CITY OF TORRANCE, CALIFORNIA

ADDENDUM NO. 1
Issued: September 20, 2010

TO

PROPOSAL, SPECIFICATIONS, BOND AND AFFIDAVIT FOR THE CONSTRUCTION OF WALTERIA RESERVOIR SLOPE STABILITY PROJECT, C.I.P. No. I-95 B2010-17

Note the following changes and/or additions to the Plans and Specifications for the project indicated above. The bidder shall execute the Certification at the end of this addendum, and shall **attach all pages of this addendum to the Contract Documents submitted with the Bid.** In addition, the bidder shall complete and submit the "Acknowledgment of Addenda Received" Form provided in Section C of the Specifications.

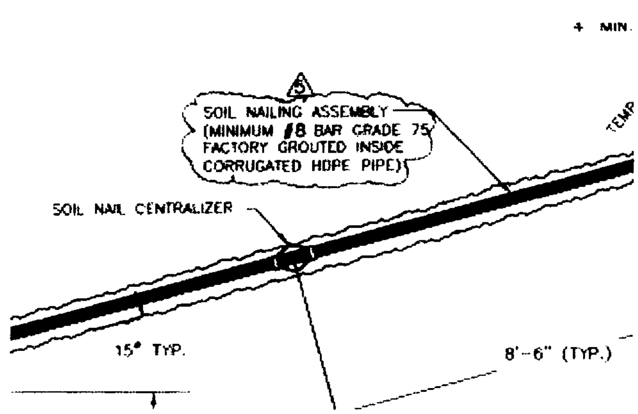
1. **Refer to Specifications SECTION A – NOTICE OF INVITING BIDS.**

The City has delayed the time to open bids. Consequently, the first paragraph is hereby deleted in its entirety and new language is added as follows:

"Notice is hereby given that sealed bids for performing the following described work will be received at the Office of the City Clerk of the City of Torrance, California, **between 12:30 p.m. and 3:00 p.m. on Thursday, September 23, 2010,** after which time they will be publicly opened and read at approximately 3:15 p.m. in the Council Chambers of said City:"

2. **Refer to PLAN SHEET WP-280 (Sheet 6 of 12) Section 3, Typical Wall Section.**

The detail of the lower soil nailing assembly below is hereby revised to change the bar size from #4 to #8:.



3. **<u>Refer to page C-2 of the Bidder's Proposal document on blue-colored paper included with the Contract Documents.</u>**

The Item Description for Bid Item #17 is hereby revised to "Supply and install final shotcrete facing including all reinforcement and final surface finish." The bidder shall make these corrections as shown below on its blue-colored original Bidder's Proposal to be submitted with your Bid. Should the bidder not correctly make the corrections below, it would not necessarily result in a non-responsive bid.

17	8,550	SF	SUPPLY AND INSTALL FINAL SHOTCRETE FACING ~~AND TOP AND BOTTOM V-DITCHES~~ INCLUDING ALL REINFORCEMENT AND FINAL SURFACE FINISH		

4. **<u>Refer to PLAN SHEET WP-280, Sheet 12 of 12, Cross Sections.</u>**

All cut and fill operations performed by the Contractor shall follow all requirements of the applicable agencies, and be reviewed and approved by the on-site geotechnical engineer prior to execution. The Contractor shall perform all excavation under the direction of the on-site geotechnical engineer, and shall provide the necessary means and methods to protect the slope against any sliding and to keep the cut and fill operations safe at the site.

5. **<u>Refer to PLAN SHEET WP-280, Sheet 10 of 12, Note 1.</u>**

The Geo-technical Report referenced in the note is hereby provided as Appendix VIII of the Specifications.

6. **<u>Refer to Specifications SECTION 7-1, THE CONTRACTOR'S EQUIPMENT AND FACILITIES.</u>**

The Temporary Access Agreement with the adjacent property owner is hereby provided as Appendix VIX of the Specifications.

END OF ADDENDUM NO.1

By Order of the Public Works Director

ROBERT J. BESTE
Public Works Director

By: ______________________
ELIZABETH OVERSTREET. P.E.
Acting City Engineer

BIDDER'S CERTIFICATION

I acknowledge receipt of the foregoing Addendum No. 1 and accept all conditions contained therein.

____

Bidder

____________________________ ____________________

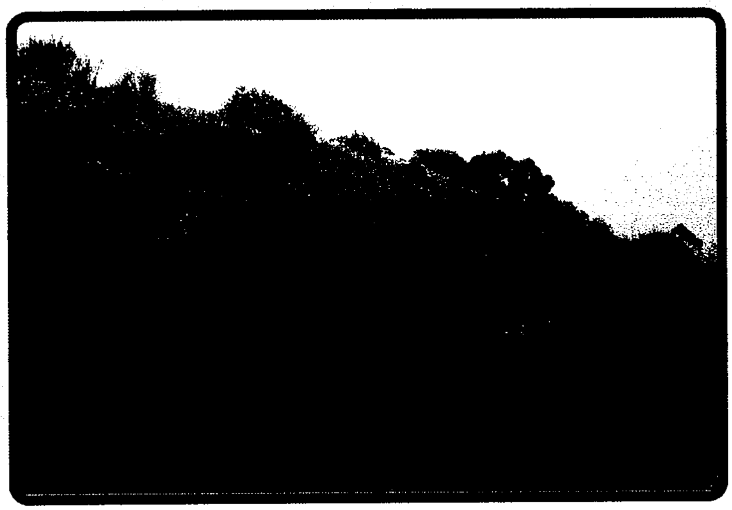
By Date

******* Submit this executed form with the bid *******

Please fill out and submit the "Acknowledgment of Addenda Received" form provided in Section C of the Specifications.

GEO-ENVIRONMENTAL, INC.
Caltrans Certified
DBE Firm

GEOTECHNICAL INVESTIGATION REPORT
Slope Stabilization Methods
Northwest Portion of Walteria Reservoir
City of Torrance, Los Angeles County, California



GEI-Project No.: 172-43

Prepared for
John Dettle, P.E.
Principal City Engineer
City of Torrance, Public Works Department
20500 Madrona Avenue
Torrance, California 90503-3690

April 29, 2009

Prepared by

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GEO-ENVIRONMENTAL, INC.

Caltrans Certified
DBE Firm

GEOTECHNICAL INVESTIGATION REPORT

SLOPE STABILIZATION METHODS
REPAIRING/RESTORING THE NORTHWEST PORTION OF WALTERIA RESERVOIR
CITY OF TORRANCE, LOS ANGELES COUNTY, CALIFORNIA

Prepared for

John Dettle, P.E.
Principal City Engineer
City of Torrance, Public Works Department
20500 Madrona Avenue
Torrance, California 90503-3690

GEI Project No. 172-43

Prepared by

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EXP. 12/31/09
CIVIL
STATE OF CALIFORNIA

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April 29, 2009

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1.0 INTRODUCTION

This report presents the results of a geotechnical investigation performed by Geo-Environmental, Inc. (GEI) within the surficial slope failure located along the northwest portion of Walteria Reservoir located in the City of Torrance, Los Angeles County, California. GEI's work has been performed in general accordance with GEI proposal 09-017, dated February 5, 2009. This investigation was authorized by Mr. John Dettle, Principal City Engineer of the City of Torrance Public Works Department (City).

2.0 PURPOSE AND SCOPE

The purpose of this geotechnical investigation was to evaluate the soil conditions existing at the site, investigate the causes of the surficial instability, and provide recommendations for stabilization utilizing alternative methods based on constructability, favorable flexibility and drainage characteristics, costs, quality of onsite and readily available local import soil material, aesthetics, ability to blend in with neighboring slopes, ability to meet all the minimum factors of safety for static and seismic slope stability, and retention of soils to prevent unwanted sediment runoff.

The scope of GEI's work consisted of the following tasks:

- Background data review and site reconnaissance;
- Geotechnical engineering analysis utilizing the results of the field investigation performed by Leighton Consulting, Inc. (LCI) that consisted of a site reconnaissance, the marking of boring locations, the drilling of two (2) 8-inch diameter hollow-stem auger soil borings to a maximum depth of approximately 30 feet, and the collection of drive and bulk soil samples from the borings;
- The preparation of this geotechnical report presenting conclusions and recommendations regarding:
  - *Type and extent of materials encountered;*
  - *Sliding zones and the extent of the surficial slides;*
  - *Physical and engineering characteristics of the onsite soils;*
  - *Presence of groundwater or seepage;*
  - *Suitability of onsite materials for use in slope stabilization;*
  - *Nature of bedrock and soil strength characteristics;*
  - *Area seismicity;*
  - *Factor of safety against sliding;*
  - *Recommendations for slope stabilization; and*
  - *Site preparation for the proposed construction of the selected stabilization method.*

3.0 SITE AND PROJECT DESCRIPTION

The project site is located in the lower region of the descending slope that comprises the northwest portion of Walteria Reservoir, a reservoir with a capacity of approximately 18.7 million gallons (Figure 1). The reservoir structure is buried within a natural hill at the northeastern corner of Crenshaw Boulevard and Rolling Hills Road in the City of Torrance. Commercial buildings exist between the reservoir property and Crenshaw Boulevard. A paved parking lot separates the existing commercial buildings. The surficial slope instability is located within the lower region of the slope that is between the buildings; it is characterized by two (2) shallow slumps and downslope translation of slope debris. The areas of instability are approximately 10 to 15 feet in width and up to approximately 8.0 feet in depth. The slope rises from the grade of the adjacent parking lot at an elevation of approximately 215 to 220 feet, extending to a maximum elevation of 284 feet above mean sea level (AMSL) at the top of the slope reservoir. The slope inclination is non-uniform with the initial 20 to 25 feet at an inclination of approximately 1.14:1 (H:V) and the remainder with an average inclination at 1.6:1 to the swale near the top of the slope where the slope gradually rises to the top of the reservoir.

3.1 BACKGROUND

The project site was first investigated by Converse Consultants (1984, 1985, 1988). The geotechnical investigation studies performed by Converse included the slope stability analyses of a number of cross-sections through the reservoir property. The results of the slope stability analyses concluded that the natural slope in which the current instability exists was grossly stable (the minimum factor of safety for a circular failure surface was significantly greater than 1.5, the typical minimum with respect to the standard of practice). LCI revised the studies performed by Converse in their report entitled "Geotechnical Investigation of Slope Instability at the Walteria Reservoir, Crenshaw Boulevard, Torrance, California, Project No. 600920-001 dated October 19, 2005". The report stated, "evaluation of other shapes of potential failure surfaces was not considered by Converse to be relative due to the bedding attitudes determined by their subsurface exploration. Review of the stability analyses did not include a specific evaluation of shallow surficial stability of the formational outcrop in which the current instability occurred." LCI reevaluated the stability of the slope and recommended that the instability at the site should be repaired and restored with the construction of a shotcrete wall reinforced with soil nails. Results and recommendations provided by LCI in their report were translated by GeoSyntec Consultants in their set of plans entitled, "City of Torrance, Soil Nailed Wall at Walteria Reservoir, CIP Project I-95", dated February 2007 (Appendix F). The utilization of soil nailing to repair and restore the slope instability as recommended by LCI is geotechnically desirable and feasible, although cost prohibitive. Under these circumstances, the City contacted GEI to perform a soils investigation at the site to reevaluate the slope at the site and provide alternative cost-effective stabilization methods.

3.2 SUBSURFACE CONDITIONS

Based on the exploratory borings drilled by LCI, artificial fill materials (af) were encountered from approximately 3.0 to 6.0 feet below the existing ground surface. The fill materials consisted of loose silty-to-clayey sands and stiff clays. Colluvium and weathered bedrock generally envelop the project site. Colluvium was observed within the slope face across the project site and was approximately 2.0 to 4.0 feet thick. The colluvium was generally comprised of medium stiff silty clay-to-clay, which appeared to be dry with low plasticity. Cracking due to desiccation was observed within this unit across the slope. The Malaga Mudstone Member of the Monterey Formation (Malaga) underlies the colluvium and weathered bedrock. The upper Miocene Malaga overlies the Valmonte Diatomite (Valmonte) and crops out as a band adjacent to and north of the Valmonte from approximately north of the Palos Verdes Reservoir to Rolling Hills Estates, and as scattered exposures protruding through the Holocene alluvium west of Walteria. The results of LCI's subsurface exploration indicate the formation consists of an upper stratum of weathered clay that exhibited brown-to-gray/brown coloration with minor amounts of sand and silt. The weathered zone extended to depths of approximately 18 to 22 feet below the existing ground surface.

4.0 GEOLOGY, FAULTING, AND SEISMICITY

4.1 GEOLOGY

The site is located in the Torrance 7.5-minute Quadrangle, which encompasses parts of the Los Angeles Basin Physiographic Province of Southern California. The Los Angeles Basin Physiographic Province is characterized as a sedimentary filled basin located between the Transverse Ranges to the north and the Peninsular Ranges to the south. The Quadrangle covers approximately 60 square miles in southwestern Los Angeles County, including part or all of the cities of Carson, Gardena, Lomita, Los Angeles (communities of East San Pedro, Harbor City and Wilmington), Palos Verdes Estates, Rancho Palos Verdes, Redondo Beach, Rolling Hills, Rolling Hills Estates and Torrance.

The project site is located along the northeastern flank of the Palos Verdes Hills. Based on LCI's boring logs the site is generally mantled with approximately a 2.0 to 4.0 feet thick colluvium deposit. Underlying the colluvium is the Malaga Mudstone Member of the Monterey Formation. The formation was found to have a weathered zone extending to a depth of 18 to 22 feet below the existing ground surface.

The upper Miocene Malaga Mudstone Member (Tmal) of the Monterey Formation overlies the Valmonte Diatomite and crops out as a band adjacent to and north of the Valmonte Diatomite from about north of the Palos Verdes Reservoir to Rolling Hills Estates and as scattered exposures protruding through the Holocene alluvium west of Walteria. The unit consists of radiolarian mudstone and diatomite (CDMG, 1998).

4.2 FAULTING AND SEISMICITY

Active faults are defined by the California Division of Mines and Geology (now the California Geological Survey, CGS) as a fault that has exhibited surface displacement within the last 11,000 years. Potentially active faults are defined as those with a history of movement between 11,000 and 1.6 million years. Based on our literature research, no active or potentially active faults are mapped as underlying the site. The site is not mapped within a designated Alquist-Priolo Earthquake Fault Zone (CDMG) for fault rupture hazard. The potential for ground surface rupture to occur at the site due to faulting is considered to be low.

Active faults that are primary sources for ground shaking affecting the site, that are located within 15 km of the project site, include the Palos Verdes Fault (Palos Verdes Hill section), Cabrillo Fault, Redondo Canyon Fault and the Newport-Inglewood-Rose Fault Zone (Los Angeles Basin section). They are briefly described below.

The Palos Verdes Fault is divided into three (3) sections (Santa Monica Basin, Palos Verdes Hill and San Pedro Shelf sections) which extends a total length of 72.7 km with an approximate slip-rate category between 1.0 and 5.0 mm/yr. The fault is a high-angle southwest-dipping dextral oblique fault that forms the southwestern boundary of Los Angeles basin with the Palos Verdes uplift. The Palos Verdes Hill section is approximately 12 km in length and lies approximately 0.3 km from the project site (Treiman, *et al.* 1998).

The Cabrillo Fault is a normal fault with probable dextral trends northwesterly across the Palos Verdes Hills which is divided into two sections (Onshore and Offshore sections) with a total length of 10 km. The Onshore section lies approximately 2.9 km from the project site and has a slip-rate category between 0.2 to 1.0 mm/yr (Treiman, *et al.* 1998).

The Redondo Canyon Fault is a high-angle, down to the north, reverse fault that is approximately 12 km in length and may absorb some dextral slip from the Palos Verdes fault zone. The slip-rate category is between 0.2 to 1.0 mm/yr. The Redondo Canyon Fault lies approximately 6.0 km from the project site and extends towards the west (Treiman, *et al.* 1998).

The Newport-Inglewood-Rose Fault Zone has been divided into seven (7) sections that combine for the total length of 209.4 with an approximate slip-rate category between 1.0 and 5.0 mm/yr. Closest to the site is the Los Angeles Basin section that is marked by a northwesterly trending line of generally en echelon anticlinal folds and faults that extends 40 miles from Newport Mesa to the Cheviot Hills along the western side of the Los Angeles Basin. The Newport-Inglewood-Rose Fault Zone lies approximately 13.4 km to the northeast from the project site (Treiman, *et al.* 1999).

The peak ground acceleration for the project site on firm rock with 10 percent probability of exceedance in 50 years is estimated to be 0.424g, based on the Probabilistic Seismic Hazard Assessment Maps (CGS, 2002) and on the CGS website: http://www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html.

5.0 SLOPE STABILITY AND INDUCED LANDSLIDING

The subject site is mapped as being in an *Earthquake-Induced Landslide Hazard Zone (CDMG)*. GEI has determined that the site consists of potential unstable zones with factors of safety against sliding below the generally accepted minimum. Based on the current state of the subject property and its proximity to many active regional faults, *the potential for an earthquake-induced landslide is considered high*. The implementation of our recommendations in the design and construction of the best suitable slope stabilization methods is expected to provide relatively safe construction and long-term stability of the slope.

6.0 FIELD EXPLORATION

6.1 SITE RECONNAISSANCE

A site reconnaissance was performed to verify the condition of the subject site and to determine the suitability of the site for the proposed construction of the selected slope stabilization method. Surficial conditions encountered were as anticipated, based on our initial data review.

6.2 DRILLING AND SOIL SAMPLING

A subsurface investigation was conducted by LCI on July 21, 2005 at the parking lot area below the slope in the areas of instability. The field investigation consisted of drilling two (2) 8-inch diameter hollow-stem auger borings to a maximum depth of approximately 30 feet below the existing ground surface (Appendix A).

Relatively undisturbed drive samples were collected in accordance with ASTM D3350 Test Method from the soils borings at specified depths using a sampler lined with one-inch-high brass rings. The samples were obtained by pushing or driving the sampler into the earth material. The brass rings were carefully removed from the sampler, transferred to a plastic tube, and sealed at both ends with plastic caps to protect and maintain the in-situ moisture content of the soils. The ring samples were subsequently tested in the soils laboratory to determine moisture content and in-place dry density, plasticity/expansive characteristics, and shear strength. In addition, Standard Penetration Test (SPT) samples were collected in accordance with ASTM D1586 Test Method. Bulk samples of the surficial soils also were collected for subsequent laboratory analysis to evaluate the sulfate content of the onsite near-surface soils.

The soils encountered in the borings were classified in accordance with the Unified Soil Classification Systems. The logs of the borings are presented in Appendix A.

6.3 GROUNDWATER

Groundwater was encountered in LCI's borings BA-1 and BA-2 at approximately 8.5 and 18.5 feet below the existing ground surface (approximate elevations of 207.5 and 212.5 feet AMSL), respectively. The future depth to groundwater may fluctuate, depending on rainfall and possible groundwater recharge or pumping activity in the site vicinity.

7.0 LABORATORY TESTING

7.1 INTRODUCTION

Laboratory testing on samples of the soils obtained from the borings was performed by LCI in accordance with ASTM specifications. Relatively undisturbed and disturbed soil samples obtained from the borings were tested in the laboratory to determine in-situ moisture content and in-place dry density, plasticity/expansive characteristics, sulfate content, and shear strength. The results of moisture content and dry density testing are indicated on the boring logs in Appendix A. The results of all other laboratory testing are presented in the following sections and in Appendix B. Brief descriptions of the laboratory testing performed are presented below.

7.2 In-Situ Moisture Content and Dry Density

7.2.1 In-Situ Moisture Content

The in-situ moisture content of the soils was determined in accordance with the ASTM D-2216-92 Test Method. This method involves obtaining the moist weight of the sample and then drying the sample to obtain its dry weight. The moisture content is calculated by taking the difference between the wet and dry weights, dividing it by the dry weight of the sample, and expressing the result as a percentage.

7.2.2 In-Situ Dry Density

In-situ dry density testing was performed in accordance with the ASTM D-2937-83 Test Method. This method involves obtaining a relatively undisturbed soil sample by driving a thin-walled cylinder into the soil to determine the dry weight and volume of the sample. Simple computations are then performed to determine the dry unit weight of the soil, generally referred to as the in-situ density of that material. The results of the in-situ moisture content and dry density testing are presented in Figures B-1 and B-2 shown in Appendix B.

7.3 Atterberg Limits

7.3.1 Liquid Limit

The liquid limit is determined by performing trials in which a portion of the specimen is spread into a brass cup, divided in two (2) with a grooving tool, and allowed to flow together by repeatedly dropping the cup in a standard mechanical device. The multi-point method involves a series of trials over a range of moisture contents. The liquid limit (moisture content at which the soil groove closes for a distance of ½-inch in 25 blows) is determined by the plotted data.

7.3.2 Plastic Limit

The plastic limit is determined by alternately pressing together and rolling a portion of the plastic soil into a 1/8-inch diameter thread until the moisture content is reduced to a point at which the thread crumbles and is no longer able to be pressed together and rerolled into a 1/8-inch diameter thread. The moisture content at this stage is reported as the plastic limit.

7.3.3 Plasticity Index

The Plasticity Index is calculated as the difference between the liquid limit and the plastic limit. The results of Atterberg Limits tests are presented below in Table 1 and in Figures B-3 and B-4 shown in Appendix B.

Table 1 – Atterberg Limits Test Results

Boring Number and Depth	Liquid Limit (LL) %	Plastic Limit (PL) %	Plasticity Index (PI) %	Plasticity Characteristics
BA-1 at 8.5 feet	70	39	31	High
BA-2 at 18.5 feet	66	42	24	High

- *Plasticity Index = Liquid Limit – Plastic Limit*

7.4 DIRECT SHEAR

Direct shear testing was performed on selected samples in accordance with the ASTM D-3080-90 Test Method on relatively undisturbed ring samples. This method consists of placement of the soil sample in a direct shear device, application of a predetermined normal stress, provision for wetting or draining of the soil specimen, or both, consolidation of the specimen under the normal stress, and then shearing the specimen at a constant rate of shearing deformation. The shearing force and horizontal displacements are measured and recorded as the soil specimen is sheared. The shearing is continued well beyond the point of maximum stress until the stress reaches a constant or residual value. Three (3) samples of the same material are sheared at different confining pressures. By plotting the shear stress versus the confining pressure for the samples, a best-fit straight line drawn through the data yields the angle of internal friction and the apparent cohesion of the material. LCI performed two (2) direct shear tests on selected samples. Based on ultimate strength values, the test results indicated angles of internal friction (ǿ) ranging from 35 to 37 degrees and cohesion (c') of 80 to 215 pounds per square foot (psf). Plots of direct shear testing, values of cohesion, and the angle of friction are presented in Figures B-5, and B-6 in Appendix B. The results are also summarized in Table 2.

Table 2 – Direct Shear Test Results

Boring No. and Depth	Ultimate Cohesion (psf)	Ultimate Friction Angle (degrees)
BA-1 @ 6.0 feet	213	35
BA-2 @ 6.0 feet	82	37

7.4.1 Shear Strength Parameters for Slope Stability Analyses

LCI reviewed the test results obtained by Converse and the test results indicate the underlying bedrock exhibits an angle of internal friction (ǿ) of 25 to 33 degrees and cohesion (c') of 600 to 1,200 psf. We concurred with LCI's selection of using the shear strength parameters for the slope stability analyses. The shear strength parameters are shown below in Table 3.

Table 3 – Shear Strength Parameters

Boring No. and Depth	Ultimate Cohesion (psf)	Ultimate Friction Angle (degrees)
Colluvium/Weathered Bedrock	100	34
Bedrock	600	31

7.5 Sulfate Content

Testing of the sulfate content of the subgrade soils was performed in the laboratory by LCI on selected samples. This method is used for determination of the sulfate content of soils and waters. In this test method, the sulfate ion is precipitated with barium chloride, in an acidic medium, to barium sulfate crystals of uniform size. The barium sulfate present in suspension is determined by a measurement of its turbidity and comparison with a known standardization curve. The results are used to determine the corrosive nature of the environment for concrete structures, as well as for other purposes. The soil sulfate content detected in the samples collected on BA-1 @ 1.0 feet and BA-2 @ 0-5 feet are 225 parts per million (ppm) and 3750 ppm, respectively. The sulfate content test results are considered mildly and moderately corrosive to ferrous metal. Type V Portland cement may be used for concrete in contact with the subgrade soils. The results are shown in Figure B-7 in Appendix B.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 General Conclusions

The surficial slope instability occurred during the winter season of 2004-2005 in the region located between the existing building structures. The slope instability was exhibited as shallow slumping, sloughing, and erosion damage of the surficial materials. As demonstrated in previous geotechnical studies (performed by Converse and LCI), the materials that comprise the slope exhibit adequate shear strength characteristics with regard to global stability, but the material is prone to shallow slumps and erosion within the surficial zone that is subjected to weathering and seasonal moisture changes. Several techniques are available to repair and restore the surficial instability; however, every stabilization method varies in the cost and the expected future performance of the slope.

Based on our field observations, our analysis of laboratory testing results, the performance of required slope stability evaluations, and our engineering judgment, it is our opinion that the construction of the selected stabilization method provided below for repairing the surficial slope instability at the subject site is feasible. Provided the recommendations presented in this report are implemented during the construction of the selected stabilization method. Rankings were made based on attributes such as the following:

- *Constructability;*
- *Favorable flexibility and drainage characteristics;*
- *Probable costs;*
- *Quality of onsite and readily available local import soil materials;*

- *During compaction operations;*
- *During construction and installation of gabion walls, block walls, and shotcrete;*
- *During the installation and load testing of soil nails;*
- *During construction of drainage systems; and*
- *When any unusual conditions are encountered.*

It is the responsibility of the City of Torrance's authorized representative to review the recommendations made by GEI and to authorize the Contractor to perform such work as required to comply with such recommendations. The Contractor and/or City of Torrance's representative shall have the responsibility to inform GEI of the starting date of construction and the anticipated period during which testing and/or observation by the Soils Engineer and/or his representative will be needed. Any backfill performed without testing as specified by the Soils Engineer and/or his representative and the Los Angeles County Grading Code cannot be approved or certified by the Soils Engineer and/or his representative.

11.0 REFERENCES

California Department of Conservation (2002), California Geological Survey, available: http://www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html.

California Division of Mines and Geology, (1997), Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117, p.74.

California Division of Mines and Geology, (1975), Recommended Guidelines for Determining the Maximum Credible and the Maximum Probable Earthquakes, Note 43.

California Division of Mines and Geology, 1998, Seismic Hazard Evaluation of Torrance 7.5-Minute Quadrangle, Los Angeles County, California. Open-File Report 98-26.

CDMG (1975), "Recommended Guidelines for Determining the Maximum Credible and the Maximum Probable Earthquakes," Technical Note No. 43, California Division of Mines and Geology, Sacramento, California, 1p.

Google Earth T mapping service.

Leighton and Associates, (2005), Geotechnical Investigation of Slope Instability at the Walteria Reservoir, Crenshaw Boulevard, Torrance, California, Project No. 600920-001, dated October 19, 2005.

Saucedo G.J, Greene H.G., Kennedy M.P, and Bezore S.P., 2003, "Geologic Map of the Long Beach 30' x 60' Quadrangle, California Version 1.0", available http://www.consrv.ca.gov/cgs/rghm/pshamap/pshamain.html.

Treiman, J.A., and Lundberg, M.Matthew, compilers, 1999, Fault number 127b, Newport-Inglewood-Rose Canyon fault zone, south Los Angeles Basin section, in Quaternary fault and fold database of the United States: U.S. Geological Survey website, http://earthquakes.usgs.gov/regional/qfaults, accessed 04/29/2009 10:45 AM.

Treiman, J.Jerome, and Lundberg, M.Matthew, compilers, 1998, Fault number 128b, Palos Verdes fault zone, Palos Verdes Hills section, in Quaternary fault and fold database.

ILLUSTRATIONS

(Not to scale)

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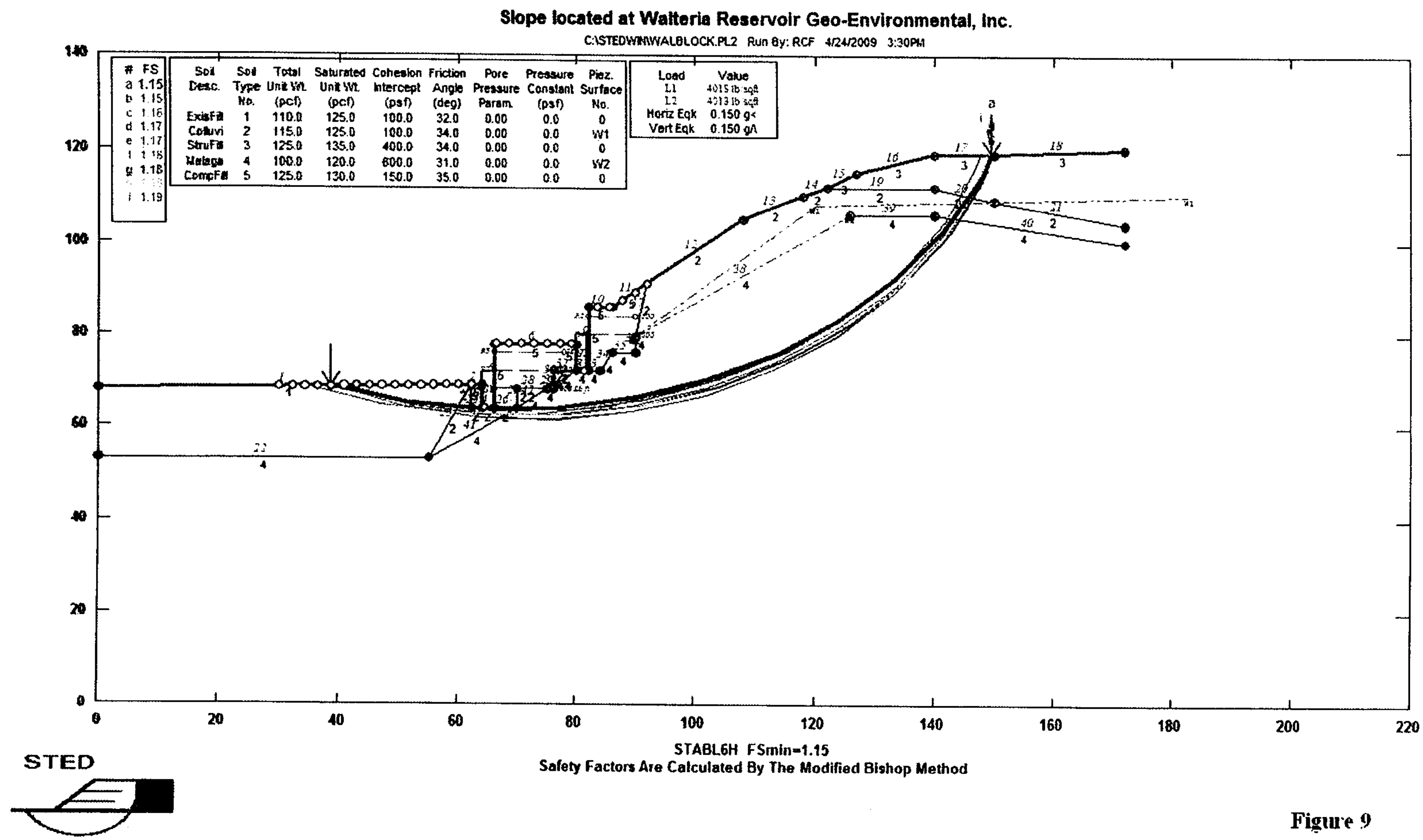
LEGEND:

○ ***Project Site Location***

VICINITY MAP

Geotechnical Investigation Report
Slope Stabilization at Walteria Reservoir
City of Torrance, Los Angeles County, California

FIGURE 1	
DRAWN BY:	RCF
APPROVED BY:	FHS
PROJECT NO:	172-43
DATE:	4/24/09



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Safety Factors Are Calculated By The Modified Bishop Method

Figure 9

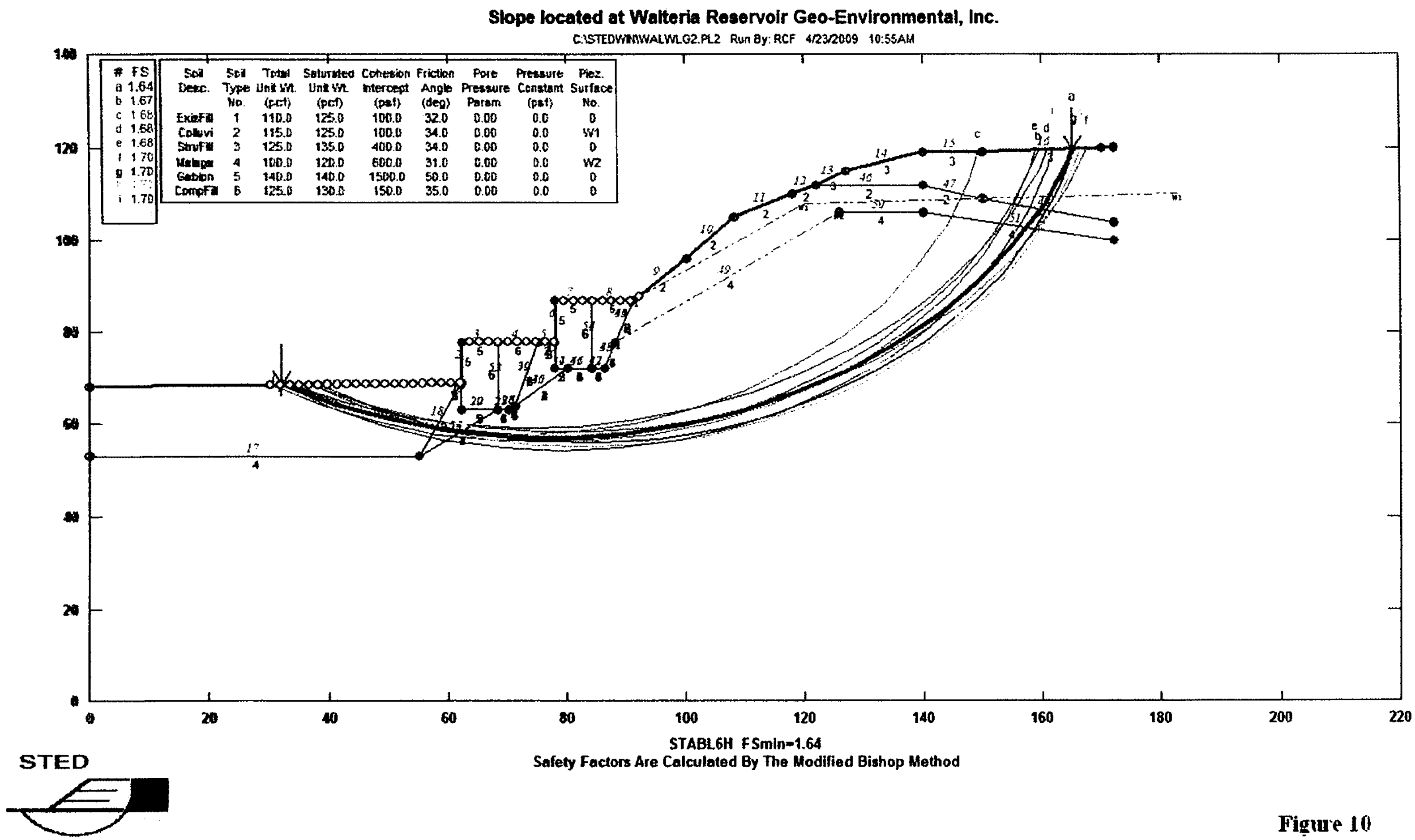
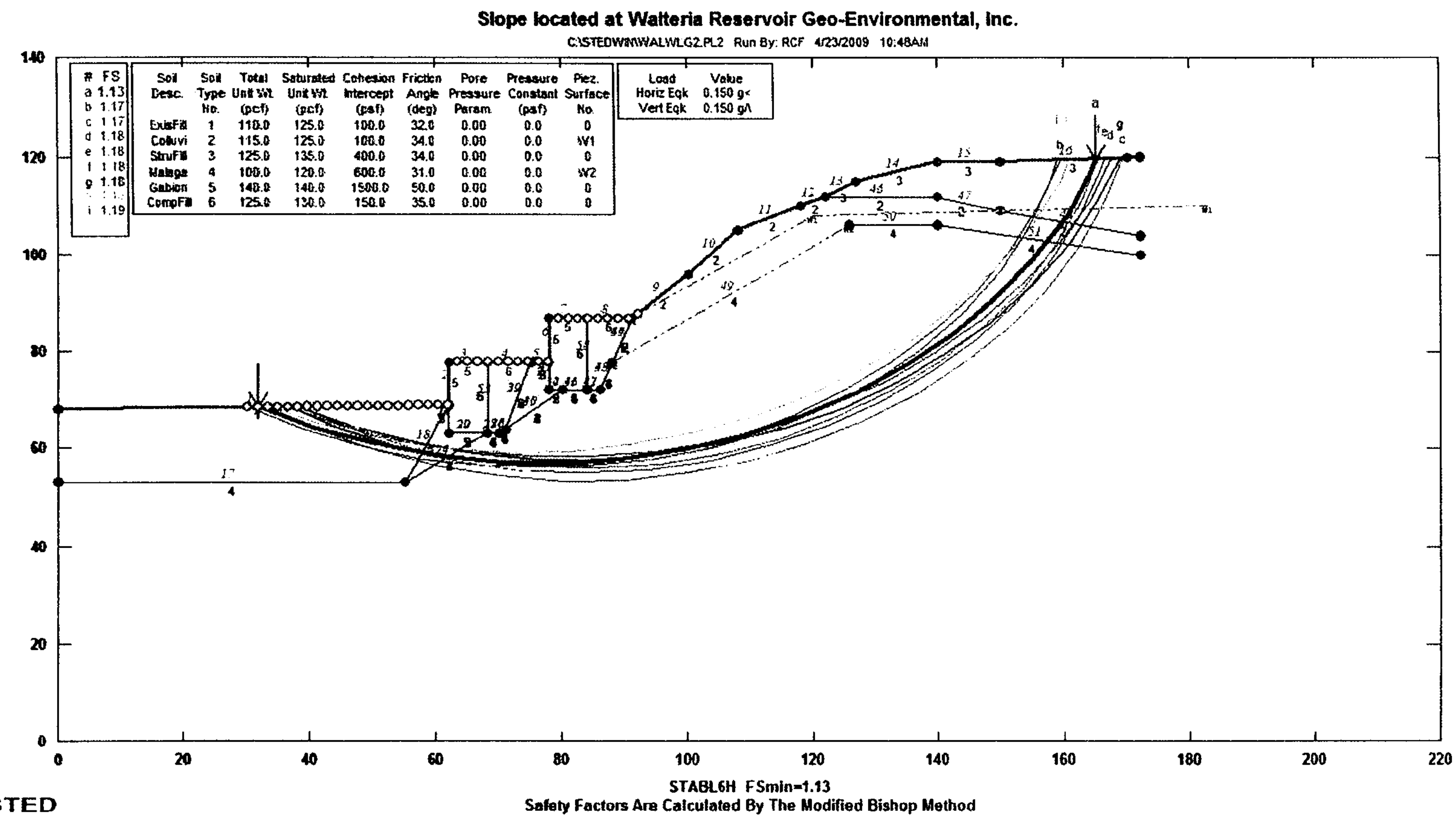

Slope located at Walteria Reservoir Geo-Environmental, Inc.
C:\STEDWIN\WALWLG2.PL2 Run By: RCF 4/23/2009 10:55AM
FS
a 1.64
b 1.67
c 1.68
d 1.68
e 1.68
f 1.70
g 1.70
i 1.70
Soil Desc. | Soil Type No. | Total Unit Wt. (pcf) | Saturated Unit Wt. (pcf) | Cohesion Intercept (psf) | Friction Angle (deg) | Pore Pressure Param | Pressure Constant (psf) | Piez. Surface No.
ExisFill 1 110.0 125.0 100.0 32.0 0.00 0.0 0
Colluvi 2 115.0 125.0 100.0 34.0 0.00 0.0 W1
StruFill 3 125.0 135.0 400.0 34.0 0.00 0.0 0
Malaga 4 100.0 120.0 600.0 31.0 0.00 0.0 W2
Gabion 5 140.0 140.0 1500.0 50.0 0.00 0.0 0
CompFill 6 125.0 130.0 150.0 35.0 0.00 0.0 0
STABL6H FSmin=1.64
Safety Factors Are Calculated By The Modified Bishop Method
STED

Figure 10

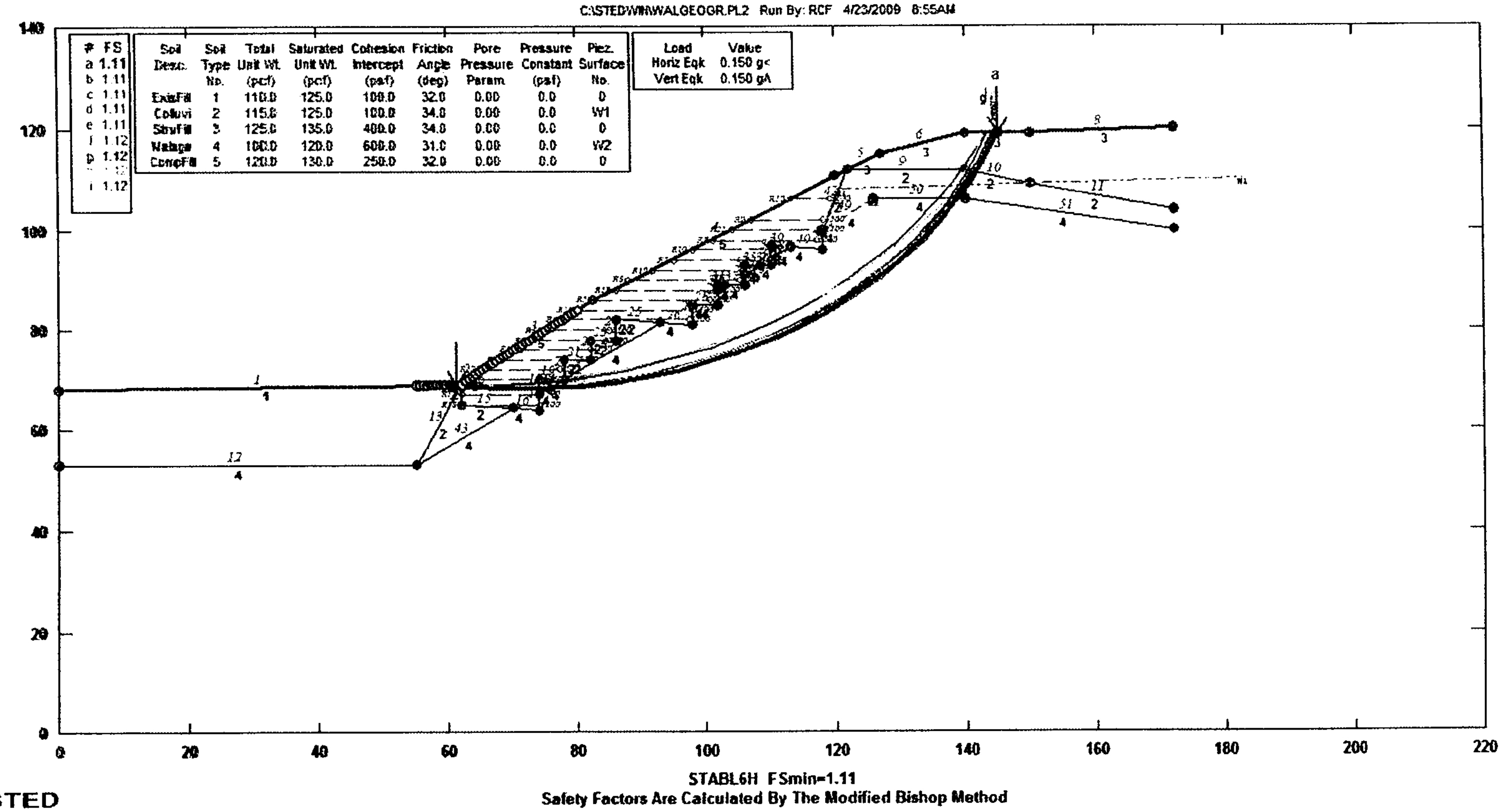


STED

Figure 11

Slope located at Walteria Reservoir Geo-Environmental, Inc.

C:\STEDWIN\WALGEOGR.PL2 Run By: RCF 4/23/2009 8:55AM



STED

Figure 13

APPENDIX A

LCI BORING LOGS

GEOTECHNICAL BORING LOG BA-1

Date	7-21-05	**Sheet**	1 **of** 2
Project	Torrance	**Project No.**	600920-001
Drilling Co.	Redman	**Type of Rig**	CME-75
Hole Diameter	8"	**Drive Weight**	140 lb autohammer **Drop** 30"
Elevation Top of Hole	215'	**Location**	See Boring Location Map

Logged By CDL
Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
215	0								@ 0': 4" of Asphalt over 2.5" aggregate base	
				R-1	17			MLS	FILL: @ 1': Sandy SILT, very fine grained sand; moist; medium dense; trace thin roots; trace oxidization; dark brown	
				R-2	10			MLS	@ 3.5': Sandy SILT, predominately very fine grained sand, trace very coarse sand, trace angular small gravel; moist; soft to medium stiff; asphalt in sampler head; dark brown mottled with medium brown	
210	5								BEDROCK?	
				R-3	11			CH	@ 6': CLAY; moist; soft; heavily oxidized; small cobble in sampler head; mottled dark blackish brown and medium brown	
				R-4	7			CH	@ 8.5': CLAY; wet; soft; medium to high plasticity; trace gypsum; abundant (40%) highly decomposed organic matter in head of sampler, dark blackish brown	
205	10									
				R-5	10			CH	@ 13.5': CLAY with sand, very fine grained sand; wet; soft; trace gypsum; dark brown mottled with medium brown	
200	15									
				S-1	28			CH	@ 18.5': CLAY with sand, very fine grained sand; wet; soft; trace gypsum; dark brown mottled with medium brown @ 19.0': clayey GRAVEL, 1" thick, fine angular to sub-angular; wet @19.1': sandy CLAY, very fine grained sand; slightly moist; slight sulfur odor; dark blackish brown	
195	20									
				S-2	12			CH	@ 23.5': CLAY with some sand, very fine grained sand; slightly moist; medium stiff; strong sulfur odor; very small tan specs grading minimally with depth in dark brown matrix	
190	25									
				S-3	15			CH	@ 28.5': CLAY with some sand, very fine grained sand, sand resides in pockets slightly mottled from 28.5 to 29.0; slightly moist; medium stiff; tan specs are as above; dark blackish brown	
185	30									

SAMPLE TYPES:		TYPE OF TESTS:	
S SPLIT SPOON	G GRAB SAMPLE	DS DIRECT SHEAR	SA SIEVE ANALYSIS
R RING SAMPLE	C CORE SAMPLE	MD MAXIMUM DENSITY	SE SAND EQUIVALENT
B BULK SAMPLE		CN CONSOLIDATION	EI EXPANSION INDEX
T TUBE SAMPLE		CR CORROSION	RV R VALUE

LEIGHTON CONSULTING, INC.

Figure A-1

GEOTECHNICAL BORING LOG BA-1

Date	7-21-05	Sheet	2 of 2
Project	Torrance	Project No.	600920-001
Drilling Co.	Redman	Type of Rig	CME-75
Hole Diameter	8"	Drive Weight	140 lb autohammer — Drop 30"
Elevation Top of Hole	215'	Location	See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION Logged By CDL Sampled By CDL	Type of Tests
185	30								Total depth: 30' Groundwater encoutered at approximately 8.5' Boring backfilled with soil cuttings and patched with asphalt	
180	35									
175	40									
170	45									
165	50									
160	55									
155	60									

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

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- EI EXPANSION INDEX
- RV R VALUE

LEIGHTON CONSULTING, INC.

Figure A-1a

GEOTECHNICAL BORING LOG BA-2

Date 7-21-05 | Sheet 1 of 2
Project Torrance | Project No. 600920-001
Drilling Co. Redman | Type of Rig CME-75
Hole Diameter 8" | Drive Weight 140 lb autohammer | Drop 30"
Elevation Top of Hole 221' | Location See Boring Location Map

Logged By CDL
Sampled By CDL

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION	Type of Tests
220	0			Bulk-1 @0'-5'					@0': 4" of Asphalt over 2.5" of aggregate base	
				R-1	15			MLS	**FILL:** @ 1': Sandy SILT, predominately very vine grained sand, trace coarse grained sand, trace fine angular gravel; moist; medium dense; some oxidization; dark brown	
				R-2	29			CH	@ 3.5': CLAY; very moist; soft; dark blackish brown; grades to a clayey SAND, fine to coarse grained sand; moist; medium dense to dense; low to medium plasticity; medium brown mottled with orange and some black	
215	5			R-3	12			CL	**BEDORCK?** @ 6': Silty CLAY with some sand, very fine grained sand, mottled among silty clay; very moist; soft; low to medium plasticity; oxidized; light brown mottled with red and tan	
				R-4	9			CH	@ 8.5': CLAY with some sand, very fine grained sand; very moist; soft; trace gypsum; moderately oxidized; reddish brown	
210	10									
				R-5	19			CH	@ 13.5': CLAY; dry to slightly moist clay nodules within very moist matrix; medium stiff; highly oxidized; mottled red, orange, brown and some grey	
205	15									
				R-6	77/8"			CH	@ 18.5': CLAY; wet; very dense; trace medium angular to sub-angular gravel; medium to high plasticity; thin vein of yellowish granular material; sulfur odor; blackish brown	
200	20									
				S-1	18			CH	@ 23.5': CLAY; wet; slightly stiff; medium to high plasticity; sulfur odor; blackish brown	
195	25									
				S-2	16			CH	@ 28.5': CLAY with some sand, very fine grained sand; slightly moist to moist; soft to slightly stiff; medium plasticity; sulfur odor; trace white specs within blackish matrix	
	30									

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

TYPE OF TESTS:
DS DIRECT SHEAR
MD MAXIMUM DENSITY
CN CONSOLIDATION
CR CORROSION
SA SIEVE ANALYSIS
SE SAND EQUIVALENT
EI EXPANSION INDEX
RV R VALUE

LEIGHTON CONSULTING, INC.

Figure A-2

GEOTECHNICAL BORING LOG BA-2

Date 7-21-05 | Sheet 2 of 2

Project Torrance | Project No. 600920-001

Drilling Co. Redman | Type of Rig CME-75

Hole Diameter 8" | Drive Weight 140 lb autohammer | Drop 30"

Elevation Top of Hole 221' | Location See Boring Location Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	DESCRIPTION (Logged By CDL; Sampled By CDL)	Type of Tests
	30									
190										
	35									
185									Total depth: 30' Groundwater encoutered at approximately 18.5' Boring backfilled with soil cuttings and patched with asphalt	
	40									
180										
	45									
175										
	50									
170										
	55									
165										
	60									

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

TYPE OF TESTS:
- DS DIRECT SHEAR
- MD MAXIMUM DENSITY
- CN CONSOLIDATION
- CR CORROSION
- SA SIEVE ANALYSIS
- SE SAND EQUIVALENT
- EI EXPANSION INDEX
- RV R VALUE

LEIGHTON CONSULTING, INC.

Figure A-2a

APPENDIX B

LCI LABORATORY TEST RESULTS

Boring No.	BA-1	BA-1	BA-1	BA-1	BA-1	BA-1	BA-1	BA-2
Sample No.	R-1	R-2	R-4	R-5	S-1	S-2	S-3	R-2
Depth (ft.)	1.0	3.5	8.5	13.5	18.5	23.5	28.5	3.5
Sample Type	Drive	Drive	Drive	Drive	SPT	SPT	SPT	Drive
Soil Identification	Brown sandy silty clay s(CL-ML)	Brown clayey sand with gravel (SC)g	Brown elastic silt (MH)	Brown lean clay (CL)	Dark brown silty clay (CL-ML)	Dark brown silty clay (CL-ML)	Dark brown silty clay (CL-ML)	Dark brown lean clay (CL) / Brown sandy lean clay s(CL)
Pocket Penetrometer (tons/ft^2)	3.00	>4.5 / 2.0	0.75	1.50				>4.5
Weight Soil + Rings / Tube (g)	879.50	892.31	978.08	789.54				1156.70
Weight of Rings / Tube (g)	222.00	222.00	266.40	222.00				266.40
Average Length (in.)	5.00	5.00	6.00	5.00				6.00
Average Diameter (in.)	2.416	2.416	2.416	2.416				2.416
Wet. Wt. of Soil + Cont. (g)	217.25	184.68	195.41	171.09	311.24	288.64	315.15	195.60
Dry Wt. of Soil + Cont. (g)	205.24	170.45	138.89	127.54	223.01	197.64	200.51	162.93
Weight of Container (g)	53.37	50.66	52.79	53.53	53.94	52.62	54.40	53.02
Container No.								
Wet Density	109.3	111.4	98.6	94.3				123.3
Moisture Content (%)	**7.9**	**11.9**	**65.6**	**58.8**	**52.2**	**62.7**	**78.5**	**29.7**
Dry Density (pcf)	**101.3**	**99.6**	**59.5**	**59.4**				**95.0**
Degree of Saturation (%)	32.1	46.3	96.7	86.4				103.8

Leighton

MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Walteria Reservoir
Project No.: 600920-001
Client Name: LCI / Irvine
Tested By: FT   Date: 07/27/05

M & D BA-1 & BA-2

Figure B-1

Boring No.	BA-2	BA-2	BA-2	BA-2	BA-2	BA-2		
Sample No.	R-3	R-4	R-5	R-6	S-1	S-2		
Depth (ft.)	6.0	8.5	13.5	18.5	23.5	28.5		
Sample Type	Drive	Drive	Drive	Drive	SPT	SPT		
Soil Identification	Brown lean clay with sand (CL)s	Brown lean clay (CL)	Brown sandy lean clay s(CL) / lean clay (CL)	Black elastic silt (MH)	Dark brown lean clay (CL)	Dark brown lean clay (CL)		
Pocket Penetrometer (tons/ft^2)	1.75 / 3.5	1.00	2.0 / 1.0	>4.5				
Weight Soil + Rings / Tube (g)	866.05	780.34	1034.30					
Weight of Rings / Tube (g)	222.00	222.00	266.40					
Average Length (in.)	5.00	5.00	6.00					
Average Diameter (in.)	2.416	2.416	2.416					
Wet. Wt. of Soil + Cont. (g)	160.88	132.54	190.63	197.84	264.33	304.90		
Dry Wt. of Soil + Cont. (g)	128.42	97.31	142.10	149.78	174.87	225.29		
Weight of Container (g)	53.53	51.27	51.05	53.87	53.81	53.88		
Container No.								
Wet Density	107.0	92.8	106.4					
Moisture Content (%)	**43.3**	**76.5**	**53.3**	**50.1**	**73.9**	**46.4**		
Dry Density (pcf)	**74.7**	**52.6**	**69.4**					
Degree of Saturation (%)	93.1	93.6	100.7					

Leighton

MOISTURE & DENSITY of SOILS

ASTM D 2216 & ASTM D 2937

Project Name: Walteria Reservoir
Project No.: 600920-001
Client Name: LCI / Irvine
Tested By: FT Date: 07/27/05

M & D BA-1 & BA-2 **Figure B-2**

Leighton

ATTERBERG LIMITS

ASTM D 4318

Project Name:	Walteria Reservoir	Tested By:	FT	Date:	08/03/05
Project No. :	600920-001	Input By:	LF	Date:	08/04/05
Boring No.:	BA-1	Checked By:	LF		
Sample No.:	R-4	Depth (ft.)	8.5		
Soil Identification:	Brown elastic silt (MH)				

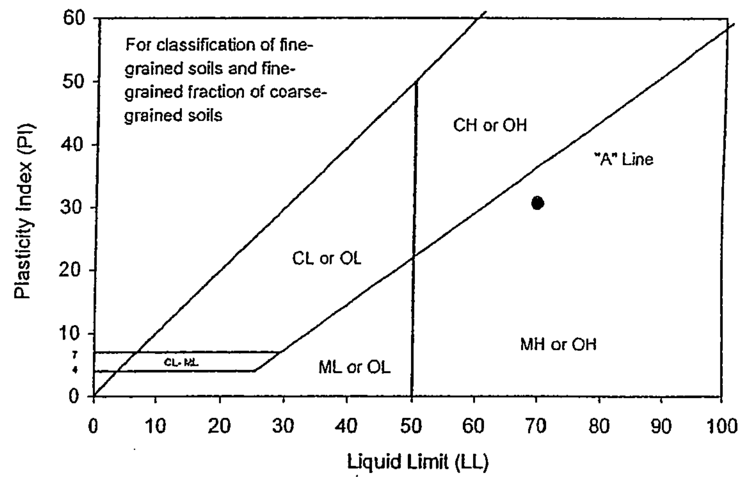
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]				17	22	26
Wet Wt. of Soil + Cont. (g)	38.48	37.57		47.22	43.33	55.46
Dry Wt. of Soil + Cont. (g)	34.62	33.89		37.63	35.60	45.51
Wt. of Container (g)	24.89	24.48		24.78	24.83	31.14
Moisture Content (%) [Wn]	39.67	39.11		74.63	71.77	69.24

Liquid Limit	**70**
Plastic Limit	**39**
Plasticity Index	**31**
Classification	**MH**

PI at "A" - Line = 0.73(LL-20) | 36.5

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.12}$



PROCEDURES USED

- [ ] Wet Preparation Multipoint - Wet
- [X] Dry Preparation Multipoint - Dry
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

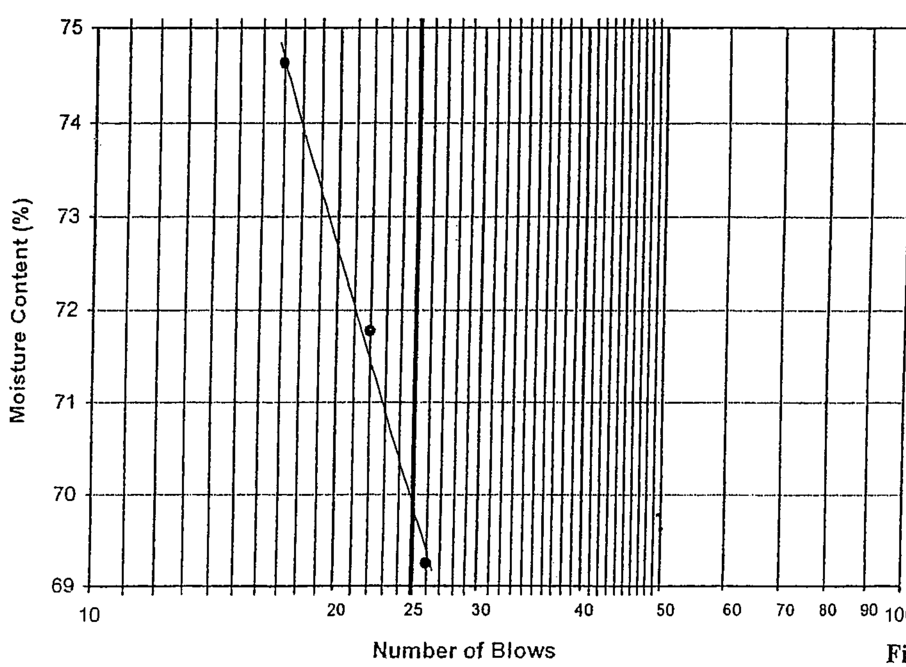


Figure B-3

ATTERBERG LIMITS

ASTM D 4318

Leighton

Project Name:	Walteria Reservoir	Tested By:	CMC	Date:	08/02/05
Project No. :	600920-001	Input By:	LF	Date:	08/03/05
Boring No.:	BA-2	Checked By:	LF		
Sample No.:	R-6	Depth (ft.)	18.5		
Soil Identification:	Black elastic silt (MH)				

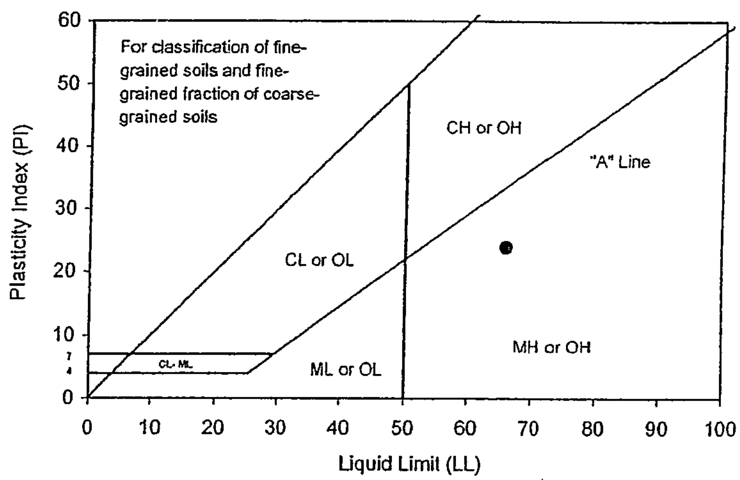
TEST	PLASTIC LIMIT		LIQUID LIMIT			
NO.	1	2	1	2	3	4
Number of Blows [N]			35	23	13	
Wet Wt. of Soil + Cont. (g)	27.64	35.17	44.98	41.75	48.11	
Dry Wt. of Soil + Cont. (g)	26.59	34.12	39.69	37.66	41.27	
Wt. of Container (g)	24.06	31.67	31.42	31.60	31.54	
Moisture Content (%) [Wn]	41.50	42.86	63.97	67.49	70.30	

Liquid Limit	**66**
Plastic Limit	**42**
Plasticity Index	**24**
Classification	**MH**

PI at "A" - Line = 0.73(LL-20) 33.58

One - Point Liquid Limit Calculation

$LL = Wn(N/25)^{0.12}$



PROCEDURES USED

- [ ] Wet Preparation Multipoint - Wet
- [X] Dry Preparation Multipoint - Dry
- [X] Procedure A Multipoint Test
- [ ] Procedure B One-point Test

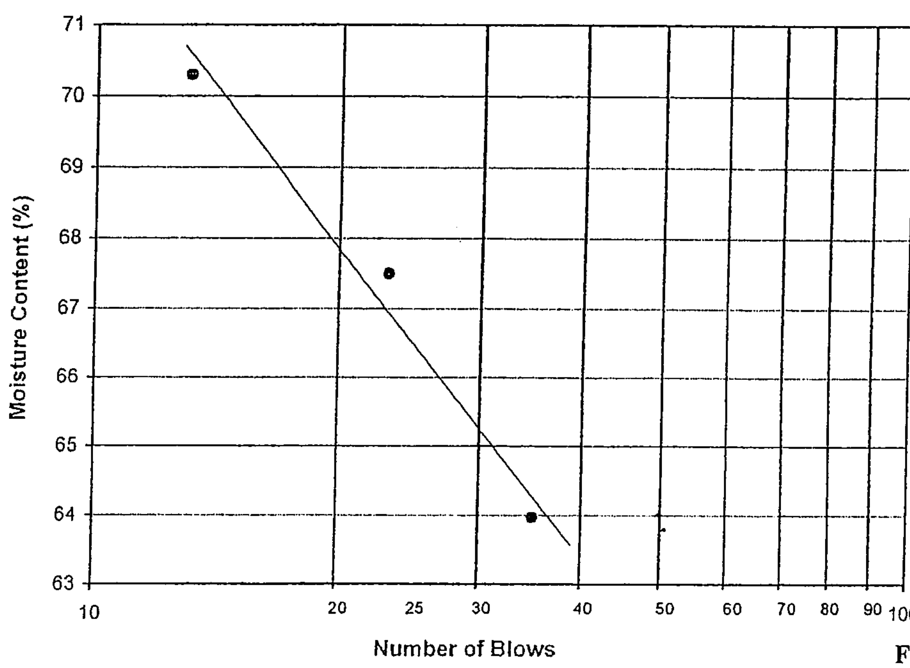
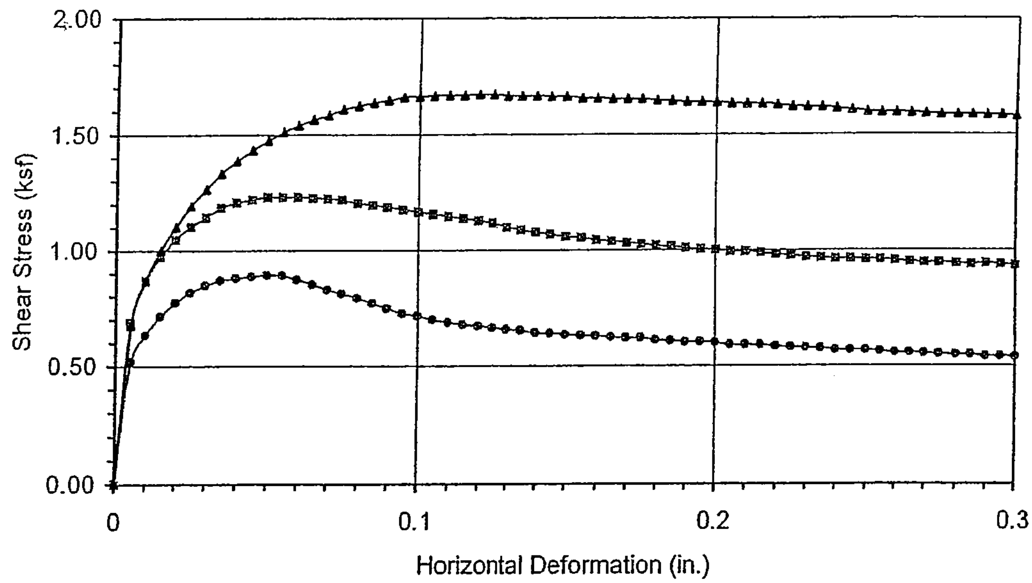
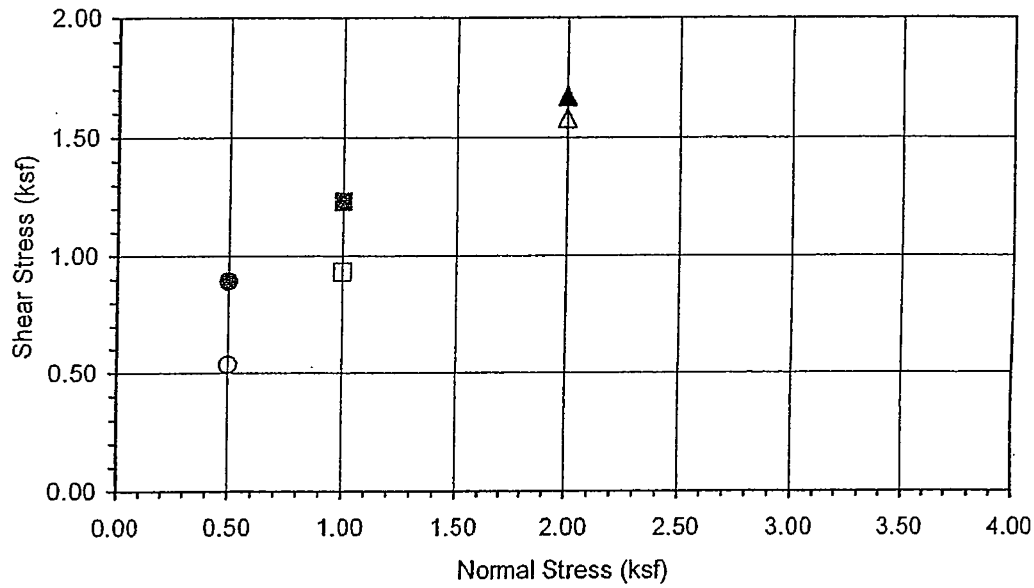


Figure B-4





Boring No.	**BA-1**
Sample No.	**R-3**
Depth (ft)	**6**
Sample Type: Drive	
Soil Identification: Brown lean clay (CL)	

Normal Stress (kip/ft²)	0.500	1.000	2.000
Peak Shear Stress (kip/ft²)	● 0.892	■ 1.232	▲ 1.671
Shear Stress @ End of Test (ksf)	○ 0.536	□ 0.932	△ 1.578
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	30.53	30.53	30.53
Dry Density (pcf)	83.0	83.5	83.7
Saturation (%)	80.0	80.9	81.4
Soil Height Before Shearing (in.)	1.0017	0.9967	0.9928
Final Moisture Content (%)	44.1	42.7	41.1

Leighton

DIRECT SHEAR TEST RESULTS

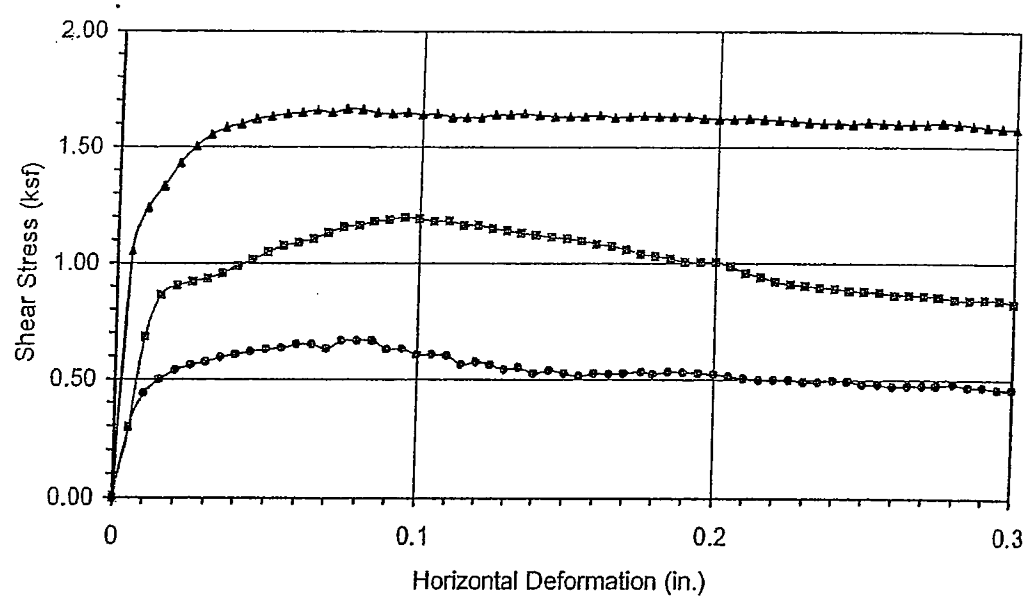
Consolidated Undrained

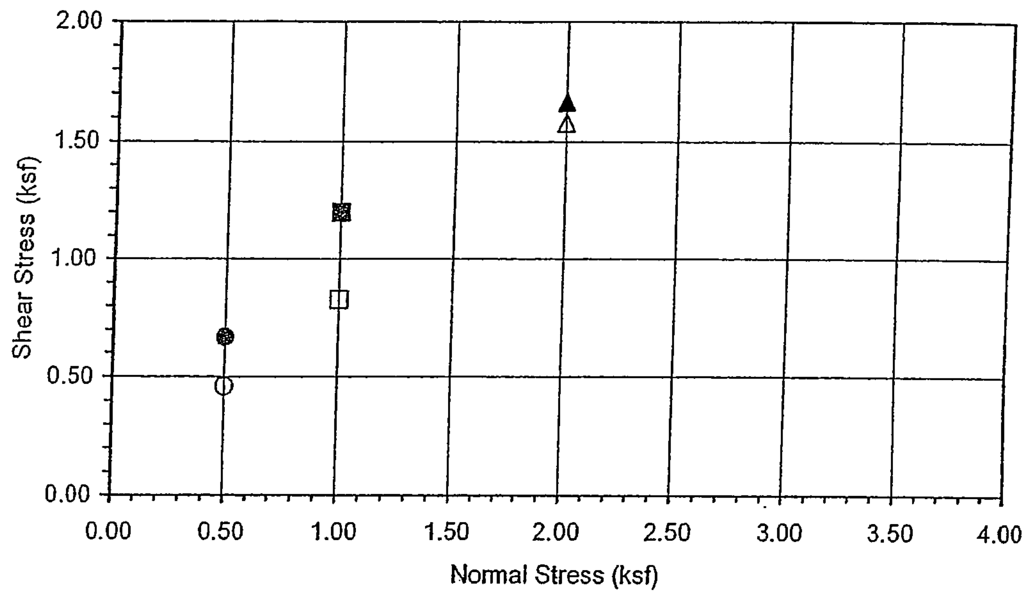
Project No.: 600920-001

Walteria Reservoir

07-05

Figure B-5





Boring No.	**BA-2**
Sample No.	**R-3**
Depth (ft)	**6**

Sample Type:

Drive

Soil Identification:
Brown lean clay (CL)

Normal Stress (kip/ft^2)	0.500	1.000	2.000
Peak Shear Stress (kip/ft^2)	● 0.667	■ 1.197	▲ 1.665
Shear Stress @ End of Test (ksf)	○ 0.458	□ 0.826	△ 1.578
Deformation Rate (in./min.)	0.0500	0.0500	0.0500
Initial Sample Height (in.)	1.000	1.000	1.000
Diameter (in.)	2.415	2.415	2.415
Initial Moisture Content (%)	43.34	43.34	43.34
Dry Density (pcf)	75.6	77.0	76.9
Saturation (%)	95.1	98.3	98.2
Soil Height Before Shearing (in.)	1.0000	0.9947	0.9849
Final Moisture Content (%)	48.0	44.2	41.6

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DIRECT SHEAR TEST RESULTS
Consolidated Undrained

Project No.: 600920-001

Walteria Reservoir

07-05

Figure B-6

Leighton

Soluble Sulfates
(Hach Sulfate Test Kit)

Project Name: Walteria Reservoir
Project Number: 600920-001
Date: 08/02/05
Technician: FT

Sample Identification		Dilution	Reading (PPM) Tube Reading		H_2O:Soil Ratio	% Sulfates
Boring No.:	BA-1	3 :1	75	X	3	**0.0225**
Sample No:	R-1		=	225		
Depth (ft.):	1					
Boring No.:	BA-2	3 :1	125	X	30	**0.3750**
Sample No:	Bulk-1		=	3750		
Depth (ft.):	0-5					
Boring No.:						
Sample No:						
Depth (ft.):						
Boring No.:						
Sample No:						
Depth (ft.):						
Boring No.:						
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Sample No:						
Depth (ft.):						
Boring No.:						
Sample No:						
Depth (ft.):						
Boring No.:						
Sample No:						
Depth (ft.):						

Figure B-7

APPENDIX C

SLOPE STABILITY ANALYSES

WALTERIB.OUT
** PCSTABL5M **

by
Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	4/23/2009
Time of Run:	11:12AM
Run By:	RCF
Input Data Filename:	C:walterib.
Output Filename:	C:walterib.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:walterib.PLT

PROBLEM DESCRIPTION Slope located at Walteria Reservoir
Geo-Environmental, Inc.

BOUNDARY COORDINATES

13 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	68.00	62.00	69.00	1
2	62.00	69.00	69.00	75.00	2
3	69.00	75.00	75.00	80.00	2
4	75.00	80.00	82.00	85.00	2
5	82.00	85.00	93.00	95.00	2
6	93.00	95.00	100.00	100.00	2
7	100.00	100.00	108.00	105.00	2
8	108.00	105.00	118.00	110.00	2
9	118.00	110.00	122.00	112.00	2
10	122.00	112.00	127.00	115.00	3
11	127.00	115.00	140.00	119.00	3
12	140.00	119.00	150.00	119.00	3
13	150.00	119.00	172.00	120.00	3
14	122.00	112.00	140.00	112.00	2
15	140.00	112.00	150.00	109.00	2
16	150.00	109.00	172.00	104.00	2
17	.00	53.00	55.00	53.00	4
18	55.00	53.00	62.00	69.00	2
19	55.00	53.00	126.00	106.00	4
20	126.00	106.00	140.00	106.00	4
21	140.00	106.00	172.00	100.00	4

1

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	110.0	125.0	100.0	32.0	.00	.0	1
2	115.0	125.0	100.0	34.0	.00	.0	1
3	125.0	135.0	400.0	34.0	.00	.0	0
4	100.0	120.0	600.0	31.0	.00	.0	2

1

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	66.00
2	61.00	68.00
3	86.00	88.00
4	120.00	108.00
5	183.00	110.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	55.00	52.00
2	126.00	106.00

1

A Critical Failure Surface Searching Method, Using A Random Technique For Generating Circular Surfaces, Has Been Specified.

1500 Trial Surfaces Have Been Generated.

30 Surfaces Initiate From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 30.00 ft.
and X = 70.00 ft.

Each Surface Terminates Between X = 110.00 ft.
and X = 170.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.65	69.56
2	72.45	71.55
3	81.80	75.10
4	90.46	80.11
5	98.19	86.44
6	104.81	93.94
7	110.12	102.41
8	112.07	107.03

Circle Center At X = 55.5 ; Y = 130.3 and Radius, 61.1

*** .767 ***

Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	.4	5.9	.0	.0	.0	.0	.0	.0	.0
2	5.9	1593.3	.0	541.1	.0	.0	.0	.0	.0
3	3.5	2207.1	.0	810.5	.0	.0	.0	.0	.0
4	2.5	2148.0	.0	840.8	.0	.0	.0	.0	.0
5	6.8	7189.2	.0	2964.7	.0	.0	.0	.0	.0
6	.2	236.4	.0	109.2	.0	.0	.0	.0	.0
7	4.0	5129.4	.0	2328.0	.0	.0	.0	.0	.0
8	4.5	6483.3	.0	2940.2	.0	.0	.0	.0	.0
9	2.5	3936.7	.0	1826.1	.0	.0	.0	.0	.0
10	5.2	7913.8	.0	3407.3	.0	.0	.0	.0	.0
11	1.8	2597.6	.0	1222.9	.0	.0	.0	.0	.0
12	4.8	5955.0	.0	2542.5	.0	.0	.0	.0	.0
13	3.2	2856.8	.0	1147.6	.0	.0	.0	.0	.0
14	1.9	1093.7	.0	185.7	.0	.0	.0	.0	.0
15	.2	96.6	.0	.0	.0	.0	.0	.0	.0

16	1.9	408.2	.0	.0	.0	.0	.0	.0	.0

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	66.74	73.06
2	76.43	75.52
3	85.75	79.14
4	94.57	83.85
5	102.76	89.59
6	110.20	96.28
7	116.77	103.81
8	122.39	112.08
9	122.51	112.31

Circle Center At X = 51.2 ; Y = 154.4 and Radius, 82.9

*** .826 ***

1

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.92	72.36
2	75.39	75.58
3	84.44	79.82
4	92.98	85.02
5	100.90	91.13
6	108.10	98.07
7	114.50	105.75
8	116.98	109.49

Circle Center At X = 41.8 ; Y = 159.2 and Radius, 90.2

*** .852 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	75.83
2	79.89	77.33
3	89.34	80.59
4	98.04	85.52
5	105.70	91.95
6	112.07	99.66
7	116.93	108.40

8	117.35	109.68

Circle Center At X = 66.9 ; Y = 130.2 and Radius, 54.5

*** .861 ***

1

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	75.83
2	79.94	76.94
3	89.38	80.24
4	97.83	85.59
5	104.86	92.70
6	110.12	101.21
7	112.10	107.05

Circle Center At X = 70.1 ; Y = 120.0 and Radius, 44.2

*** .874 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.61	68.66
2	50.57	67.71
3	60.55	68.24
4	70.36	70.22
5	79.76	73.62
6	88.57	78.36
7	96.58	84.34
8	103.64	91.43
9	109.57	99.47
10	114.15	108.07

Circle Center At X = 52.0 ; Y = 135.7 and Radius, 68.0

*** .905 ***

1

Failure Surface Specified By 7 Coordinate Points

Point X-Surf Y-Surf

No.	(ft)	(ft)
1	69.18	75.15
2	78.58	78.58
3	87.41	83.27
4	95.53	89.11
5	102.76	96.02
6	108.99	103.84
7	110.37	106.19

Circle Center At X = 48.9 ; Y = 145.2 and Radius, 72.9

*** .947 ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.90	68.56
2	44.85	67.57
3	54.84	67.86
4	64.72	69.42
5	74.32	72.24
6	83.47	76.26
7	92.04	81.42
8	99.87	87.63
9	106.85	94.80
10	112.85	102.80
11	116.51	109.26

Circle Center At X = 47.6 ; Y = 145.5 and Radius, 78.0

*** .957 ***

1

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	67.55	73.76
2	76.75	77.68
3	85.61	82.32
4	94.08	87.64
5	102.10	93.61
6	109.62	100.20
7	116.60	107.36
8	119.37	110.69

Circle Center At X = 23.2 ; Y = 190.9 and Radius, 125.3

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        ***      .959    ***
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Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.10	71.66
2	74.22	75.76
3	83.08	80.40
4	91.65	85.55
5	99.90	91.21
6	107.80	97.34
7	115.32	103.93
8	122.43	110.96
9	124.97	113.78

Circle Center At X =   .6 ; Y = 227.2 and Radius, 168.4

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        ***      .962    ***
```

```
1

                Y          A     X     I     S          F     T

                 .00     26.40     52.80     79.20    105.60    132.00

  X       .00 +---------+---------*----W*---+---------+---------+
              -
              -
              -
              -
              -
        26.40 +
              -                        .
              -                     .  8
              -                     ...6
              -                   . ...8
              -                   .....6
  A     52.80 +                 .*.....8
              -                 ........
              -                  ......*.
              -                ........832
              -                .........1*4
              -               ..........8.2*
  X     79.20 +                ..........647.
              -              ............1829*
              -              ..............547W.
              -              ..............1829..*
              -              ................417..
              -               ................8237.*
  I    105.60 +               ..................410.
              -                ..................2341*1
              -               ......................836
              -                 ....................2.W*
```

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            -                  .......................*2
            -                  .....................*...*
S    132.00 +                   .........................
            -                    .........................
            -                     ..................*.*..*
            -                        .....................
            -                        ................*...*
            -                           ..................
     158.40 +                              ...............
            -                               ..............
            -                                  . .........
            -                                     **  ...*
            -
            -
F    184.80 +                                         W
            -
            -
            -
            -
            -
T    211.20 +
```

WALTERIB2.OUT

** PCSTABL5M **

by

Purdue University

1

--Slope Stability Analysis--
Simplified Janbu, Simplified Bishop
or Spencer`s Method of Slices

Run Date:	4/23/2009
Time of Run:	11:11AM
Run By:	RCF
Input Data Filename:	C:walterib.
Output Filename:	C:walterib.OUT
Unit:	ENGLISH
Plotted Output Filename:	C:walterib.PLT

PROBLEM DESCRIPTION Slope located at Walteria Reservoir
Geo-Environmental, Inc.

BOUNDARY COORDINATES

13 Top Boundaries
21 Total Boundaries

Boundary No.	X-Left (ft)	Y-Left (ft)	X-Right (ft)	Y-Right (ft)	Soil Type Below Bnd
1	.00	68.00	62.00	69.00	1
2	62.00	69.00	69.00	75.00	2
3	69.00	75.00	75.00	80.00	2
4	75.00	80.00	82.00	85.00	2
5	82.00	85.00	93.00	95.00	2
6	93.00	95.00	100.00	100.00	2
7	100.00	100.00	108.00	105.00	2
8	108.00	105.00	118.00	110.00	2
9	118.00	110.00	122.00	112.00	2
10	122.00	112.00	127.00	115.00	3
11	127.00	115.00	140.00	119.00	3
12	140.00	119.00	150.00	119.00	3
13	150.00	119.00	172.00	120.00	3
14	122.00	112.00	140.00	112.00	2
15	140.00	112.00	150.00	109.00	2
16	150.00	109.00	172.00	104.00	2
17	.00	53.00	55.00	53.00	4
18	55.00	53.00	62.00	69.00	2
19	55.00	53.00	126.00	106.00	4
20	126.00	106.00	140.00	106.00	4
21	140.00	106.00	172.00	100.00	4

1

ISOTROPIC SOIL PARAMETERS

4 Type(s) of Soil

Soil Type No.	Total Unit Wt. (pcf)	Saturated Unit Wt. (pcf)	Cohesion Intercept (psf)	Friction Angle (deg)	Pore Pressure Param.	Pressure Constant (psf)	Piez. Surface No.
1	110.0	125.0	100.0	32.0	.00	.0	1
2	115.0	125.0	100.0	34.0	.00	.0	1
3	125.0	135.0	400.0	34.0	.00	.0	0
4	100.0	120.0	600.0	31.0	.00	.0	2

1

2 PIEZOMETRIC SURFACE(S) HAVE BEEN SPECIFIED

Unit Weight of Water = 62.40

Piezometric Surface No. 1 Specified by 5 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	.00	66.00
2	61.00	68.00
3	86.00	88.00
4	120.00	108.00
5	183.00	110.00

Piezometric Surface No. 2 Specified by 2 Coordinate Points

Point No.	X-Water (ft)	Y-Water (ft)
1	55.00	52.00
2	126.00	106.00

A Horizontal Earthquake Loading Coefficient
Of .150 Has Been Assigned

A Vertical Earthquake Loading Coefficient
Of .150 Has Been Assigned

Cavitation Pressure = .0 (psf)

1

A Critical Failure Surface Searching Method, Using A Random
Technique For Generating Circular Surfaces, Has Been Specified.

1500 Trial Surfaces Have Been Generated.

30 Surfaces Initiate From Each Of 50 Points Equally Spaced
Along The Ground Surface Between X = 30.00 ft.
and X = 70.00 ft.

Each Surface Terminates Between X = 110.00 ft.
and X = 170.00 ft.

Unless Further Limitations Were Imposed, The Minimum Elevation
At Which A Surface Extends Is Y = .00 ft.

10.00 ft. Line Segments Define Each Trial Failure Surface.

1

Following Are Displayed The Ten Most Critical Of The Trial
Failure Surfaces Examined. They Are Ordered - Most Critical
First.

* * Safety Factors Are Calculated By The Modified Bishop Method * *

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	62.65	69.56
2	72.45	71.55
3	81.80	75.10
4	90.46	80.11
5	98.19	86.44
6	104.81	93.94
7	110.12	102.41
8	112.07	107.03

Circle Center At X = 55.5 ; Y = 130.3 and Radius, 61.1

*** .504 ***

Individual data on the 16 slices

Slice No.	Width (ft)	Weight (lbs)	Water Force Top (lbs)	Water Force Bot (lbs)	Tie Force Norm (lbs)	Tie Force Tan (lbs)	Earthquake Force Hor (lbs)	Earthquake Force Ver (lbs)	Surcharge Load (lbs)
1	.4	5.9	.0	.0	.0	.0	.9	.9	.0
2	5.9	1593.3	.0	541.1	.0	.0	239.0	239.0	.0
3	3.5	2207.1	.0	810.5	.0	.0	331.1	331.1	.0
4	2.5	2148.0	.0	840.8	.0	.0	322.2	322.2	.0
5	6.8	7189.2	.0	2964.7	.0	.0	1078.4	1078.4	.0

6	.2	236.4	.0	109.2	.0	.0	35.5	35.5	.0
7	4.0	5129.4	.0	2328.0	.0	.0	769.4	769.4	.0
8	4.5	6483.3	.0	2940.2	.0	.0	972.5	972.5	.0
9	2.5	3936.7	.0	1826.1	.0	.0	590.5	590.5	.0
10	5.2	7913.8	.0	3407.3	.0	.0	1187.1	1187.1	.0
11	1.8	2597.6	.0	1222.9	.0	.0	389.6	389.6	.0
12	4.8	5955.0	.0	2542.5	.0	.0	893.3	893.3	.0
13	3.2	2856.8	.0	1147.6	.0	.0	428.5	428.5	.0
14	1.9	1093.7	.0	185.7	.0	.0	164.1	164.1	.0
15	.2	96.6	.0	.0	.0	.0	14.5	14.5	.0
16	1.9	408.2	.0	.0	.0	.0	61.2	61.2	.0

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	66.74	73.06
2	76.43	75.52
3	85.75	79.14
4	94.57	83.85
5	102.76	89.59
6	110.20	96.28
7	116.77	103.81
8	122.39	112.08
9	122.51	112.31

Circle Center At X = 51.2 ; Y = 154.4 and Radius, 82.9

*** .542 ***

1

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	75.83
2	79.89	77.33
3	89.34	80.59
4	98.04	85.52
5	105.70	91.95
6	112.07	99.66
7	116.93	108.40
8	117.35	109.68

Circle Center At X = 66.9 ; Y = 130.2 and Radius, 54.5

*** .575 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.92	72.36
2	75.39	75.58
3	84.44	79.82
4	92.98	85.02
5	100.90	91.13
6	108.10	98.07
7	114.50	105.75
8	116.98	109.49

Circle Center At X = 41.8 ; Y = 159.2 and Radius, 90.2

*** .578 ***

1

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	70.00	75.83
2	79.94	76.94
3	89.38	80.24
4	97.83	85.59
5	104.86	92.70
6	110.12	101.21
7	112.10	107.05

Circle Center At X = 70.1 ; Y = 120.0 and Radius, 44.2

*** .591 ***

Failure Surface Specified By 10 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	40.61	68.66
2	50.57	67.71
3	60.55	68.24
4	70.36	70.22
5	79.76	73.62
6	88.57	78.36
7	96.58	84.34
8	103.64	91.43
9	109.57	99.47
10	114.15	108.07

Circle Center At X = 52.0 ; Y = 135.7 and Radius, 68.0

*** .636 ***

1

Failure Surface Specified By 9 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	65.10	71.66
2	74.22	75.76
3	83.08	80.40
4	91.65	85.55
5	99.90	91.21
6	107.80	97.34
7	115.32	103.93
8	122.43	110.96
9	124.97	113.78

Circle Center At X = .6 ; Y = 227.2 and Radius, 168.4

*** .673 ***

Failure Surface Specified By 8 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	67.55	73.76
2	76.75	77.68
3	85.61	82.32
4	94.08	87.64
5	102.10	93.61
6	109.62	100.20
7	116.60	107.36
8	119.37	110.69

Circle Center At X = 23.2 ; Y = 190.9 and Radius, 125.3

*** .676 ***

1

Failure Surface Specified By 7 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	69.18	75.15
2	78.58	78.58
3	87.41	83.27

4	95.53	89.11
5	102.76	96.02
6	108.99	103.84
7	110.37	106.19

Circle Center At X =   48.9 ; Y = 145.2 and Radius,   72.9

      ***   .677   ***

Failure Surface Specified By 11 Coordinate Points

Point No.	X-Surf (ft)	Y-Surf (ft)
1	34.90	68.56
2	44.85	67.57
3	54.84	67.86
4	64.72	69.42
5	74.32	72.24
6	83.47	76.26
7	92.04	81.42
8	99.87	87.63
9	106.85	94.80
10	112.85	102.80
11	116.51	109.26

Circle Center At X =   47.6 ; Y = 145.5 and Radius,   78.0

      ***   .681   ***

1

```
            Y           A     X     I     S            F     T

             .00    26.40     52.80     79.20    105.60    132.00

X        .00 +---------+---------*----W*---+---------+---------+
             -
             -
             -
             -
             -
       26.40 +
             -                          .
             -                       .  0
             -                       ...6
             -                     . ...0
             -                     .....6
A      52.80 +                   .*.....0
             -                   ........
             -                    ......*.
             -                  ........042
             -                  .........1*3
             -                 ..........0.2*
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                         WALTERIB2.OUT
X     79.20 +                 ..........639.
            -               ............1028*
            -               ..............539W.
            -               ..............1028..*
            -               ................319..
            -                ................0249.*
I    105.60 +                ..................317.
            -                 ..................2431*1
            -                ......................746
            -                  ....................2.W*
            -                  ......................*2
            -                  .....................*...*
S    132.00 +                   .........................
            -                    .........................
            -                     ..................*.*..*
            -                        .....................
            -                        ................*...*
            -                           ..................
     158.40 +                              ...............
            -                               ..............
            -                                  . .........
            -                                     **  ...*
            -
            -
F    184.80 +                                         W
            -
            -
            -
            -
            -
T    211.20 +
```

CITY OF TORRANCE

PUBLIC WORKS DEPARTMENT
ROBERT BESTE
PUBLIC WORKS DIRECTOR

May 22, 2007

L.C. "Bud" Huber
L.C. Huber & Associates
25690 Crenshaw Boulevard, Suite 205
Torrance, CA 90505

Dear Mr. Huber:

Subject: Soil Nailed Wall at Walteria Reservoir

This letter is in response to your requests for additions to the Soil Nail Wall at Walteria Reservoir Project during your meeting with Mr. John Dettle on May 7, 2007.

The shared slope between your property at 25690 Crenshaw Boulevard and the City's Walteria and Ben Haggott Reservoir site has experienced erosion problem and surficial mudslides during the 2005-2006 rainy season. To prevent any further erosion off the slope the City has prepared plans and specifications for the Soil Nail Wall at Walteria Reservoir Project. Bids were opened for this project on May 10, 2007. Prior to awarding this contract the City requires permission for staff and the contractor to use your parking lot to construct the wall. A Temporary Right of Way was provided for your review at the meeting on the 10th, and a copy is attached for your signature.

At the meeting on the 10th you shared your concerns about erosion of the parking lot from water being concentrated onto one discharge point at the low point of the wall and about damage to the parking lot from construction activities. These are valid concerns. To address your concerns about erosion of the parking lot asphalt from concentrated water flows, the City will construct a concrete curb and gutter and concrete swale to convey the flows to a catch basin, from the catch basin the flows will be piped to the street via curb drains. Pleases refer to the enclosed marked up plan for the layout of the drainage system. This layout is schematic and the final layout will be determined during construction.

To address your concerns about damage to the parking lot from construction activities, the City will have the parking lot slurry sealed and re-striped. This is in addition to replacing asphalt concrete that is removed or broken during construction. Please refer to the enclosed marked up plan for the limits of slurry seal.

css813-Huber-jd

If these additions to the contract are acceptable, then please respond to that fact in writing and sign and return the Temporary Right of Way agreement. The City will then proceed to award this contract, and you will then be invited to the "Pre-Construction Meeting" to meet the Contractor and to be part of the Project Team.

The City of Torrance looks forward to working closely with you on this project and to fix the erosion problems that affect both of our properties.

Very truly yours,

ROBERT J. BESTE
Public Works Director

css813-Huber-jd

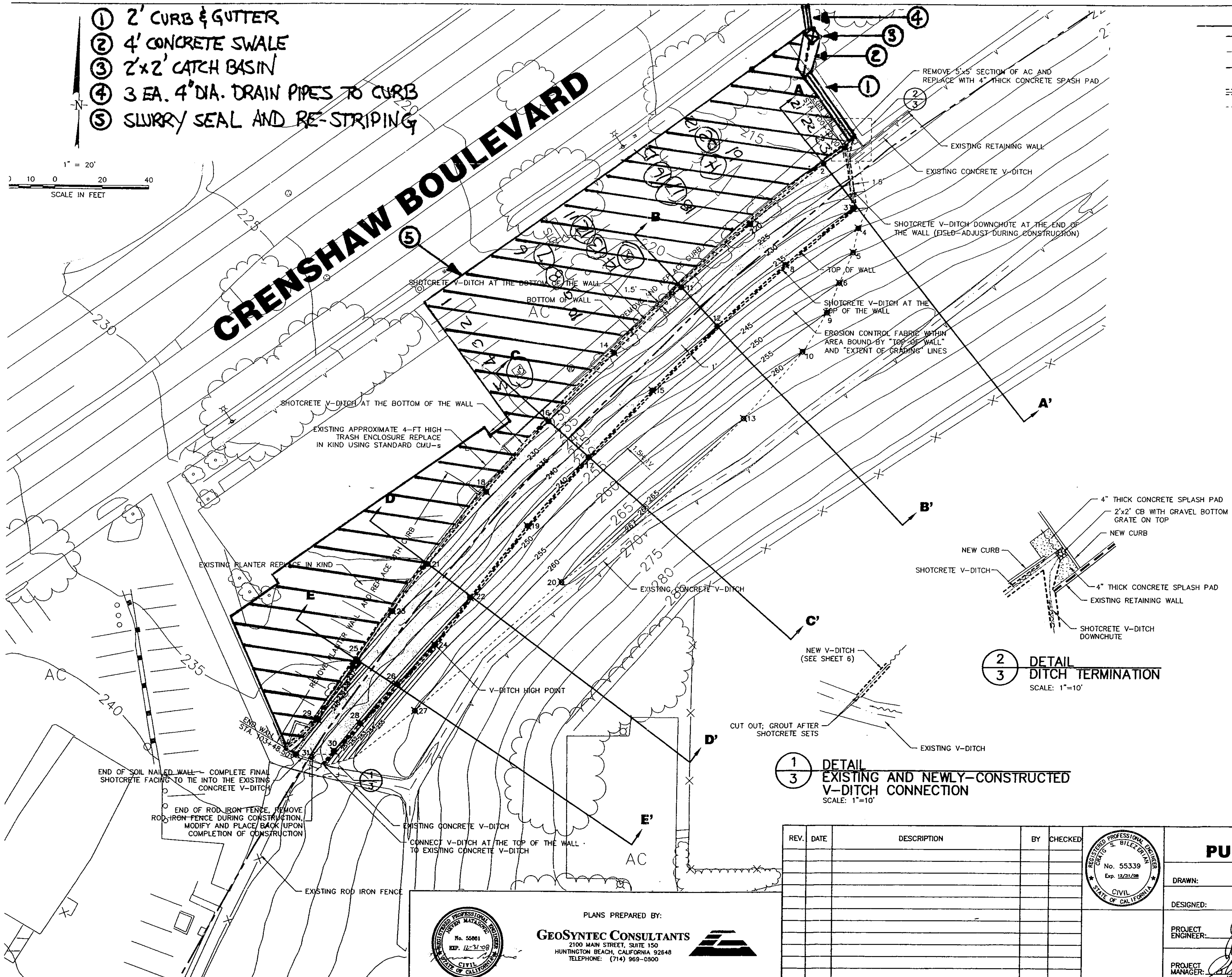
TEMPORARY RIGHT-OF-WAY

I am the party assigned to lawfully represent the Laughlin R. Gordon and Family Trust who are in possession of the property at 25660-25690 Crenshaw Boulevard in the City of Torrance and I hereby permit the City of Torrance, its employees and/or its agents to enter the property for the construction of Soil Nailed Wall at Walteria Reservoir, Plan No. WP-280, and site improvements at 25660-25690 Crenshaw Boulevard per letter from the City of Torrance dated May 22, 2007. This right of way shall remain in full force and effect until the completion of the Soil Nailed Wall and site improvements or until the permission is expressly revoked in writing.

Signed:

Louis C. Huber ______ ______ May 7, 07

(Print Name) (Signature) (Date)



LEGEND

— — —	PROPERTY BOUNDARY
—225—	EXISTING TOPOGRAPHY (FEET ABOVE M.S.L.)
—220—	FINAL SOIL-NAIL WALL FACING AND SOIL GRADING ELEVATIONS
=====	SHOTCRETE V-DITCH
- - - -	EXTENT OF GRADING AND SE LIMIT OF EROSION CONTROL FABRIC
	SOIL NAILING WALL
~~→	DIRECTION OF WATER FLOW
⊠13	CONTROL POINTS

CONTROL POINT TABLE

POINT	NORTHING	EASTING	ELEVATION
1	1745778.4574	6458616.8183	214.30
2	1745771.3892	6458607.8108	215.00
3	1745752.4357	6458620.7492	235.00
4	1745743.9642	6458623.1765	240.00
5	1745733.6631	6458621.1470	245.00
6	1745720.6668	6458615.3424	250.00
7	1745745.8305	6458577.0414	217.50
8	1745728.4544	6458592.1216	237.50
9	1745707.9808	6458610.2657	255.00
10	1745691.3645	6458600.0817	260.00
11	1745719.0899	6458547.5371	220.00
12	1745702.3786	6458563.3513	240.00
13	1745662.7954	6458575.3634	265.00
14	1745690.9744	6458519.0850	242.00
15	1745674.9627	6458535.6066	222.00
16	1745661.4921	6458491.7300	225.00
17	1745646.2136	6458508.9319	245.00
18	1745631.0179	6458465.8200	227.50
19	1745616.4974	64584[illegible].6664	247.50
20	1745592.4765	6458498.3345	265.00
21	1745599.9199	6458441.6001	230.00
22	1745585.7020	6458459.6983	250.00
23	1745579.6733	6458426.9347	232.50
24	1745565.4408	6458445.0530	252.62
25	1745558.7311	6458412.6181	232.00
26	1745548.4376	6458429.4811	252.00
27	1745537.2062	6458437.0273	260.00
28	1745531.7490	6458414.1973	251.00
29	1745533.3855	6458396.3842	238.00
30	1745519.9544	6458403.3955	250.00
31	1745518.5260	6458387.3958	239.75

NOTES:

1. VEGETATION REMOVAL AND REPLACEMENT WITHIN THE "EXTENT OF GRADING" AREA.
   - FOUR AGAVAS: REMOVE AND REPLACE WITH 5-GALLON PLANTS.
   - FOUR TREES: REMOVE AND REPLACE IN KIND WITH 15-GALLON PLANTS.
   - SHRUBS AT THE TOE OF THE SLOPE: REMOVE AND DISPOSE OF.
   - PLANTER WALL, CURB AND PLANTERS AT THE TOE OF THE SLOPE: REMOVE AND DISPOSE OF PLANTER WALL AND CURB; REPLACE EXISTING PLANTERS IN KIND; BUILD CURB PER DETAIL 6 ON PAGE 7.
   - AC PAVING: REPAIR ANY AC PAVING DAMAGED BY CONSTRUCTION.
   - THREE TREE STUMPS: REMOVE AND DISPOSE OF.
2. CLEAR AND GRUB VEGETATION WITHIN SOIL NAILING WALL AREA.
3. IRRIGATION
   - REMOVE INTERFERING PORTIONS OF IRRIGATION SYSTEM FROM SOIL NAILING WALL AREA
   - REMOVE AND REPLACE IRRIGATION SYSTEM WITHIN EXTENT OF GRADING AREA, SEE SHEET 8 OF 8

PLANS PREPARED BY:

GEOSYNTEC CONSULTANTS
2100 MAIN STREET, SUITE 150
HUNTINGTON BEACH, CALIFORNIA 92648
TELEPHONE: (714) 969-0800

REGISTERED PROFESSIONAL ENGINEER NEVEN MATASOVIC No. 55861 EXP. 12-31-08 CIVIL STATE OF CALIFORNIA

REV.	DATE	DESCRIPTION	BY	CHECKED

REGISTERED PROFESSIONAL ENGINEER CRAIG S. BILEZERIAN No. 55339 Exp. 12/31/08 CIVIL STATE OF CALIFORNIA

SITE PLAN

CITY OF TORRANCE
PUBLIC WORKS DEPARTMENT

DRAWN:

DESIGNED:

PROJECT ENGINEER: JEFF KIDD, P.E.

PROJECT MANAGER: JOHN C. DETTLE, P.E.

APPROVED: 11 APR 07
CRAIG S. BILEZERIAN, CITY ENGINEER, R.C.E. NO. 55339 — DATE — EXP. 12/31/08

SCALE: AS SHOWN | SHEET 3 OF 8

PLAN NO. WP-280