	14.44	14.44	15.53	15.53
M/C (%)	10.96	10.96	13.21	13.21
DRY DENSITY (pcf)	104.5		96.6	
% Saturation* (48%-52%)	48.3		47.9	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	45		63	
Potential Expansion *(per ASTM 4829-08)*	Low		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado - Construction Level	Date: 9/17/18	QA:	5294

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP27 @ 3.5' - 4.2'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	731.670	
Wt. of ring (gr)	364.15	
Wt. Specimen (gr)	367.520	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	0.9995	N/A
Height change (final)(in)	N/A	0.1435
Adjusted Spec.height(in)	1.00	0.8560
" " (cm)	2.539	2.174
Specimen Volume (cm^3)	206.854	
Moist Density (pcf)	110.92	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	149.13	149.19
Wt. dry soil+tare(gr)	132.49	132.49
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	132.49	132.49
Wt. of water (gr)	16.64	16.70
M/C (%)	12.56	12.60
DRY DENSITY (pcf)	98.5	
% Saturation* (48%-52%)	47.7	

*Assumes Gs = 2.7

EXPANSION INDEX = 144

Potential Expansion *(per ASTM 4829-08)* Very High

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 18-0817 Date: 9/18/18	Run by: SA QA:	Lab: 5300

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP26 @ 4.2' - 4.9'		TP30 @ 3' - 3.5'		TP22 @ 4' - 4.8'	
USCS Symbol	CL		CL		CL	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	715.780		752.220		737.200	
Wt. of ring (gr)	366.60		367.44		364.14	
Wt. Specimen (gr)	349.180		384.780		373.060	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	1.0025	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.0744	N/A	0.0483	N/A	0.0620
Adjusted Spec.height(in)	1.00	0.9261	1.00	0.9542	1.00	0.9375
" " (cm)	2.541	2.352	2.546	2.424	2.539	2.381
Specimen Volume (cm^3)	207.061		207.475		206.854	
Moist Density (pcf)	105.28		115.78		112.59	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	136.32	136.32	126.77	126.77	135.36	135.36
Wt. dry soil+tare(gr)	117.67	117.67	112.79	112.79	119.12	119.12
Wt. of tare(gr)	0.00	0.00	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	117.67	117.67	112.79	112.79	119.12	119.12
Wt. of water (gr)	18.65	18.65	13.98	13.98	16.24	16.24
M/C (%)	15.85	15.85	12.39	12.39	13.63	13.63
DRY DENSITY (pcf)	90.9		103.0		99.1	
% Saturation* (48%-52%)	50.1		52.6		52.5	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	74		48		62	
Potential Expansion *(per ASTM 4829-08)*	Medium		Low		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado - Construction Level	Date: 9/19/18	QA:	5304

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP40 @ 3' - 3.8"		TP22 @ 3' - 3.8'	
USCS Symbol	CH		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	756.190		731.400	
Wt. of ring (gr)	366.59		364.11	
Wt. Specimen (gr)	389.600		367.290	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0005	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.1624	N/A	0.1263
Adjusted Spec.height(in)	1.0005	0.8381	0.9995	0.8732
" " (cm)	2.541	2.129	2.539	2.218
Specimen Volume (cm^3)	207.061		206.854	
Moist Density (pcf)	117.47		110.85	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	133.29	133.29	121.12	121.12
Wt. dry soil+tare(gr)	119.39	119.39	107.54	107.54
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	119.39	119.39	107.54	107.54
Wt. of water (gr)	13.90	13.90	13.58	13.58
M/C (%)	11.64	11.64	12.63	12.63
DRY DENSITY (pcf)	105.2		98.4	
% Saturation* (48%-52%)	52.2		47.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	162		126	
Potential Expansion *(per ASTM 4829-08)*	Very High		High	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado - Construction Level	Date: 9/21/18	QA:	5312

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP70 @ 2.5' - 3.5'	
USCS Symbol	CL	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	741.660	
Wt. of ring (gr)	367.45	
Wt. Specimen (gr)	374.210	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0025	N/A
Height change (final)(in)	N/A	0.1599
Adjusted Spec.height(in)	1.00	0.8426
" " (cm)	2.546	2.140
Specimen Volume (cm^3)	207.475	
Moist Density (pcf)	112.60	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	120.26	120.26
Wt. dry soil+tare(gr)	107.55	107.55
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	107.55	107.55
Wt. of water (gr)	12.71	12.71
M/C (%)	11.82	11.82
DRY DENSITY (pcf)	100.7	
% Saturation* (48%-52%)	47.3	
*Assumes Gs =	2.7	
EXPANSION INDEX =	160	
Potential Expansion *(per ASTM 4829-08)*	Very High	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado - Construction Level	Project No.: 18-0817 Date: 9/22/18	Run by: SA QA:	Lab: 5316

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	B25 @ 2' - 4'		TP26 @ Surface	
USCS Symbol	CL		CL / SC	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	735.110		686.320	
Wt. of ring (gr)	364.12		367.45	
Wt. Specimen (gr)	370.990		318.870	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	0.9995	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0783	N/A	0.0200
Adjusted Spec.height(in)	1.00	0.9212	1.00	0.9825
" " (cm)	2.539	2.340	2.546	2.496
Specimen Volume (cm^3)	206.854		207.475	
Moist Density (pcf)	111.97		95.95	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	109.32	109.32	110.27	110.27
Wt. dry soil+tare(gr)	98.35	98.35	89.96	89.96
Wt. of tare(gr)	19.67	19.67	0.00	0.00
Wt. dry soil (gr)	78.68	78.68	89.96	89.96
Wt. of water (gr)	10.97	10.97	20.31	20.31
M/C (%)	13.94	13.94	22.58	22.58
DRY DENSITY (pcf)	98.3		78.3	
% Saturation* (48%-52%)	52.6		52.9	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	78		20	
Potential Expansion *(per ASTM 4829-08)*	Medium		Very Low	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado Construction Level	Date: 9/26/18	QA:	5322

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP55 @ 2' - 4'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	744.870	
Wt. of ring (gr)	366.59	
Wt. Specimen (gr)	378.280	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0005	N/A
Height change (final)(in)	N/A	0.1114
Adjusted Spec.height(in)	1.00	0.8891
" " (cm)	2.541	2.258
Specimen Volume (cm^3)	207.061	
Moist Density (pcf)	114.05	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	117.15	117.15
Wt. dry soil+tare(gr)	105.12	105.12
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	105.12	105.12
Wt. of water (gr)	12.03	12.03
M/C (%)	11.44	11.44
DRY DENSITY (pcf)	102.3	
% Saturation* (48%-52%)	47.8	
*Assumes Gs =	2.7	
EXPANSION INDEX =	111	
Potential Expansion *(per ASTM 4829-08)*	High	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado - Construction Level	Date: 9/27/18	QA:	5325

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP23 @ 1.5' - 2.2'		TP28 @ 3' - 3.8'	
USCS Symbol	CL / CH		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	726.770		756.580	
Wt. of ring (gr)	367.47		364.13	
Wt. Specimen (gr)	359.300		392.450	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0025	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.0968	N/A	0.0805
Adjusted Spec.height(in)	1.0025	0.9057	1.00	0.9190
" " (cm)	2.546	2.300	2.539	2.334
Specimen Volume (cm^3)	207.475		206.854	
Moist Density (pcf)	108.11		118.44	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	101.09	101.90	110.56	110.56
Wt. dry soil+tare(gr)	89.21	89.21	97.98	97.98
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	89.21	89.21	97.98	97.98
Wt. of water (gr)	11.88	12.69	12.58	12.58
M/C (%)	13.32	14.22	12.84	12.84
DRY DENSITY (pcf)	95.4		105.0	
% Saturation* (48%-52%)	46.9		57.2	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	97		81	
Potential Expansion *(per ASTM 4829-08)*	High		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado - Construction Level	Date: 9/28/18	QA:	5328

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	B24 @ 2' - 4'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	760.600	
Wt. of ring (gr)	366.62	
Wt. Specimen (gr)	393.980	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0965
Adjusted Spec.height(in)	1.00	0.9055
" " (cm)	2.545	2.300
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	118.61	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	11.38	11.38
Wt. dry soil+tare(gr)	10.22	10.22
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	10.22	10.22
Wt. of water (gr)	1.16	1.16
M/C (%)	11.35	11.35
DRY DENSITY (pcf)	106.5	
% Saturation* (48%-52%)	52.6	
*Assumes Gs =	2.7	
EXPANSION INDEX =	96	
Potential Expansion *(per ASTM 4829-08)*	High	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: CG	Lab:
OC Prado - Construction Level	Date: 10/3/18	QA:	5331 Retest

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP31 @ 3.8' - 4.2'	
USCS Symbol	CL / CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	750.670	
Wt. of ring (gr)	367.47	
Wt. Specimen (gr)	383.200	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0025	N/A
Height change (final)(in)	N/A	0.0866
Adjusted Spec.height(in)	1.00	0.9159
" " (cm)	2.546	2.326
Specimen Volume (cm^3)	207.475	
Moist Density (pcf)	115.31	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	103.19	103.19
Wt. dry soil+tare(gr)	92.26	92.26
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	92.26	92.26
Wt. of water (gr)	10.93	10.93
M/C (%)	11.85	11.85
DRY DENSITY (pcf)	103.1	
% Saturation* (48%-52%)	50.4	
*Assumes Gs =	2.7	
EXPANSION INDEX =	86	
Potential Expansion *(per ASTM 4829-08)*	Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: CG	Lab:
OC Prado - Construction Level	Date: 10/3/18	QA:	5337

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP42 @ 2.7' - 3.2'		TP 37 @ 3' - 3.5'	
USCS Symbol	CL		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	754.350		716.200	
Wt. of ring (gr)	364.16		367.44	
Wt. Specimen (gr)	390.190		348.760	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	0.9990	N/A	1.0025	N/A
Height change (final)(in)	N/A	0.0619	N/A	0.1049
Adjusted Spec.height(in)	1.00	0.9371	1.00	0.8976
" " (cm)	2.537	2.380	2.546	2.280
Specimen Volume (cm^3)	206.750		207.475	
Moist Density (pcf)	117.82		104.94	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	100.65	100.65	102.16	102.16
Wt. dry soil+tare(gr)	91.33	91.33	88.75	88.75
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	91.33	91.33	88.75	88.75
Wt. of water (gr)	9.32	9.32	13.41	13.41
M/C (%)	10.20	10.20	15.11	15.11
DRY DENSITY (pcf)	106.9		91.2	
% Saturation* (48%-52%)	47.8		48.1	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	62		105	
Potential Expansion *(per ASTM 4829-08)*	Medium		High	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: CG	Lab:
OC Prado - Construction Level	Date: 10/4/18	QA:	5338

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 44 @ 3' - 3.5'		TP 48 @ 1.8' - 2.3'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	750.950		750.020	
Wt. of ring (gr)	366.63		364.11	
Wt. Specimen (gr)	384.320		385.910	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9990	N/A
Height change (final)(in)	N/A	0.0570	N/A	0.0636
Adjusted Spec.height(in)	1.00	0.9450	1.00	0.9354
" " (cm)	2.545	2.400	2.537	2.376
Specimen Volume (cm^3)	207.371		206.750	
Moist Density (pcf)	115.70		116.53	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	101.23	101.23	101.31	101.31
Wt. dry soil+tare(gr)	90.69	90.69	90.67	90.67
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	90.69	90.69	90.67	90.67
Wt. of water (gr)	10.54	10.54	10.64	10.64
M/C (%)	11.62	11.62	11.73	11.73
DRY DENSITY (pcf)	103.7		104.3	
% Saturation* (48%-52%)	50.1		51.4	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	57		64	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: CG	Lab:
OC Prado - Construction Level	Date: 10/5/18	QA:	5341

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 53 @ 3' - 3.5'		TP 50 @ 2' - 2.5'	
USCS Symbol	CL		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	702.460		744.770	
Wt. of ring (gr)	367.41		366.58	
Wt. Specimen (gr)	335.050		378.190	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0025	N/A	1.0020	N/A
Height change (final)(in)	N/A	0.0506	N/A	0.0710
Adjusted Spec.height(in)	1.00	0.9519	1.00	0.9310
" " (cm)	2.546	2.418	2.545	2.365
Specimen Volume (cm^3)	207.475		207.371	
Moist Density (pcf)	100.82		113.86	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	102.01	102.01	102.71	102.71
Wt. dry soil+tare(gr)	86.55	86.55	91.41	91.41
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	86.55	86.55	91.41	91.41
Wt. of water (gr)	15.46	15.46	11.30	11.30
M/C (%)	17.86	17.86	12.36	12.36
DRY DENSITY (pcf)	85.5		101.3	
% Saturation* (48%-52%)	49.7		50.3	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	50		71	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: SA	Lab:
OC Prado - Construction Level	Date: 10/10/18	QA:	5346

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 60 @ 2' - 2.5'		TP 58 @ 3' - 3.5'	
USCS Symbol	CH		CL	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	707.870		748.270	
Wt. of ring (gr)	366.59		364.11	
Wt. Specimen (gr)	341.280		384.160	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0020	N/A	0.9990	N/A
Height change (final)(in)	N/A	0.1021	N/A	0.0594
Adjusted Spec.height(in)	1.00	0.8999	1.00	0.9396
" " (cm)	2.545	2.286	2.537	2.387
Specimen Volume (cm^3)	207.371		206.750	
Moist Density (pcf)	102.74		116.00	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	101.15	101.15	104.12	104.12
Wt. dry soil+tare(gr)	86.71	86.71	92.64	92.64
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	86.71	86.71	92.64	92.64
Wt. of water (gr)	14.44	14.44	11.48	11.48
M/C (%)	16.65	16.65	12.39	12.39
DRY DENSITY (pcf)	88.1		103.2	
% Saturation* (48%-52%)	49.2		52.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	102		59	
Potential Expansion *(per ASTM 4829-08)*	High		Medium	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: CG	Lab:
OC Prado - Construction Level	Date: 10/11/18	QA:	5347

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP 65 @ 6' - 6.5'	
USCS Symbol	CL / CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	718.690	
Wt. of ring (gr)	367.42	
Wt. Specimen (gr)	351.270	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0010	N/A
Height change (final)(in)	N/A	0.0994
Adjusted Spec.height(in)	1.00	0.9016
" " (cm)	2.543	2.290
Specimen Volume (cm^3)	207.164	
Moist Density (pcf)	105.86	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	102.13	102.13
Wt. dry soil+tare(gr)	87.81	87.81
Wt. of tare(gr)	0.00	0.00
Wt. dry soil (gr)	87.81	87.81
Wt. of water (gr)	14.32	14.32
M/C (%)	16.31	16.31
DRY DENSITY (pcf)	91.0	
% Saturation* (48%-52%)	51.7	
*Assumes Gs =	2.7	
EXPANSION INDEX =	99	
Potential Expansion *(per ASTM 4829-08)*	High	

KOURY ENGINEERING & TESTING, INC.

Project Name:	Project No.: 18-0817	Run by: CG	Lab:
OC Prado - Construction Level	Date: 9/1/18	QA:	5351

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-1 @ 6' - 7'		TP-3 @ 5' - 6'		TP-17 @ 2' - 3.5'	
USCS Symbol	CL/CH		CL/CH		CL/CH	
Normal Load (psf)	144		144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	697.240		749.180		724.600	
Wt. of ring (gr)	364.23		367.53		366.70	
Wt. Specimen (gr)	333.010		381.650		357.900	
Specimen diameter (in)	4.010		4.010		4.010	
Specimen radius (cm)	5.09		5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479		81.479	
Init. Spec. height (in)	0.9980	N/A	1.0035	N/A	0.9965	N/A
Height change (final)(in)	N/A	0.0775	N/A	0.0619	N/A	0.0961
Adjusted Spec.height(in)	1.00	0.9205	1.00	0.9416	1.00	0.9004
" " (cm)	2.535	2.338	2.549	2.392	2.531	2.287
Specimen Volume (cm^3)	206.543		207.682		206.233	
Moist Density (pcf)	100.66		114.73		108.34	
MOISTURE CONTENT						
Wt. moist soil+tare(gr)	288.16	288.16	286.85	286.85	205.10	205.10
Wt. dry soil+tare(gr)	243.53	243.53	254.11	254.11	179.40	179.40
Wt. of tare(gr)	0.00	0.00	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	243.53	243.53	254.11	254.11	179.40	179.40
Wt. of water (gr)	44.63	44.63	32.74	32.74	25.70	25.70
M/C (%)	18.33	18.33	12.88	12.88	14.33	14.33
DRY DENSITY (pcf)	85.1		101.6		94.8	
% Saturation* (48%-52%)	50.4		52.8		49.7	
*Assumes Gs =	2.7		2.7		2.7	
EXPANSION INDEX =	78		62		96	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium		High	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0899 Date: 7/14/17	Run by: SN/MFP QA:
			Lab: 4458 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-5 @ 1.5' - 2'		TP-7 @ 7' - 8'	
USCS Symbol	CL		CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	734.400		735.970	
Wt. of ring (gr)	364.22		366.68	
Wt. Specimen (gr)	370.180		369.290	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	0.9960	N/A	0.9995	N/A
Height change (final)(in)	N/A	0.0502	N/A	0.0591
Adjusted Spec.height(in)	1.00	0.9458	1.00	0.9404
" " (cm)	2.530	2.402	2.539	2.389
Specimen Volume (cm^3)	206.129		206.854	
Moist Density (pcf)	112.12		111.45	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	286.42	286.42	426.87	426.87
Wt. dry soil+tare(gr)	267.49	267.49	401.97	401.97
Wt. of tare(gr)	114.53	114.53	226.08	226.08
Wt. dry soil (gr)	152.96	152.96	175.89	175.89
Wt. of water (gr)	18.93	18.93	24.90	24.90
M/C (%)	12.38	12.38	14.16	14.16
DRY DENSITY (pcf)	99.8		97.6	
% Saturation* (48%-52%)	48.5		52.6	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	50		59	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0899 Date: 6/7/17	Run by: MFP QA:	Lab: 4458 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-8 @ 12' - 13'	
USCS Symbol	CH	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	725.110	
Wt. of ring (gr)	367.54	
Wt. Specimen (gr)	357.570	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0010	N/A
Height change (final)(in)	N/A	0.0901
Adjusted Spec.height(in)	1.00	0.9109
" " (cm)	2.543	2.314
Specimen Volume (cm^3)	207.164	
Moist Density (pcf)	107.76	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	329.02	329.02
Wt. dry soil+tare(gr)	315.31	315.31
Wt. of tare(gr)	226.12	226.12
Wt. dry soil (gr)	89.19	89.19
Wt. of water (gr)	13.71	13.71
M/C (%)	15.37	15.37
DRY DENSITY (pcf)	93.4	
% Saturation* (48%-52%)	51.6	

*Assumes Gs =	2.7
EXPANSION INDEX =	90
Potential Expansion *(per ASTM 4829-08)*	High

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0899 Date: 6/1/17	Run by: MFP QA:	Lab: 4458 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-15 @ 3' - 4'		TP-14 @ .5' - 1.5'	
USCS Symbol	CL/CH		CL/CH	
Normal Load (psf)	144		144	
SAMPLE CONDITION	Initial	Final	Initial	Final
Wt Specimen & Ring (gr)	711.000		719.000	
Wt. of ring (gr)	367.00		364.00	
Wt. Specimen (gr)	344.000		355.000	
Specimen diameter (in)	4.010		4.010	
Specimen radius (cm)	5.09		5.09	
Area of Specimen (cm^2)	81.479		81.479	
Init. Spec. height (in)	1.0010	N/A	0.9990	N/A
Height change (final)(in)	N/A	0.0460	N/A	0.0787
Adjusted Spec.height(in)	1.00	0.9550	1.00	0.9203
" " (cm)	2.543	2.426	2.537	2.338
Specimen Volume (cm^3)	207.164		206.750	
Moist Density (pcf)	103.67		107.20	
MOISTURE CONTENT				
Wt. moist soil+tare(gr)	202.00	202.00	200.00	200.00
Wt. dry soil+tare(gr)	159.00	159.00	166.00	166.00
Wt. of tare(gr)	0.00	0.00	0.00	0.00
Wt. dry soil (gr)	159.00	159.00	166.00	166.00
Wt. of water (gr)	43.00	43.00	34.00	34.00
M/C (%)	27.04	27.04	20.48	20.48
DRY DENSITY (pcf)	81.6		89.0	
% Saturation* (48%-52%)	68.5		61.8	
*Assumes Gs =	2.7		2.7	
EXPANSION INDEX =	60		89	
Potential Expansion *(per ASTM 4829-08)*	Medium		Medium	

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0899 Date: 7/17/17	Run by: MFP QA:	Lab: 4458 Series

EXPANSION INDEX TESTS

DENSITY AND MOISTURE CONTENT DATA - EI TEST

Location/ Elevation	TP-19 @ 1' - 2'	
USCS Symbol	SC	
Normal Load (psf)	144	
SAMPLE CONDITION	Initial	Final
Wt Specimen & Ring (gr)	765.800	
Wt. of ring (gr)	364.24	
Wt. Specimen (gr)	401.560	
Specimen diameter (in)	4.010	
Specimen radius (cm)	5.09	
Area of Specimen (cm^2)	81.479	
Init. Spec. height (in)	1.0020	N/A
Height change (final)(in)	N/A	0.0245
Adjusted Spec.height(in)	1.00	0.9775
" " (cm)	2.545	2.483
Specimen Volume (cm^3)	207.371	
Moist Density (pcf)	120.89	
MOISTURE CONTENT		
Wt. moist soil+tare(gr)	422.90	422.90
Wt. dry soil+tare(gr)	406.29	406.29
Wt. of tare(gr)	229.33	229.33
Wt. dry soil (gr)	176.96	176.96
Wt. of water (gr)	16.61	16.61
M/C (%)	9.39	9.39
DRY DENSITY (pcf)	110.5	
% Saturation* (48%-52%)	48.3	

*Assumes Gs =	2.7
EXPANSION INDEX =	24
Potential Expansion *(per ASTM 4829-08)*	Low

KOURY ENGINEERING & TESTING, INC.	Project Name: OC Prado	Project No.: 16-0889 Date: 6/14/17	Run by: MFP QA:	Lab: 4458 Series

Maximum Density & Optimum Moisture

Curve No.: 5326

Project No.: 18-0817 **Date:** 9/27/18

Project: OC Prado - Construction Level

Client:

Location: TP40 @ 3' - 3.8'

Sample Number: 2018-249

Remarks: Less than 5% Material retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Observed as: Dark Yellowish Brown Clay

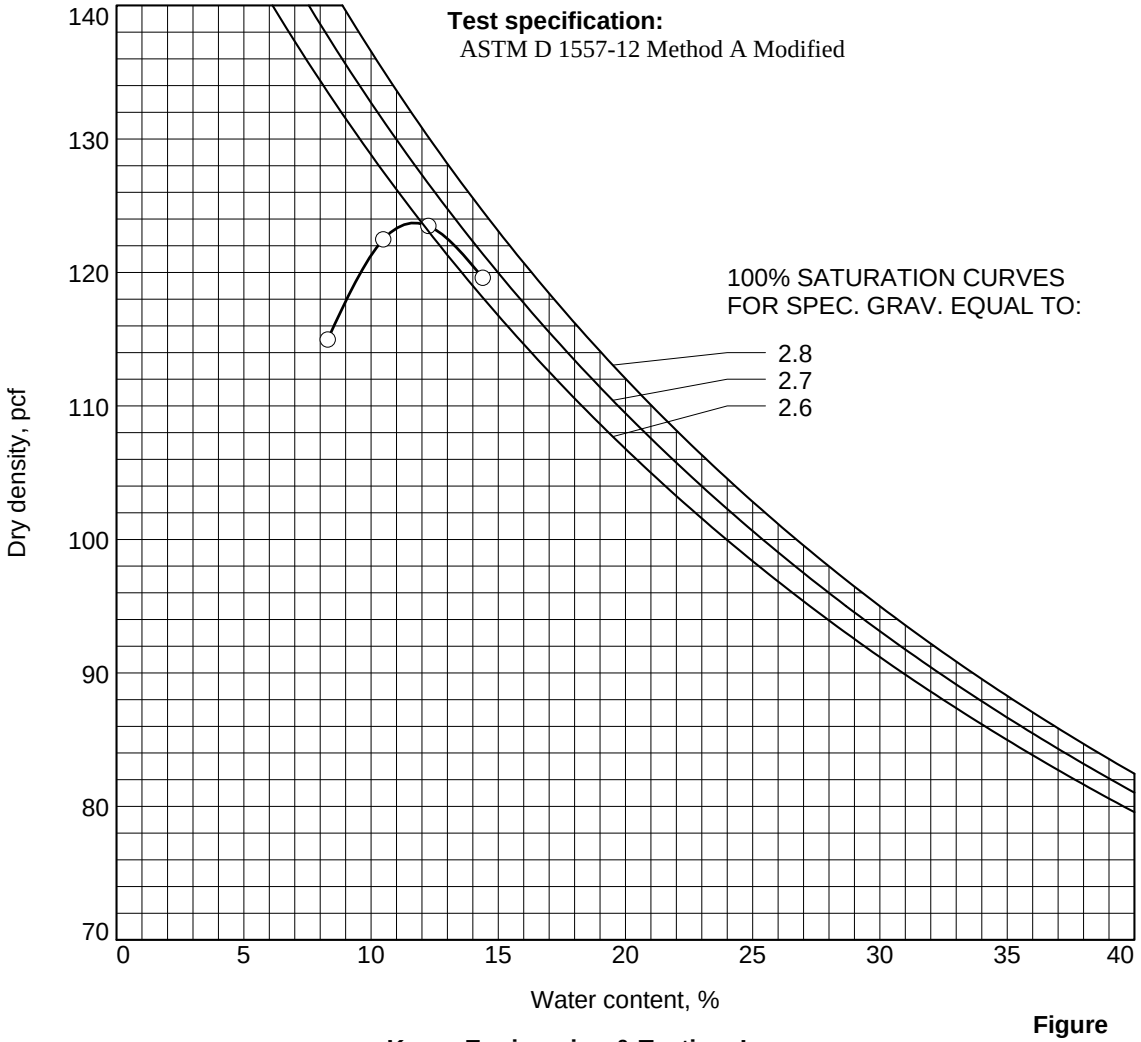
Classifications - **USCS:** Observed as: CH **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 123.7 pcf
Optimum moisture = 11.7 %



Figure

Koury Engineering & Testing, Inc.

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: Carlos Garcia **Checked By:** _____

MAXIMUM DENSITY TEST REPORT

Curve No.: 4458 Series

Project No.: 16-0899 **Date:** 06/01/17

Project: OC Prado

Client:

Location: TP-10 @ 1.5'-2.5'

Depth: 1.5'to 2.5'

Remarks: Less Than 5% Material Retained on the #4 Sieve

MATERIAL DESCRIPTION

Description: Observed as: Dark Brown Sandy Lean Clay

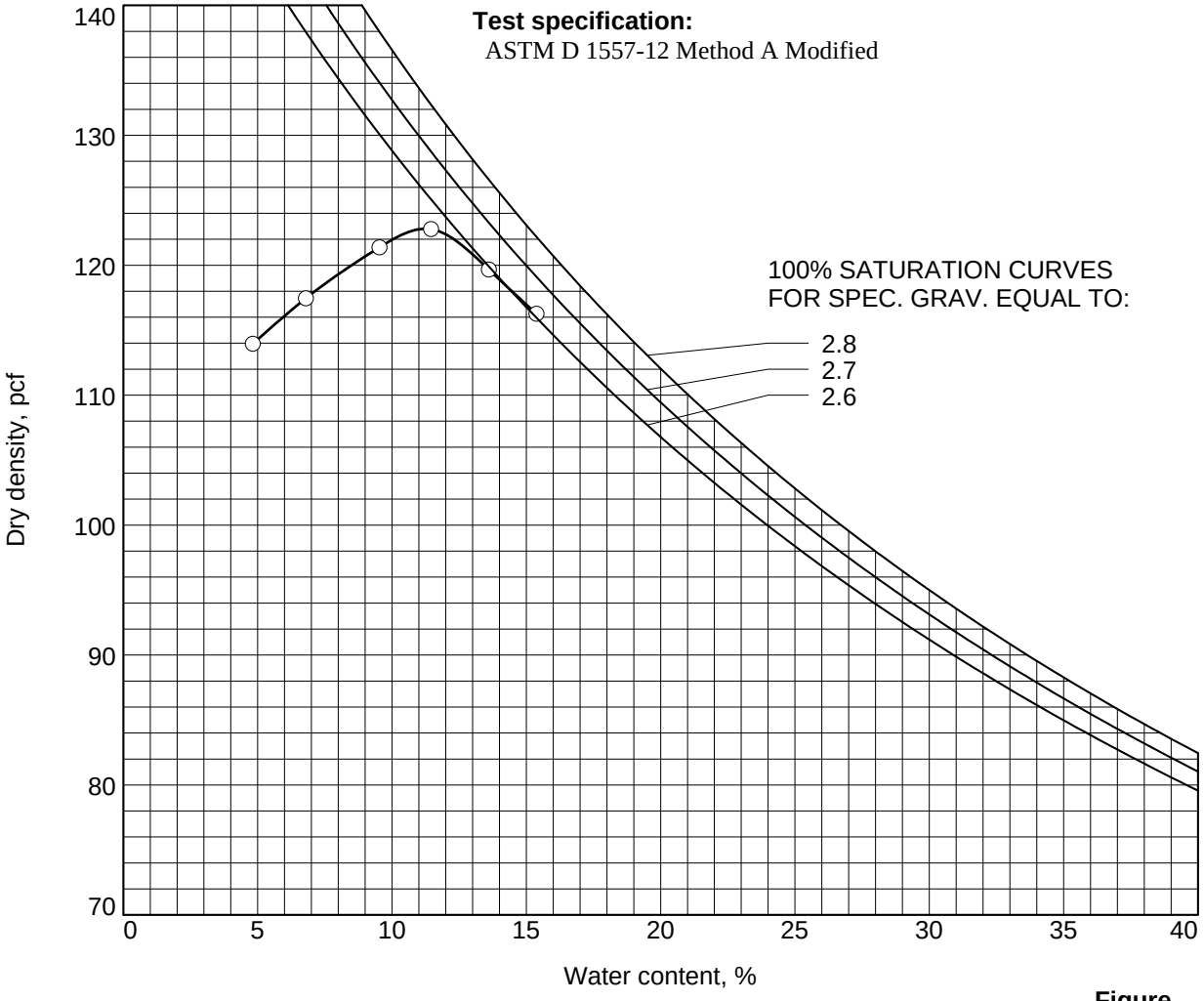
Classifications - **USCS:** CL **AASHTO:**

Nat. Moist. = 17.2 % **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 = 73.8 %

TEST RESULTS
Maximum dry density = 122.8 pcf
Optimum moisture = 11.2 %



Figure

Koury Engineering & Testing, Inc.

Tested By: ABB **Checked By:** _____

MAXIMUM DENSITY TEST REPORT

Curve No.: 4458 Series

Project No.: 16-0899 **Date:** 6/7/17

Project: OC Prado

Client:

Location: TP-7 @ 7' to 8'

Sample Number: 4458 Series

Remarks: Less than 5% Material retained on the #4 Sieve. (1.9% retained)

MATERIAL DESCRIPTION

Description:

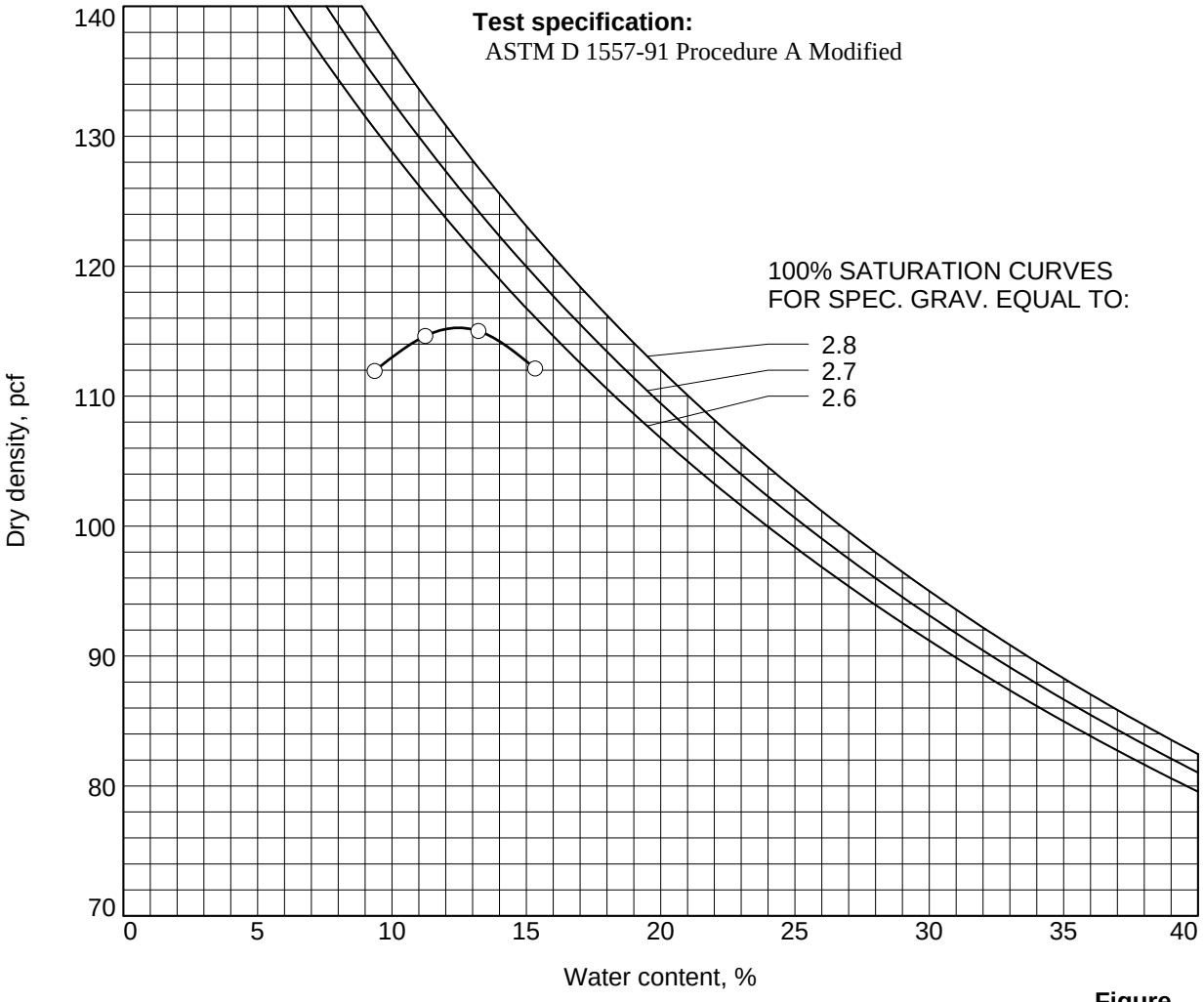
Classifications - **USCS:** **AASHTO:**

Nat. Moist. = **Sp.G. =**

Liquid Limit = **Plasticity Index =**

% < No.200 =

TEST RESULTS
Maximum dry density = 115.3 pcf
Optimum moisture = 12.5 %



Figure

Koury Engineering & Testing, Inc.

Tested By: ABB **Checked By:** _____

MAXIMUM DENSITY TEST REPORT

Curve No.: 4458 Series

Project No.: 16-0899 **Date:** 06/01/17

Project: OC Prado

Client:

Location: TP-8 @ 12' - 13'

Sample Number: 4458 Series **Depth:** 12' to 13'

Remarks: Less Than 5% Material Retained on the #4 Sieve.

MATERIAL DESCRIPTION

Description: Observed as: Olive Brown Fat Clay with Sand

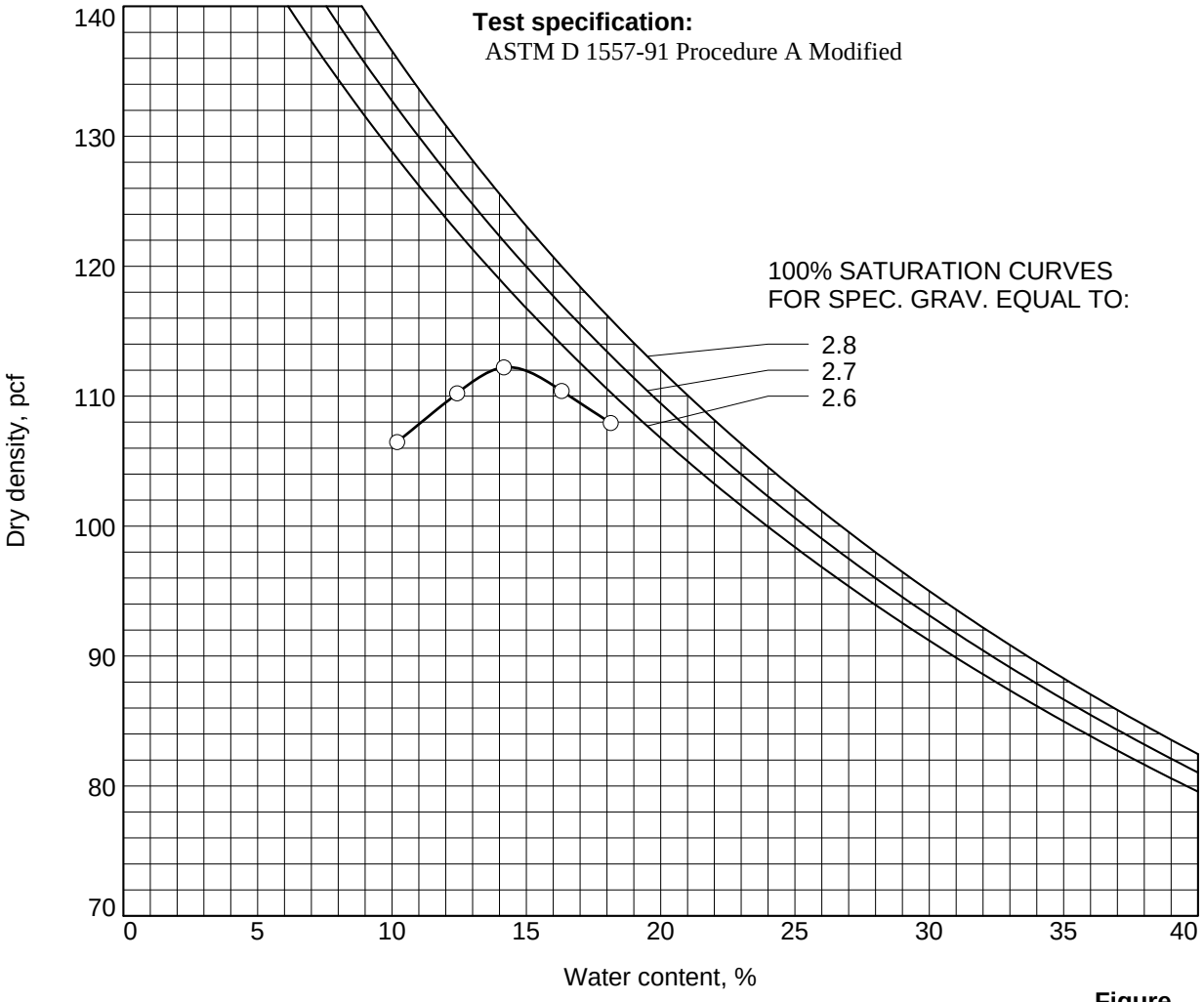
Classifications - **USCS:** CH **AASHTO:**

Nat. Moist. = 35.2 % **Sp.G. =**

Liquid Limit = 68 **Plasticity Index =** 46

% < No.200 =

TEST RESULTS
Maximum dry density = 112.2 pcf
Optimum moisture = 14.3 %



Figure

Koury Engineering & Testing, Inc.

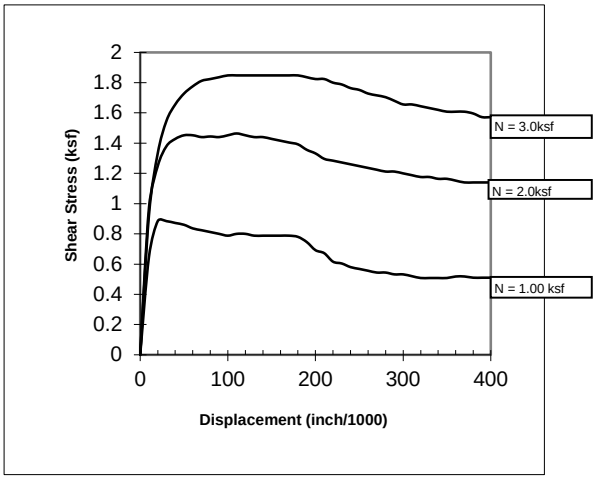
Tested By: ABB **Checked By:** _____

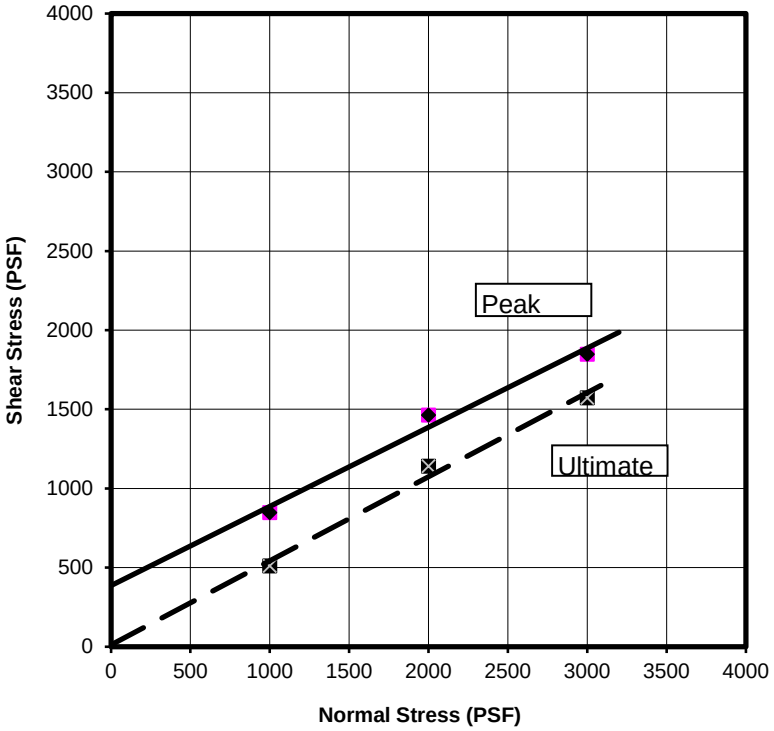
Direct Shear Test Report

Sample Identification	Sample Description	Sample Test State
TP40 @ 3' - 3.8'	Dark Yellowish Brown Clay	Saturated-Consolidated

Peak:	**Phi (Degrees)**	**26.6**	(Avg.Dry Dens. = 111.4 pcf)
	Cohesion (PSF)	**386.7**	(Avg.Moist. = 15.4 %)
Ultimate:	**Phi (Degrees)**	**28.0**	
	Cohesion (PSF)	**12.0**	

Relatively Undisturbed
Remolded





KOURY ENGINEERING & TESTING, INC.	**Project Name:** OC Prado - Construction Level	**Project No.: 18-0817** Date: 10/8/18	**Lab #** 2018-249

Percolation Testing (Falling Head)-Porchet

Job Name: OC Prado

Job No.: 18-0817

Test Location: South of Building 2, west end of proposed detention Basin A

Water Table Depth (ft): _____ **Relatively Impervious Layer Depth (ft):** _____

Test Date: 9/7/2018

Test No.: P-1-Falling Head

Depth of Boring (d_b): 240 in

Diameter of Boring (D): 8 in

Test Performer: AB

Trial No.	Start Time (hr:min)	Stop Time (hr:min)	Time Interval (hr:min)	Initial Water Depth (in)	Final Water Depth (in)	Water Level Change (in)	Water Level Change >6"
1	8:15	8:40	0:25	14	14 11/16	8 4/16	Yes
2	8:45	9:10	0:25	16	16 8/16	6 6/16	Yes

If both yes, run test for an additional hour, reading at 10 minute interval

If no, run test for an additional 6 hours, reading at 30 minute interval

Trial No.	Time of Testing			Water Level Measurement		Water Level Calculations				Percolation & Infiltration Rate Calculations		
	Initial Time T_1 (hr:min)	Final Time T_2 (hr:min)	Time Interval $\Delta T = T_2 - T_1$ (hr:min)	Initial Depth to Water d_1 (in)	Final Depth to Water d_2 (in)	Initial Height of Water Column $d_{H1} = d_b - d_1$ (in)	Final Height of Water Column $d_{H2} = d_b - d_2$ (in)	Drop in Height $\Delta d_H = d_{H1} - d_{H2}$ (in)	Average Height of Water Column $d_{avg} = (d_{H1}+d_{H2})/2$ (in)	Measured Percolation $K_i = \Delta d_H / \Delta T$ (in/hr)	Reduction Factor	Calculated Infiltration Rate = $(60\Delta dHD/2)/(\Delta T(D/2+2davg)$ (in/hr)
1	0:00	0:10	0:10	189 5/8	196 3/8	50 3/8	43 5/8	6 6/8	47	40.32	24.5	1.64
2	0:00	0:10	0:10	183 3/8	191 1/8	56 5/8	48 7/8	7 6/8	52 6/8	46.80	27.4	1.71
3	0:00	0:10	0:10	191 1/8	197 3/8	48 7/8	42 5/8	6 2/8	45 6/8	37.44	23.9	1.57
4	0:00	0:10	0:10	190 4/8	196 2/8	49 4/8	43 6/8	5 5/8	46 5/8	33.84	24.3	1.39
5	0:00	0:10	0:10	184 6/8	191	55 2/8	49	6 2/8	52 1/8	37.20	27.1	1.38
6	0:00	0:10	0:10	185 6/8	192 4/8	54 2/8	47 4/8	6 5/8	50 7/8	40.08	26.5	1.52
7	0:00	0:10	0:10	193 5/8	198 5/8	46 3/8	41 3/8	4 7/8	43 7/8	29.52	22.9	1.29
8	0:00	0:10	0:10	189 5/8	194 5/8	50 3/8	45 3/8	5	47 7/8	30.24	24.9	1.21
9												
10												
11												
12												

Note:

1. Infiltration Rate, It = $(60\Delta dHD/2)/(\Delta T(D/2+2davg)$

2. Long Term Infiltration Rate = Short Term Infiltration Rate / Correction Factor for Test Limitations

   Correction Factor Range Normally used to account for Long Term Moderate Siltation, Test Scale Limitations and Other Factors = 3 to 12

   Reference: Riverside County - Low Impact Development BMP Design Handbook Appendix A, dated 9/2011

Lowest Infiltration Rate = **1.21** **in/hr**

Adjusted Infiltration Rate = **0.30** **in/hr**

Percolation Testing (Falling Head)-Porchet

Job Name: OC Prado

Job No.: 18-0817

Test Location: South of Building 2, west end of proposed WQ Basin B

Water Table Depth (ft): _____ **Relatively Impervious Layer Depth (ft):** _____

Test Date: 9/7/2018

Test No.: P-2-Falling Head

Depth of Boring (d_b): 180 in

Diameter of Boring (D): 8 in

Test Performer: GG, AB

Trial No.	Start Time (hr:min)	Stop Time (hr:min)	Time Interval (hr:min)	Initial Water Depth (ft)	Final Water Depth (ft)	Water Level Change (in)	Water Level Change >6"
1	10:15	10:40	0:25	11 13/16	11 14/16	1 3/16	NO
2	10:40	11:05	0:25	11 14/16	11 14/16	0	NO

If both yes, run test for an additional hour, reading at 10 minute interval

If no, run test for an additional 6 hours, reading at 30 minute interval

Trial No.	Time of Testing			Water Level Measurement		Water Level Calculations				Percolation & Infiltration Rate Calculations		
	Initial Time T_1 (hr:min)	Final Time T_2 (hr:min)	Time Interval $\Delta T = T_2 - T_1$ (hr:min)	Initial Depth to Water d_1 (in)	Final Depth to Water d_2 (in)	Initial Height of Water Column $d_{H1} = d_b - d_1$ (in)	Final Height of Water Column $d_{H2} = d_b - d_2$ (in)	Drop in Height $\Delta d_H = d_{H1} - d_{H2}$ (in)	Average Height of Water Column $d_{avg} = (d_{H1}+d_{H2})/2$ (in)	Measured Percolation $K_i = \Delta d_H / \Delta T$ (in/hr)	Reduction Factor	Calculated Infiltration Rate = $(60\Delta dHD/2)/(\Delta T(D/2+2davg)$ (in/hr)
1	0:00	0:30	0:30	142 6/8	144	37 2/8	36	1 2/8	36 5/8	2.40	19.3	0.124
2	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
3	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
4	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
5	0:00	0:30	0:30	144	144 1/8	36	35 7/8	1/8	36	0.24	19.0	0.013
6	0:00	0:30	0:30	159	159 1/8	21	20 7/8	1/8	21	0.24	11.5	0.021
7	0:00	0:30	0:30	159	159 1/8	21	20 7/8	1/8	21	0.24	11.5	0.021
8	0:00	0:30	0:30	159	159 1/8	21	20 7/8	1/8	21	0.24	11.5	0.021
9												
10												
11												
12												

Note:

1. Infiltration Rate, It = $(60\Delta dHD/2)/(\Delta T(D/2+2davg)$

2. Long Term Infiltration Rate = Short Term Infiltration Rate / Correction Factor for Test Limitations

   Correction Factor Range Normally used to account for Long Term Moderate Siltation, Test Scale Limitations and Other Factors = 3 to 12

   Reference: Riverside County - Low Impact Development BMP Design Handbook Appendix A, dated 9/2011

Lowest Infiltration Rate = **0.013** **in/hr**

Adjusted Infiltration Rate = **0.003** **in/hr**

Percolation Testing (Falling Head)-Porchet

Job Name: OC Prado

Job No.: 18-0817

Test Location: South of Building 2, east end of proposed WQ Basin B

Water Table Depth (ft): _____ **Relatively Impervious Layer Depth (ft):** _____

Test Date: 9/7/2018

Test No.: P-3-Falling Head

Depth of Boring (d_b): 264 in

Diameter of Boring (D): 8 in

Test Performer: AB

Trial No.	Start Time (hr:min)	Stop Time (hr:min)	Time Interval (hr:min)	Initial Water Depth (in)	Final Water Depth (in)	Water Level Change (in)	Water Level Change >6"
							< 6"
							< 6"

If both yes, run test for an additional hour, reading at 10 minute interval

If no, run test for an additional 6 hours, reading at 30 minute interval

Trial No.	Time of Testing			Water Level Measurement		Water Level Calculations				Percolation & Infiltration Rate Calculations		
	Initial Time T_1 (hr:min)	Final Time T_2 (hr:min)	Time Interval $\Delta T = T_2 - T_1$ (hr:min)	Initial Depth to Water d_1 (in)	Final Depth to Water d_2 (in)	Initial Height of Water Column $d_{H1} = d_b - d_1$ (in)	Final Height of Water Column $d_{H2} = d_b - d_2$ (in)	Drop in Height $\Delta d_H = d_{H1} - d_{H2}$ (in)	Average Height of Water Column $d_{avg} = (d_{H1}+d_{H2})/2$ (in)	Measured Percolation $K_i = \Delta d_H / \Delta T$ (in/hr)	Reduction Factor	Calculated Infiltration Rate = $(60\Delta dHD/2)/(\Delta T(D/2+2davg)$ (in/hr)
1	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 4/8	0.24	53.8	0.004
2	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 4/8	0.24	53.8	0.004
3	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 4/8	0.24	53.8	0.004
4	0:00	0:30	0:30	158 3/8	158 4/8	105 5/8	105 4/8	1/8	105 5/8	0.25	53.8	0.005
5												
6												
7												
8												
9												
10												
11												
12												

Note:

1. Infiltration Rate, It = $(60\Delta dHD/2)/(\Delta T(D/2+2davg)$

2. Long Term Infiltration Rate = Short Term Infiltration Rate / Correction Factor for Test Limitations

   Correction Factor Range Normally used to account for Long Term Moderate Siltation, Test Scale Limitations and Other Factors = 3 to 12

   Reference: Riverside County - Low Impact Development BMP Design Handbook Appendix A, dated 9/2011

Lowest Infiltration Rate = **0.004** **in/hr**

Adjusted Infiltration Rate = **0.001** **in/hr**

Table C-1 -Test Pit Samples - Unit Weight Summary

Test Pit No.	Sample Type	Depth (feet)	Soil Type	Deposit	Dry Unit Weight (pcf)	Moisture Content (pcf)
22	CD	4	CL/CH	Older Alluvium	122	16.4
22	NG	5.5	CL/CH	Older Alluvium	96	19.1
23	CD	5.5	CL/CH	Older Alluvium	103	22.0
23	NG	5.5	CL/CH	Older Alluvium	96	19.1
24	CD	5.25	CL/CH	Older Alluvium	107	21.1
24	NG	5.25	CL/CH	Older Alluvium	99	22.3
25	CD	3	CL/CH	Older Alluvium	100	21.8
25	NG	3	CL/CH	Older Alluvium	97	24.0
26	CD	3	CL	Older Alluvium	116	14.8
26	NG	3	CL	Older Alluvium	111	13.3
26	NG	4.25	CL	Older Alluvium	97	19.2
27	CD	3.5	CL	Alluvium	110	18.4
27	NG	3.5	CL	Alluvium	100	16.2
28	CD	5	CL	Older Alluvium	115	13.4
28	NG	5	CL	Older Alluvium	109	12.6
28	NG	7.25	CH	Older Alluvium	86	31.3
29	CD	4.5	CL	Older Alluvium	98	20.4
29	NG	4.5	CL	Older Alluvium	98	19.6
29	NG	7.5	CL	Older Alluvium	118	13.6
30	CD	5	CL/CH	Older Alluvium	110	19.1
30	NG	5	CL/CH	Older Alluvium	94	26.1
31	CD	4.5	CL	Older Alluvium	112	15.9
31	NG	4.8’	CL	Older Alluvium	102	16.2
33	CD	5.25	CL	Older Alluvium	110	15.7
35	CD	6.5	CL	Older Alluvium	116	15.6
35	NG	6.5	CL	Older Alluvium	101	20.9
36	CD	4.5	CL/CH	Older Alluvium	118	10.8
36	NG	4.5	CL/CH	Older Alluvium	108	11.8
37	NG	2	CL	Alluvium	111	16.2
37	CD	4	CL	Older Alluvium	101	17.5
37	NG	4	CL	Older Alluvium	100	21.0
39	CD	4	CL	Alluvium	116	17.1
40	CD	3	CL	Alluvium	117	10.7
40	NG	3	CL	Alluvium	106	13.7
40	CD	4.8	CL	Older Alluvium	96	17.1
40	NG	4.8	CL	Older Alluvium	99	16.2

Table C-1 -Test Pit Samples - Unit Weight Summary (continued)

Test Pit No.	Sample Type	Depth (feet)	Soil Type	Deposit	Dry Unit Weight (pcf)	Moisture Content (pcf)
41	NG	3	CL	Alluvium	109	14.7
41	NG	5	CL/CH	Older Alluvium	93	21.2
44	NG	2	CL	Alluvium	106	17.7
44	NG	4	CL	Older Alluvium	101	20.0
45	NG	1.5	CL	Alluvium	117	14.2
45	NG	4	CL/CH	Older Alluvium	102	19.9
50	NG	2	CL	Alluvium	102	20.3
50	NG	3	CL	Older Alluvium	105	18.7
51	CD	5	CL/CH	Older Alluvium	105	16.7
52	NG	2.5	CL	Alluvium	103	13.1
52	CD	4	CL	Older Alluvium	99	13.8
52	NG	6	CL	Older Alluvium	101	22.4
53	NG	2	CL	Alluvium	111	17.0
53	NG	4	CL/CH	Older Alluvium	99	19.7
54	CD	1.5	CL	Alluvium	107	17.1
54	NG	1.5	CL	Alluvium	110	16.5
54	NG	4	CL/CH	Older Alluvium	96	26.3
55	NG	2	CL	Alluvium	105	11.0
55	NG	5	CL/CH	Older Alluvium	100	26.5
57	NG	2	CL	Alluvium	106	19.4
57	NG	4	CL/CH	Older Alluvium	86	29.6
63	NG	2.5	CL	Alluvium	98	15.7
63	NG	6’	CL	Older Alluvium	90	23.3
64	NG	2	CL	Alluvium	99	21.3
65	NG	1.5	CL	Alluvium	109	7.9
65	CD	3	CL	Alluvium	113	9.3
65	CD	5.25	CL/CH	Alluvium	114	17.4
67	CD	5	CL/CH	Older Alluvium	115	19.9
68	CD	6	CL/CH	Alluvium	93	33.4
69	NG	4	CL/CH	Alluvium	91	18.4
70	CD	2	CL	Alluvium	108	15.0
70	NG	2	CL	Alluvium	106	14.7
70	NG	5	CL	Older Alluvium	105	14.1
71	NG	3.5	CL	Alluvium	117	13.1
71	CD	3.5	CL	Alluvium	119	14.5
72	NG	3	CL	Older Alluvium	105	19.1
72	CD	4	CL	Older Alluvium	103	19.1

Table C-2 – Estimated Removal Depths

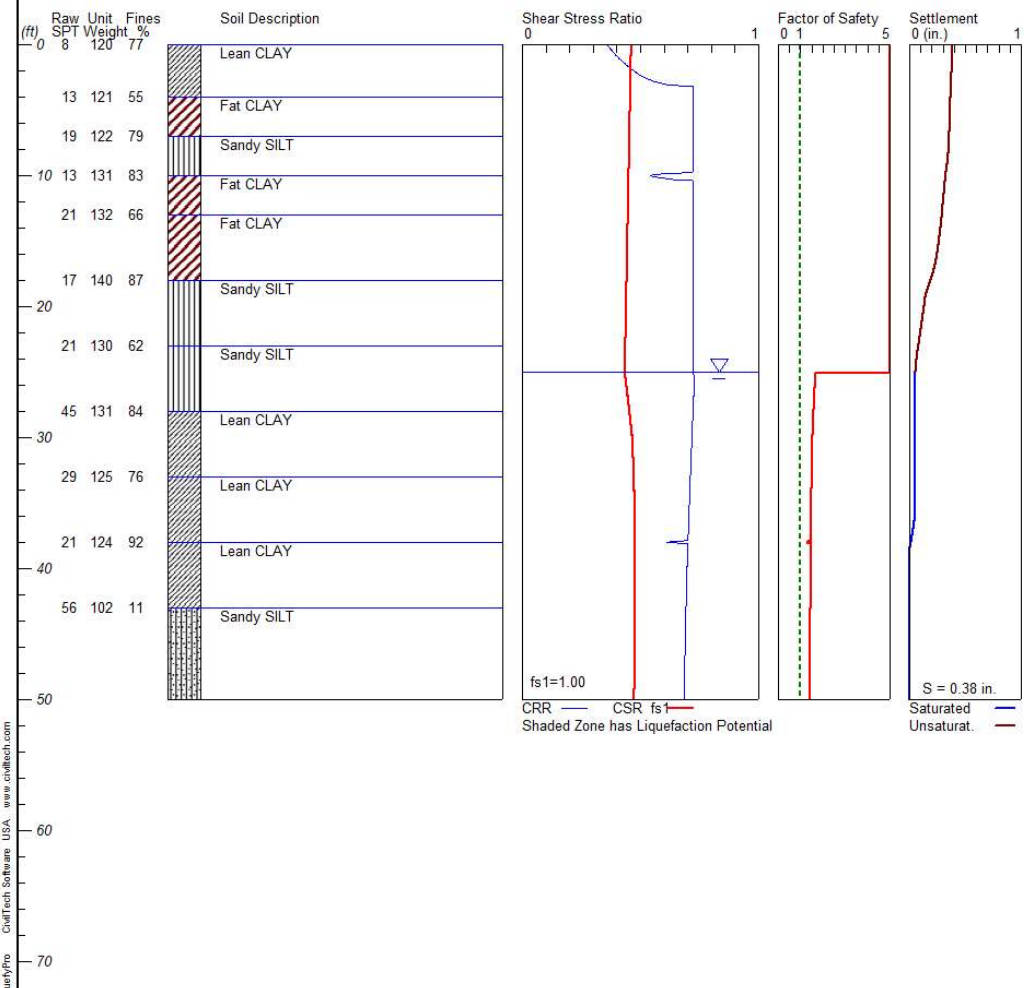
Boring/ Test Pit	*Remedial Depth (ft)	Location	Boring/ Test Pit	*Remedial Depth (ft)	Location
B-1	5	Building 2	TP-23	2.5	Driveway
B-2	5 & N/A	Detention Basin	TP-24	2.5	Driveway
B-3	3.5	Building 2	TP-25	2.5	Driveway
B-4	4.5	Building 2	TP-26	2.5	Driveway
B-5	4	Building 1	TP-27	3	Building 1
B-6	3	Building 1	TP-28	3	Building 1
B-7	5	Building 1	TP-29	3	Building 1
B-8	4	Building 2	TP-30	3.5	Building 1
B-9	3	Building 1	TP-31	3.5	Building 1
B-10	4	Building 1	TP-32	4.5	Building 1
B-11	4	Building 1	TP-33	4	Building 1
B-12	5	Building 1	TP-35	6	Building 1
B-13	4.5	Building 1	TP-36	4.5	Building 1
B-14	5	Building 1	TP-37	4	Building 1
B-15	5	Building 1	TP-38	4	Building 1
B-16	5	Building 1	TP-39	4	Building 1
B-17	5	Building 1	TP-40	4	Building 1
B-18	6	Building 1	TP-41	4	Building 1
B-19	6	Building 1	TP-42	4	Building 1
B-20	6	Building 1	TP-43	4	Building 1
B-21	6	Building 2	TP-44	3	Parking
B-22	5	Building 2	TP-45	3	Parking
B-23	5	Building 2	TP-46	2.5	Driveway
B-24	5	Building 2	TP-47	2.5	Parking
B-25	4	Building 2	TP-48	3	Parking
B-26	4.5	Building 2	TP-49	3.5	Parking
B-27	4 & N/A	Detention Basin	TP-50	2.5	Driveway
B-28	3 & N/A	WQ Basin	TP-51	4.5	Building 2
TP-1	4	Driveway	TP-52	4	Building 2
TP-2	5	Building 2	TP-53	3.5	Building 2
TP-3	5	Building 2	TP-54	3.5	Building 2
TP-4	4	Building 2	TP-55	4	Building 2
TP-5	4	Building 2	TP-56	4.5	Building 2
TP-6	3.5	Driveway	TP-57	4	Building 2
TP-7	3.5	Parking	TP-58	4.5	Building 2
TP-8	2.5 & N/A	WQ Basin	TP-59	4	Building 2
TP-9	3 & N/A	Detention Basin	TP-60	4	Building 2
TP-10	3	Driveway	TP-61	3.5	Building 2
TP-11	3	Driveway	TP-62	4.5	Building 2
TP-12	3	Driveway	TP-63	6	Driveway
TP-13	8+	Driveway	TP-64	3	Parking
TP-14	15+	Driveway	TP-65	3.5	Parking
TP-15	15+	Driveway	TP-66	4	Building 2
TP-16	3	Driveway	TP-67	4	Building 2
TP-17	2.5	Driveway	TP-68	11	Building 1
TP-18	4	Building 1	TP-69	6	Driveway
TP-19	4.5	Building 1	TP-70	3.5	Parking
TP-20	4	Driveway	TP-71	2.5	Parking
TP-21	8	Building 1	TP-72	2.5	Driveway
TP-22	3	Driveway	*Remedial Grading Removal Depth		

LIQUEFACTION ANALYSIS

OC Prado Construction Level

Hole No.=B-24 Water Depth=25 ft Surface Elev.=520

Magnitude= 6.49
Acceleration= 0.71g



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KOURY ENGINEERING & TESTING, INC.

CORPORATE OFFICE
14280 Euclid Avenue
Chino, California 91710
P: 909•606•6111
F: 909•606•6555

BRANCH OFFICE
17800 South Main Street, Suite 302
Gardena, California 90248
P: 310•851•8685
F: 310•851•8692

www.kouryengineering.com