GLOBAL GEO-ENGINEERING, INC.

January 27, 2025
Project 10380-04

Ursus Victor
1343 North Grand Avenue Suite 210
Covina, California 91724

Southland Industries
16835 W. Bernardo Dr.Suite 210
San Diego, CA 92127

Subject: Geotechnical Investigation
Proposed Photovoltaic Solar System Canopy Structures
100 Diamond Ranch Road
Pomona, California

Attention: Mr. Art Ealba & Mr. William Travers

References:
a) Leighton and Associates, Inc. – *Geotechnical Investigation and Preliminary Grading Plan Review for Diamond Ranch High School, Diamond Bar Area, Los Angeles County, California* Project No. 2920205-02 dated May 20, 1994;

b) Leighton and Associates, Inc. – *Final Report of Geotechnical Observation and Testing during Rough Grading and Phase 1 Construction of the Diamond Ranch High School, Phillips Ranch Road and State Route 60, City of Diamond Bar, Los Angeles County, California* Project No. 2920205-006 dated June 30, 1998.

Dear Mr. Art Ealba:

1. INTRODUCTION

a) In accordance with your request, we have prepared this geotechnical report for the proposed improvements at the above referenced property located in the city of Pomona, California.

b) We understand that the planned improvements will include several ground mount solar array installation over the relatively level ground in the north area of the high school campus.

c) The site is not located within the State of California designated *Seismic Hazard Zone* for potential liquefaction, but it is included in the landslide zone. However, the review of the referenced reports indicates that the landslide potential has been mitigated.

d) The support bases for the ground mount solar arrays will consist of driven piers consisting of steel beams.

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2. PRIOR WORK

a) The site was investigated by Leighton and Associates, Inc. (LAI) in 1994 for the then proposed high school project. The investigation included drilling 35 two-foot diameter borings to depths between 19 and 121 feet below the then existing grades, 51 trenches and eight shallow seismic refraction lines, laboratory testing of representative soil/bedrock samples, slope stability analyses, and engineering recommendations for the development of the school campus. The results of the investigation were provided in the referenced report dated May 20, 1994. We reviewed the report and concur with the findings and the conclusions of the report.

b) The rough grading for the subject school commenced in July 1995. Most of the grading was completed by September 1996. Minor grading work continued through October 1997.

c) The grading was conducted under the observation and testing services of LAI in accordance with the recommendation provided in the geotechnical report dated May 20, 1994. Changes in the grading plan and in the anticipated geotechnical conditions required modifications to some of the recommendations.

d) According to the *Final Report of Geotechnical Observation and Testing During Rough Grading and Phase 1 Construction of the Diamond Ranch High School* dated June 30, 1998, prepared by LAI, compressible surficial materials and landslide debris were completely removed to unweathered/undisturbed bedrock within the site area.

e) We utilized the information provided in the LAI rough grade report to prepare our geologic map and design recommendations.

3. SCOPE

The scope of services we provided was as follows:

a) Preliminary planning and evaluations, and review of the referenced geotechnical report related to the project site and nearby surrounding area *(*see *References - Appendix A)*;

b) Geologic and engineering analyses of the reviewed field and laboratory data;

c) Preparation of a report presenting our findings, conclusions and recommendations.

4. SITE DESCRIPTION

4.1 Location

a) The project site is located within the campus of Diamond Ranch High School in the city of Pomona, California.

b) An approximate site location is shown on the *Location Map, Figure 1.*

4.2 Existing Surface Conditions

a) We visited the site to observe the existing conditions. The project site is located within the northern area of the campus. The improvement site is void of any structures.

b) From the northern edge of the baseball fields, a slope descends to the north approximately at a 2.5:1 (horizontal:vertical) gradient for a vertical height of about 80 feet. The improvement area in general is level. From the improvement area the slope continues to descend for a vertical height of 50 to 70 feet. The existing elevation at the site location is at 995 feet (Google Earth Pro).

c) Surface drainage consists of sheet flow runoff of incident rainfall water derived primarily within the property boundaries and adjacent properties.

4.3 Geology

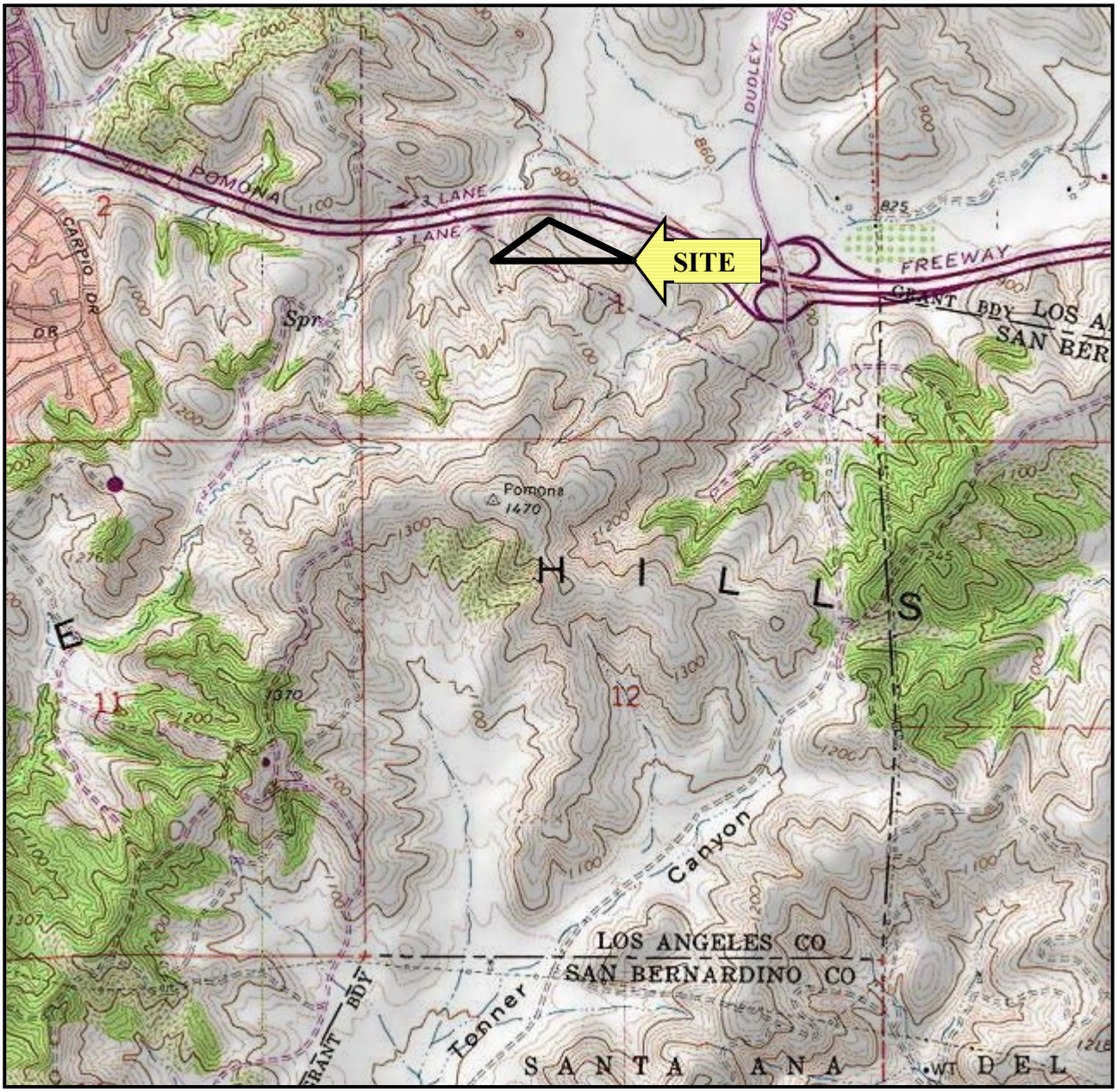
4.3.1 Regional Geologic Setting

The project site is located within the Peninsular Ranges Geomorphic Province of California, which consist of a series of mountain ranges separated by longitudinal valleys. The ranges trend northwest-southeast and are subparallel to faults branching from the San Andreas Fault. The Peninsular Ranges extend from the southern side of the Santa Monica Mountains into Baja California, Mexico.

4.3.2 Local Geologic Setting

The project site lies within the northeastern part of the Puente Hills, which are comprised of Tertiary-age marine and non-marine sedimentary rocks. Locally, the project site is underlain by engineered fill and bedrock belonging to the Puente Formation.

LOCATION MAP



BASE MAP: USGS 7.5-Minute Topographic Map,
San Dimas, Quadrangle, 1981

2000 0 2000 4000

SCALE FEET

NORTH

GLOBAL GEO-ENGINEERING, INC.

GEOLOGIC AND SOILS ENGINEERING IRVINE, CALIFORNIA

100 Diamond Ranch Road
Pomona, California

Date: January 2025

Project No.: 10380-04

Figure No: 1

4.4 Subsurface Site Conditions

4.4.1 General

a) The following paragraphs generally describe the subsurface conditions as described in the referenced rough grade report.

b) The areas of engineered fill and bedrock within the project site boundaries are delineated on our *Geologic Map, Plate 1*.

c) LAI drilled at least two borings, B-3 and B-18, inside the western portion of the proposed solar arrays and two borings, B-22 and B-31 in the general vicinity of the solar arrays.

d) Logs of Borings are included in *Appendix A*.

e) A partial copy of the LAI's Preliminary Geotechnical Map, Plate 1 with the overlay of proposal solar arrays is enclosed in *Appendix B*.

f) LAI constructed several geologic cross sections throughout the site. Three of the cross sections, E-E'. F-F' and P-P', represent the proposed solar array subsurface conditions. The cross sections are enclosed in *Appendix B*.

g) Excerpts from LAI's final rough grading report are enclosed in *Appendix C.*

h) The LAI geotechnical investigation report includes 377 pages and the rough grade report includes 294 pages. If required, these reports can be provided electronically.

4.4.2 Fill

a) The majority of the site exposes engineered fill certified by Leighton and Associates, Inc. The fill is reportedly underlain by competent bedrock.

b) The rough grade report states that all fills within the school site were placed using a minimum of 90 percent relative compaction.

4.4.3 Bedrock

a) The reminder of the site exposes bedrock belonging to the Tertiary-age Puente Formation.

b) The bedrock was reported to generally consist of interbedded Sandstone and Siltstone. Sequences of massive Sandstone and Conglomerate were also exposed.

5. GROUND WATER/SEEPAGE

a) Perched ground water and seeps were encountered following removal operations in several of the canyon areas and within landslide removal areas.

b) Following removal of compressible soils and landslide debris, subdrain systems were placed along all canyon areas and landslide removal areas.

6. POTENTIAL SEISMIC HAZARDS

6.1 General

a) The property is located in the general proximity of several active and potentially active faults, which is typical for sites in the Southern California region. Earthquakes occurring on active faults within a 70-mile radius are capable of generating ground shaking of engineering significance to the proposed construction.

b) In Southern California, most of the seismic damage to manmade structures results from ground shaking and, to a lesser degree, from liquefaction and ground rupture caused by earthquakes along active fault zones. In general, the greater the magnitude of the earthquake, greater will be the potential damage.

6.2 Ground Surface Rupture

a) The subject property is not situated inside the boundary of an Earthquake Fault Zone (EFZ). The closest known active fault is the Elsinore Fault, located approximately 5.4 miles southeast of the project site.

b) Other nearby active faults include the Whittier Fault and the Sierra Madre Fault Zone, located at distances of about 7.5 miles and 9.8 miles, respectively, from the subject property.

c) Due to the distance of the closest active fault to the site, ground rupture is not considered a significant hazard at the site.

6.3 Ground Shaking

a) We utilized the California Office of Statewide Health Planning and Development (OSHPD) Seismic Design Maps internet program to calculate the peak ground acceleration (PGA) at the project site location. Using the ASCE 7-16 standard and Site Class D, the PGA_M at the subject property resulted to be 0.854g.

b) From the seismic history of the region and proximity, the Elsinore Fault and Whittier Fault have the greatest potential for causing earthquake damage related to ground shaking at this site.

6.4 Liquefaction

The site is not located within a State of California delineated *Seismic Hazard Zone* with a potential for liquefaction during a seismic event. The subsurface soils consist mostly of compacted fill soils underlain by bedrock at a shallow depth. The potential for liquefaction is considered to be low

6.5 Landslides and Slope Failures

All previously known and newly discovered landslides were reported to have been completely removed to undisturbed bedrock during the rough grading operations. The potential for landsliding and or slope failure is considered nil.

6.6 Compressible Soils/Hydroconsolidation

The engineered fill soils are comprised of moist, medium dense soils. The structures are lightly loaded. A potential for hydroconsolidation for the upper 15 feet is *low*. Bedrock with negligible consolidation potential is present below the soils.

6.7 Seismically-Induced Settlement

Strong seismic shaking can cause settlement by allowing sediment particles to become more tightly packed, thereby reducing pore space. Some soft colluvial and alluvial deposits are more susceptible to this phenomenon than are others. Artificial fills, if not adequately compacted, may also experience seismically induced settlement. Due to the presence of engineered fill soils and shallow bedrock, the potential for seismically induced settlement is considered to be low.

6.8 Flooding Attributes to Dam/Levee Failure

a) The ground surface elevation at the project site is about 995 feet above Mean Sea Level. No major nearby dams are located upstream of the project site.

b) The project site is not located within a *Dam Inundation Area* in the event of a failure of any of the nearby dams, based on our review of a Dam Breach Inundation Map Web Publisher provided by the State of California Department of Water Resources Division of Safety of Dams.

6.9 Seiches

a) Confined bodies of water may be subject to large, earthquake-induced waves known as seiches. These waves can cause flooding and other related property damage to adjacent areas.

b) The closest major confined body of water is Puddingstone Lake, which is located approximately 4.2 miles from the project site. Since no large bodies of water are present within or adjacent to the site, the potential for seiching is regarded as low.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 General

a) It is our opinion that the site will be suitable for the proposed improvements from a geotechnical aspect, assuming that our recommendations are incorporated in the project plan designs and specifications and are implemented during construction.

b) We are of the opinion that the proposed structures may be supported on driven piers, founded in the competent soils. The mat and shallow foundations founded in the underlying competent soils to support the lightly loaded ancillary structures.

c) We are also of the opinion that with due and reasonable precautions, the required grading will not endanger adjacent property nor will grading be affected adversely by adjoining property.

d) The design recommendations in the report should be reviewed during the grading phase when soil conditions in the excavations become exposed.

e) The final foundation plan/loads should be reviewed by the Geotechnical Engineer.

7.2 Grading

7.2.1 Processing of On-Site Soils

a) The proposed foundation system will include drilled caissons or driven piers. No overexcavation below the piers is required.

b) For any shallow or mat foundations and for any slab-on-grades, we recommend reworking of the exposed subgrade soils.

c) Wherever structural fills are to be placed, the upper 6 to 8 inches of the subgrade should, after stripping or overexcavation, first be scarified and reworked.

d) There should be at least 12 inches of reworked existing soils or compacted fill under the pavement areas, if any.

e) Any loosening of reworked or native material, consequent to the passage of construction traffic, weathering, etc., should be made good prior to further construction.

f) The depths of overexcavation should be reviewed by the Geotechnical Engineer during construction. Any surface or subsurface obstructions, or any variation of site materials or conditions encountered during grading should be brought immediately to the attention of the Geotechnical Engineer.

g) No underground obstructions or facilities should remain in any structural areas. Depressions and/or cavities created as a result of the removal of obstructions should be backfilled properly with suitable materials, and compacted.

7.2.2 Material Selection

After the site has been stripped of any debris, vegetation and organic soils, excavated on-site soils are considered satisfactory for reuse in the construction of on-site fills, with the following provisions:

a) The organic content does not exceed one percent by volume;

b) Large size rocks greater than 8 inches in diameter should not be incorporated in compacted fill;

c) Rocks greater than 4 inches in diameter should not be incorporated in compacted fill to within 1 foot of the underside of the footings and slabs.

7.2.3 Compaction Requirements

a) Reworking/compaction shall include significant moisture-conditioning to bring the soils to slightly above the optimum moisture content. All reworked soils and structural fills should be compacted to achieve at least **90 percent** relative compaction with reference to laboratory compaction standard.

b) The optimum moisture content and maximum dry density should be determined in the laboratory in accordance with ASTM Test Designation D1557.

c) Fill should be compacted in lifts not exceeding 8 inches (loose).

7.2.4 Excavating Conditions

a) Based on the material exposed in our borings, excavation of on-site materials may be accomplished with standard drilling or trenching equipment in the upper 5 to 7 feet of the existing ground surface.

b) Deeper excavations into the bedrock may require specialized means of excavation (rock coring, chemical fracturing, etc.).

c) No groundwater or seepage was encountered in either of our borings. Dewatering is not anticipated.

7.2.5 Shrinkage

For preliminary earthwork calculation, an average shrinkage factor of 5 percent is recommended for the fill soils (this does not include handling losses).

7.2.6 Expansion Potential

Several representative soil samples were tested at the conclusion of the grading operation to determine the expansion potential. The results are summarized in *Appendix D.* In general, the expansion potential of the soils is considered to be *medium.*

7.2.7 Sulphate Content

Several representative soil samples were tested at the conclusion of the grading operation to determine the sulphate exposure. The results are summarized in *Appendix D.* The sulphate exposure in accordance with the ACI 318 is considered to be *severe*.

7.2.8 Utility Trenching

a) The walls of temporary construction trenches in fill should stand nearly vertical, with only minor sloughing, provided the total depth does not exceed 3 feet (approximately).

b) Shoring of excavation walls or flattening of slopes may be required, if greater depths are necessary.

c) Trenches should be located so as not to impair the bearing capacity or to cause settlement under foundations. As a guide, trenches should be clear of a 45-degree plane, extending outward and downward from the edge of foundations. Shoring should comply with Cal-OSHA regulations.

d) Existing soils may be utilized for trenching backfill, provided they are free of organic materials.

e) All work associated with trench shoring must conform to the state and federal safety codes.

7.2.9 Surface Drainage Provisions

Positive surface gradients should be provided adjacent to the buildings to direct surface water run-off away from structural foundations and to suitable discharge facilities.

7.2.10 Grading Control

a) All grading and earthwork should be performed under the observation of a Geotechnical Engineer in order to achieve proper subgrade preparation, selection of satisfactory materials, placement and compaction of all structural fill.

b) Sufficient notification prior to stripping and earthwork construction is essential to make certain that the work will be adequately observed and tested.

7.3 Slab-on-Grade (if any)

a) Concrete floor slabs may be founded on the reworked existing soils. The soils may require proof rolling.

b) The non-structural slab-on-grade may be directly supported by the reworked existing soils.

c) It is recommended that #4 bars on 12-inch center, both ways, or equivalent be provided as minimum reinforcement in non-structural slabs-on-grade. Joints should be provided and slabs should be at least 5 inches thick.

d) Use a modulus of subgrade reaction of 100 lb/in^3.

e) The control joints may be spaced at 5 feet intervals or as recommended by the structural engineer.

f) The subgrade soils should be kept moist prior to the concrete pour.

7.4 Shallow Foundations

The proposed structures can be supported by shallow spread footings founded in the competent subgrade soils. The criteria presented as follows should be adopted:

7.4.1 Dimensions/Embedment Depths

	Minimum Width (ft)	**Minimum Footing Thickness (in)**	**Minimum Embedment Below Lowest Finished Surface (ft)**
Equipment Wall Footings	1.0	6	1.0

7.4.2 Allowable Bearing Capacity

Embedment Depth (ft)	**Allowable Bearing Capacity (lb/ft^2)**
1.0	1,500

(Notes:

- These values may be increased by one-third in the case of short-duration loads, such as induced by wind or seismic forces.
- At least 4x#4 bars should be provided in wall footings, two on top and two at the bottom.
- In the event that footings are founded in structural fills consisting of imported materials, the allowable bearing capacities will depend on the type of these materials, and should be re-evaluated.
- Planter areas should not be sited adjacent to walls.
- Footing excavations should be observed by the Geotechnical Engineer.
- Footing excavations should be kept moist prior to the concrete pour.
- It should be insured that the embedment depths do not become reduced or adversely affected by erosion, softening, planting, digging, etc.

7.4.3 Settlements

Total and differential settlements under spread footings are expected to be within tolerable limits and are not expected to exceed 1 inch and ¾ inches over a horizontal distance of 40 feet, respectively.

7.5 Mat Foundation

a) The proposed equipment pad may be supported on mat footings founded in the competent soils.

b) The mat should be at least 6 inches thick and should be embedded 6 inches below the lowest finished surface.

c) The following parameters should be utilized for the design of the building. The allowable values are provided below:

	Bearing Capacity (lb/ft^2)	**Modulus of Subgrade Reaction (lb/in^3)**
Fill Soils	1,500	125

d) Footing excavations should be observed by the Geotechnical Engineer.

e) Total settlement under mat footings are expected to be within tolerable limits and are not expected to exceed ¾ inch. Due to the lighter uniform loads from the mat footing, the differential settlement will not exceed ¼ inch.

7.6 Deep Foundations (Driven Piers)

a) LAI conducted eight direct shear tests on remolded soil samples to determine the shear strength for the engineered fill. The test results are included in *Appendix C*.

b) We utilize the lowest shear parameters of these eight tests to calculate the design parameters for the driven piers. The allowable design parameters for the ground mount system foundation using a factor of safety of 3 are provided below. The end bearing and frictional capacities may be combined in the pier design. The design parameters are provided in the table below:

Minimum Embedment	8 feet
End Bearing Capacity – Driven Piers	5 kip/ft^2
Increase in Allowable Bearing Capacity for Each Additional Foot Increase in depth	500 lb/ft^2
Maximum Allowable Bearing Capacity – Driven Piers	13 kip/ft^2
Frictional Resistance	250 lb/ft^2
Passive Resistance	300 lb/ft^3

c) As the arrays will be located in the areas not covered with any hardscape, ignore the passive resistance for the upper 12 inches.

d) The passive resistance may be doubled provided the clear spacing of the piers is greater than 3 times the diameter and the structures not being affected by 0.5 inches of deflection.

e) In general, the vertical end bearing capacity and the frictional resistance may be increased by 33 percent for short-term loads such as wind or seismic.

f) The upward frictional resistance may be considered as 50 percent of the downward frictional resistance.

g) The panels will be installed over a very gentle slope, 6 to 7 percent in gradient. The ground surrounding the piles may be considered as flat.

h) Additionally we recommend that the final pile depth and design be confirmed by an indicator pile program at the start of construction. The proposed indicator piles should be installed with the same method and equipment used for the proposed production piles. In our opinion pile testing program is not deemed necessary as a certified fill or bedrock is anticipated at the bottom of the pier and the conservative design recommendations have been provided above.

i) The pile should be driven by an experienced contractor. The methodology should be submitted to the geotechnical engineer for the approval. Depending on the methodology, testing of the piles may be required in accordance with ASTM D1143 (compression), D3689 (tension) and D3966 (lateral).

j) Geotechnical engineer of record should observe the pile driving. The daily field report should, at a minimum, include:

i) Pile driving equipment;
ii) Type and length of each pile;
iii) Number of blows required for every 12 inches of penetration;
iv) Final pile embedement depth;
v) Deviation from the vertical axis;
v) Physical damage to the pile, if any.

7.7 Seismic Coefficients

The following seismic coefficients are provided in accordance ASCE 7-16 standard:

ITEM	VALUE
Site Latitude (Decimal-degrees)	34.02472
Site Longitude (Decimal-degrees)	-117.77833
Site Class	D
Risk Category	II
Mapped Spectral Response Acceleration-Short Period (0.2 Sec) - S_S	1.809
Mapped Spectral Response Acceleration-1 Second Period – S_1	0.639
Short Period Site Coefficient-F_a	1.0
Long Period Site Coefficient F_v	1.7
Adjusted Spectral Response Acceleration @ 0.2 Sec. Period (Sms)	1.809
Adjusted Spectral Response Acceleration @ 1Sec.Period (S_{m1})	1.086
Design Spectral Response Acceleration @ 0.2 Sec. Period (S_{Ds})	1.206
Design Spectral Response Acceleration @ 1-Sec. Period (S_{D1})	0.725

7.8 Soil Corrosion Potential

a) Several representative soil samples were tested at the conclusion of the grading operation to determine the corrosion potential. The results are summarized in *Appendix D.*

b) Results of electrical resistivity tests conducted after the rough grading indicate a resistivity of 530 ohm-cm in upper soils. Based on this data, it is our opinion that, in general, on-site soils are considered *severely corrosive.* This potential should be considered in design of underground metal pipes and the piers.

8. LIMITATIONS

a) Soils and bedrock over an area show variations in geological structure, type, strength and other properties from what can be observed sampled and tested from specimens extracted from necessarily limited exploratory borings. Therefore, there are natural limitations inherent in making geologic and soil engineering studies and analyses. Our findings, interpretations, analyses and recommendations are based on observation, laboratory data and our professional experience; and the projections we make are professional judgments conforming to the usual standards of the profession. No other warranty is herein expressed or implied.

b) In the event, that during construction, conditions are exposed which is significantly different from those described in this report, they should be brought to the attention of the Geotechnical Engineer.

c) The recommendations provided in this report are intended to minimize the potential of distress to the structures caused by compressible soils. However, it should be noted that certain amount of settlement of the structures is unavoidable and should be anticipated during the lifetime of the existing and the proposed structures.

The opportunity to be of service is sincerely appreciated. If you have any questions or if we can be of further assistance, please call.

Very truly yours,

GLOBAL GEO-ENGINEERING, INC.

Mohan B. Upasani
Principal Geotechnical Engineer
RGE 2301
(Exp. March 31, 2025)

Kevin B. Young
Principal Engineering Geologist
CEG 2253
(Exp. October 31, 2025)

MBU/KBY:mbu

Enclosures:

Location Map	- Figure 1
Terms and Conditions	
Logs of Borings (LAI Geotechnical Investigation)	- Appendix A
Partial Geotechnical Map (LAI Geotechnical Investigation)	- Appendix B
Pertinent Geotechnical Cross Sections (LAI Geotechnical Investigation)	- Appendix B
Excerpts from LAI Rough Grading Report	- Appendix C
Laboratory Test Data (LAI Geotechnical Investigation and Rough Grading)	- Appendix D
Geologic Map	- Plate 1

TERMS AND CONDITIONS OF AUTHORIZATION

Consultant shall serve Client by providing professional counsel and technical advice regarding subsurface conditions consistent with the scope of services agreed-to between the parties. Consultant will use his professional judgment and will perform his services using that degree of care and skill ordinarily exercised under similar circumstances, by reputable foundation engineers and/or engineering geologists practicing in this or similar localities.

- In assisting Client, the Consultant may include or rely on information and drawings prepared by others for the purpose of clarification, reference or bidding; however, by including the same, the Consultant assumes no responsibility for the information shown thereon and Client agrees that Consultant is not responsible for any defects in its services that result from reliance on the information and drawings prepared by others. Consultant shall not be liable for any incorrect advice; judgment or decision based on any inaccurate information furnished by the Client or any third party, and Client will indemnify Consultant against claims, demands, or liability arising out of, or contribute to, by such information.

- Unless otherwise negotiated in writing, Client agrees to limit any and all liability, claim for damages, cost of defense, or expenses to be levied against Consultant on account of design defect, error, omission, or professional negligence to a sum **not to exceed ten thousand dollars or charged fees whichever is less**. Further, Client agrees to notify any construction contractor or subcontractor who may perform work in connection with any design, report, or study prepared by Consultant of such limitation of liability for design defects, errors, omissions, or professional negligence, and require as a condition precedent to their performing the work a like limitation of liability on their part as against the Consultant. In the event the Client fails to obtain a like limitation of liability provision as to design defects, errors, omissions or professional negligence, any liability of the Client and Consultant to such contractor or subcontractor arising out of a negligence shall be allocated between Client and Consultant in such a manner that the aggregate liability of Consultant for such design defects to all parties, including the Client shall **not exceed ten thousand dollars or charged fees whichever is less**. No warranty, expressed or implied of merchantability or fitness, is made or intended in connection with the work to be performed by Consultant or by the proposal for consulting or other services or by the furnishing of oral or written reports or findings made by Consultant.

- The Client agrees, to the fullest extent permitted by law, to indemnify, defend and hold harmless the Consultant, its officers, directors, employees, agents and subconsultants from and against all claims, damages, liabilities or costs, including reasonable attorney's fees and defense costs, of any nature whatsoever arising from or in connection with the Project to the extent that said claims, damages, liabilities or costs arise out of the work, services, or conduct of Client or Client's contractors, subconsultants, or other third party not under Consultant's control. Client further agrees that the duty to defend set forth herein arises immediately and is not contingent on a finding of fault against Client or Client's contractors, subconsultants, or other third parties. Client shall not be obligated under this provision to indemnify Consultant for Consultant's sole negligence or willful misconduct.

- Client shall grant free access to the site for all necessary equipment and personnel and Client shall notify any and all possessors of the project site that Client has granted Consultant free access to the project site at no charge to Consultant unless expressly agreed to otherwise in writing.

- If Client is not the property owner for the subject Project, Client agrees that it will notify the property owner of the terms of this agreement and obtain said property owner's approval to the terms and conditions herein. Should Client fail to obtain the property owner's agreement as required herein, Client agrees to be solely responsible to Consultant for all damages, liabilities, costs, including litigation fees and costs, arising from such failure that exceed that limitation of Consultant's liability herein.

- Client shall locate for Consultant and shall assume responsibility for the accuracy of his representations as to the locations of all underground utilities and installations. Consultant will not be responsible for damage to any such utilities or installation not so located.

- Client and Consultant agree to waive claims against each other for consequential damages arising out of or relating to this agreement. Neither party to this agreement shall assign the contract without the express, written consent of the other party.

- Consultant agrees to cover all open test holes and place a cover to carry a 200-pound load on each hole prior to leaving project site unattended. Consultant agrees that all test holes will be backfilled upon completion of the job. However, Client may request test holes to remain open after completion of Consultants work. In the event Client agrees to pay for all costs associated with covering and backfilling said test holes at a later date, and Client shall indemnify, defend and hold harmless Consultant for all claims, demands and liabilities arising from his request, except for the sole negligence of the Consultant, to the extent permitted by law.

- Consultant shall not be responsible for the general safety on the job or for the work of Client, other contractors and third parties.

- Consultant shall be excused for any delay in completion of the contract caused by acts of God, acts of the Client or Client's agent and/or contractors, inclement weather, labor trouble, acts of public utilities, public bodies, or inspectors, extra work, failure of Client to make payments promptly, or other contingencies unforeseen by Consultant and beyond reasonable control of the Consultant.

- In the event that either party desires to terminate this contract prior to completion of the project, written notification of such intention to terminate must be tendered to the other party. In the event Client notifies Consultant of such intention to terminate Consultant's services prior to completion of the contract, Consultant reserves the right to complete such analysis and records as are necessary to place files in order, to dispose of samples, put equipment in order, and (where considered necessary to protect his professional reputation) to complete a report on the work performed to date. In the event that Consultant incurs cost in Client's termination of this Agreement, a termination charge to cover such cost shall be paid by Client.

- If the Client is a corporation, the individual or individuals who sign or initial this Contract, on behalf of the Client, guarantee that Client will perform its duties under this Contract. The individual or individuals so signing or initialing this Contract warrant that they are duly authorized agents of the Client.

- Any notice required or permitted under this Contract may be given by ordinary mail at the address contained in this Contract, but such address may be changed by written notice given by one party to the other from time to time. Notice shall be deemed received in the ordinary course of the mail. This agreement shall be deemed to have been entered into the County of Orange, State of California.

LIMITATIONS

Our findings, interpretations, analyses, and recommendations are professional opinions, prepared and presented in accordance with generally accepted professional practices and are based on observation, laboratory data and our professional experience. Consultant does not assume responsibility for the proper execution of the work by others by undertaking the services being provided to Client under this agreement and shall in no way be responsible for the deficiencies or defects in the work performed by others not under Consultant's direct control. No other warranty herein is expressed or implied.

Appendix A

Logs of Borings

(LAI Geotechnical Investigation)

GEOTECHNICAL BORING LOG

DATE 5/19-20/92 DRILL HOLE NO. B-3 SHEET 1 OF 3

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Gallagher Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 30" DRIVE WEIGHT 0-30': 5742# DROP 12 IN.

ELEVATION TOP OF HOLE 965' REF. OR DATUM See Geotechnical Map

DEPTH (FEET)	GRAPHIC LOG (N / S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)
0		@8' RS: N38W 7NE	1	1			
		@8' RS: N25W 18NE					
5		@8' Slicks plunge N63E, 32	2	Push/6" 1/11" 2/13"			
		@8.5' F:N15W 70NE					
10		@9' B:N11W 5NE	3	2			
		@10' RS: N60W, 10NE					
15		@11' B:N3E, 5SE					
		@11.5' RS: N31E, 16SE					
20		@12.5' B:N20E 15SE	4	5/7"			
		@15' B:N5E, 13SE					
		@19' B:N38W 23SW					
25		@22.5' B:N32E, 9NE					
		@25.5' B:N55W 9NE					
30							

GEOTECHNICAL DESCRIPTION

LOGGED BY PLD

SAMPLED BY PLD

Approximately 3 feet of soil removed from the drill pad.

COLLUVIUM (Qcol)

@ 0 -3' CLAYEY SILT: dark brown to yellowish brown, slightly moist to moist, firm.

LANDSLIDE DEBRIS (Qls)

@3'-5' CLAYEY SAND: yellowish brown, slightly moist, medium dense; no structure, deeply weathered.

@5' DRIVE SAMPLE: Interbedded orange SANDSTONE and gray SILTSTONE; laminated.

@5'-12' Interbedded orange SANDSTONE and gray SILTSTONE: slightly moist, medium dense; Fine to medium grained, laminated, moderately cemented.

@8.5' Fault has 3 inches of dip-slip displacement.

@10' Rupture surface consisting of 6 inch wide zone of broken bedrock with 1/8 inch to 1/4 inch thick calcium carbonate layers, polished surfaces.

@ 10' DRIVE SAMPLE: Interbedded orange SANDSTONE and gray SILTSTONE; laminated.

@11.5' Lowest failure surface and primary slide plane consisting of 1/8 inch thick green CLAY, polished, calcium carbonate coatings.

BEDROCK- PUENTE FORMATION (Tp)

@ 12'-73' Interbedded orange SANDSTONE and gray SILTSTONE: slightly moist, dense to stiff; laminated to thinly bedded.

@18' Bedding is disrupted, locally with calcium carbonate zones.

@20'-22' SILICEOUS SILTSTONE: dark brown, hard; well cemented, well indurated, fractured into angular blocks. Surrounding bedrock is squeezed into the fracture voids.

@ 25.5' Bedrock beomes tighter beyond this level.

GEOTECHNICAL BORING LOG

DATE 5/19-20/92 DRILL HOLE NO. B-3 SHEET 2 OF 3

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Gallagher Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 30" DRIVE WEIGHT 30' - 58': 4302# DROP 12 IN.

ELEVATION TOP OF HOLE 965' REF. OR DATUM See Geotechnical Map

DEPTH (FEET)	GRAPHIC LOG (N / S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30		@28' B:N37E, 10SE	5	2				LOGGED BY PLD SAMPLED BY PLD
		@30' J:N80E, 45SE						@ 30' DRIVE SAMPLE: Interbedded orange SANDSTONE and dark gray SILTSTONE; laminated.
		@31' B:E-W, 33S						@ 32'-34' Minor seepage around boring.
35		@32' F:N54W 73SW						@ 32' Two parallel minor faults are 6 inches apart with horizontal slickensides.
		@32' F:N81W 75SW	6	8				UNOXIDIZED ZONE
40		@38' B:N57E, 16SE						@ 34' Gradual change to interbedded dark bluish gray SILTSTONE and SANDSTONE: slightly moist to moist, dense to very dense; well cemented, unoxidized.
		@41' F:N70W 76NE						@ 37'-41' Minor seepage around boring.
45								@ 40' DRIVE SAMPLE: Interbedded SILTSTONE and SANDSTONE: dark bluish gray; laminated, tight.
								@ 41' Minor fault contains gypsum crystals along one side.
								@ 45' SILICEOUS SILTSTONE: hard; 6 inches thick offset by a fault so that it occurs on north side of boring only.
50		@51' B:N75E, 22SE	7	7				@ 50' DRIVE SAMPLE: Interbedded SILTSTONE and SANDY SILTSTONE: gray; laminated.
55								
60								

GEOTECHNICAL BORING LOG

DATE 5/19-20/92 DRILL HOLE NO. B-3 SHEET 3 OF 3

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Gallagher Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 30" DRIVE WEIGHT 58'-87': 3102# DROP 12 IN.

ELEVATION TOP OF HOLE 965' REF. OR DATUM See Geotechnical Map

LOGGED BY PLD

SAMPLED BY PLD

DEPTH (FEET)	GRAPHIC LOG (N / S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
60			8	8				@ 60' DRIVE SAMPLE: Interbedded black SILTSTONE and dark bluish gray SANDSTONE: moist to wet; thin-bedded, slightly micaceous, moderately steep dip in bedding.
65								
70			9	13/7"				@ 70' DRIVE SAMPLE: Interbedded SILTSTONE and SANDSTONE: dark blue; laminated.
								@ 73'-74' SANDSTONE: grayish blue: wet, dense; medium grained, associated with flowing water.
75								
80								
85								
90								

TOTAL DEPTH 74 FEET
DOWN HOLE LOGGED TO 51 FEET
WATER ROSE FROM 74 FEET TO 53 FEET IN 3.5 HOURS.
STANDING WATER AT 53 FEET
NO CAVING
BACKFILLED 5/14/92

LEIGHTON & ASSOCIATES

GEOTECHNICAL BORING LOG B-18

Date 6-17-93 | Sheet 1 of 3

Project Pomona Unified School District-Diamond Ranch High School | Project No. 2920205-02

Drilling Co. Al-Roy Drilling | Type of Rig Bucket

Hole Diameter 26" | Drive Weight 0-30':3350#, 30'-58':2047#, 58'-85':1200# | Drop 12 in.

Elevation Top of Hole 1013+/- | Ref. or Datum See Geotechnical Map

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
									Logged By PLD Sampled By PLD/JLH
1010	0								COLLUVIUM (Qcol) @ 0-3': SANDY CLAY: gray brown, slightly moist,firm.
	5		@4.5' B:N25W, 30NE	1	3				WEATHERED BEDROCK - PUENTE FORMATION (Tp) @ 3'-12': Interbedded gray SILTSTONE and orange SANDSTONE: slightly moist, moderately dense; moderately weathered with carbonate and roots along bedding planes, tight, thin bedded. @ 5': DRIVE SAMPLE: Interbedded gray SILTSTONE and orange SANDSTONE: slightly moist, firm to moderately dense; laminated to thin bedded, moderately weathered.
1005									
	10		@10' B:N25W, 37NE						
1000									BEDROCK - PUENTE FORMATION(Tp) @ 12'-26': Interbedded gray SILTSTONE and orange SANDSTONE: slightly moist, stiff to moderately dense; laminated to thin bedded, bedding undulatory, moderately fractured with fractures tight.
	15								
			@16' B:N21W 20NE	2	4				@ 17': DRIVE SAMPLE: Interbedded gray SILTSTONE and orange SANDSTONE: slightly moist, firm to dense; laminated.
995									
	20								@ 20' and below: Encountering gypsum beds 1/3 to 1/4 inch thich with spacing of 6 inches.
990			@22' B:N12W, 30NE						
	25		@25' F:N85E 70NW, F:N34E 55SE	3	4				@ 25': Conjugate faults, clay lined with broken bedrock, displacement unknown. @ 25': SILICEOUS SILTSTONE: black, on west side of boring only. @ 26': DRIVE SAMPLE: Interbedded gray SILTSTONE and orange SANDSTONE: slightly moist, firm to dense; laminated. @ 26'-31': Interbedded SHALE, SILTSTONE and SANDSTONE: mottled gray and orange, slightly moist, firm; sheared, abundant polished surface, friable apperance, bedding is indistinct.
985									
	30								

GEOTECHNICAL BORING LOG B-18

Date 6-17-93 Sheet 3 of 3

Project Pomona Unified School District-Diamond Ranch High School Project No. 2920205-02

Drilling Co. Al-Roy Drilling Type of Rig Bucket

Hole Diameter 26" Drive Weight 0-30':3350#, 30'-58':2047#, 58'-85':1200# Drop 12 in.

Elevation Top of Hole 1013+/- Ref. or Datum See Geotechnical Map

Logged By PLD

Sampled By PLD/JLH

Elevation Feet	Depth Feet	Graphic Log (N S)	Attitudes	Tube Sample No.	Blows Per Foot	Dry Density pcf	Moisture Content, %	Soil Class. (U.S.C.S.)
950	60		@63' GB:N20W 25NE					
	65			7	31			
945			@69' GB:N20W 18NE					
	70							
940								
	75		@75' GB:N25W 28NE	8	34			
935			@79' GB:N57W 16NE					
	80		@81' GB:N40W 17NE					
930								
	85							
925								
	90							

GEOTECHNICAL DESCRIPTION

----------UNOXIDIZED ZONE----------

Below 62': SILTSTONE becomes black and hard and SANDSTONE becomes gray-blue and dense to hard, all sides of boring wet.

@ 65': DRIVE SAMPLE: Interbedded black SILTSTONE and orange SANDSTONE: slightly moist, stiff to dense; laminated, unoxidized.

@ 75': DRIVE SAMPLE: Interbedded black SILTSTONE and gray SANDSTONE: moist, dense; laminated and unoxidized.

@ 75.5': SILICEOUS SILTSTONE lens on the north west side of boring, 6-12" thick.

@ 83': Coring on SILICEOUS SILTSTONE: brown, very hard; well cemented.

@ 86': Coring on SANDSTONE: blue-gray, slightly moist, very hard; well cemented, medium to coarse grained.

TOTAL DEPTH 88 FEET
DOWN HOLE LOGGED TO 75.5 FEET
NO STANDING WATER
SEEPAGES AT 54 AND 58 FEET
NO CAVING
BACKFILLED ON 6/17/93

GEOTECHNICAL BORING LOG

DATE 6/21/93 DRILL HOLE NO. B-22 SHEET 1 OF 4

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Al-Roy Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 26" DRIVE WEIGHT 0-30': 3350# DROP 12 IN.

ELEVATION TOP OF HOLE 1035' REF. OR DATUM See Geotechnical Map

DEPTH (FEET)	GRAPHIC LOG (N S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0								LOGGED BY KDC SAMPLED BY PLD
								COLLUVIUM (Qcol)
								@ 0-2.5' CLAYEY SILT: gray, slightly moist, loose to firm.
								WEATHERED BEDROCK- PUENTE FORMATION (Tp)
5								@ 2.5'-4' SANDSTONE: yellow brown to brown, slightly moist, moderately dense; fine to medium grained.
								BEDROCK- PUENTE FORMATION (Tp)
								@ 4'-12' SANDSTONE: yellow brown to brown, slightly moist, moderately dense; massive, some scattered siltstone pods.
10		@ 10.5' S:N55W, 11NE	1	10/9"				@ 10' DRIVE SAMPLE: SANDSTONE: mottled orange, slightly moist, dense; coarse grained, moderately cemented.
								@ 10.5' Shear consists of plastic clay, undulatory, stiff.
		@ 13' S:N55E, 32NW						@ 12'-70' CONGLOMERATE: brown, slightly moist, dense to hard; moderately to well cemented, granitic and sedimentary clasts, cobble to boulder size, fine to coarse grained sandstone matrix.
15								@ 17' Started coring.
								@ 19' Open fracture, randomly oriented.
20								@ 23' CONGLOMERATE becomes more cemented.
25		@ 28' J:N55W, vert.						@ 28' Clay-lined fracture.
30								

LEIGHTON & ASSOCIATES

GEOTECHNICAL BORING LOG

DATE 6/21/93 DRILL HOLE NO. B-22 SHEET 2 OF 4

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Al-Roy Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 26" DRIVE WEIGHT 30' - 58': 2047# DROP 12 IN.

ELEVATION TOP OF HOLE 1035' REF. OR DATUM See Geotechnical Map

DEPTH (FEET)	GRAPHIC LOG (N S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30								LOGGED BY KDC SAMPLED BY PLD
								@ 31'-36' Well cemented and hard zone.
35								
		@ 38.5' GB: N50W, 13NE	2	7"				@ 38.5' Sheared SILTSTONE bed.
40		@ 41' J:N85W, 72SW						@ 41' Clay-lined fracture.
45								
50								
55			Bag 1 58-59'					
60								

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GEOTECHNICAL BORING LOG

DATE 6/21/93 DRILL HOLE NO. B-22 SHEET 3 OF 4

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Al-Roy Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 26" DRIVE WEIGHT 58'-85': 2100# DROP 12 IN.

ELEVATION TOP OF HOLE 1035' REF. OR DATUM See Geotechnical Map

LOGGED BY KDC

SAMPLED BY PLD

DEPTH (FEET)	GRAPHIC LOG (N / S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
60								@ 62'-64' SANDSTONE: yellow brown, moist, moderately dense; fine to medium grained, upper contact is sharp.
			3	30/10"				
65		@ 64' F:N70W, 64SW						@ 63' DRIVE SAMPLE: SANDSTONE: brown, moist, very dense; fine to coarse grained, cemented.
								@ 64' Minor fault with dip-slip displacement.
70		@ 70' GB: N10E, 6NW						@ 70'-92' Interbedded brown and gray SILTSTONE and yellow brown SILTY SANDSTONE: moist, stiff to dense; poorly bedded, upper contact is undulatory.
		@ 73' GB: N5W, 5NE						
75		@ 75' GB: N5E, 5SE	4	35				@ 75'-78' DRIVE SAMPLES(3): Interbedded SANDSTONE and SILTSTONE: yellow brown, moist sandstone and slightly moist siltstone, very dense to very hard; oxidized stains, cemented.
			5	40				
			6	25				
80		@ 80' F:N40W, 29NE						@ 80' Fault
85			7	37				@ 85' DRIVE SAMPLE: Same as above samples from 75'-78'.
		@ 86' GB: N20W, 10NE						
90								

GEOTECHNICAL BORING LOG

DATE 6/21/93 DRILL HOLE NO. B-22 SHEET 4 OF 4

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Al-Roy Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 26" DRIVE WEIGHT 58'-85': 1200# DROP 12 IN.

ELEVATION TOP OF HOLE 1035' REF. OR DATUM See Geotechnical Map

DEPTH (FEET)	GRAPHIC LOG (N S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
90								LOGGED BY KDC SAMPLED BY Not Sampled
		@ 93' GB: N10W, 9NE						UNOXIDIZED ZONE
95								@ 92'-95' SILTSTONE: dark gray, moist, stiff; massive, unoxidized.
								@ 95'-97' SANDSTONE: brown, moist, dense.
100								**TOTAL DEPTH 97 FEET** **DOWN HOLE LOGGED TO 95 FEET** **NO STANDING WATER** **NO SEEPAGES** **BACKFILLED 6/22/93**
105								
110								
115								
120								

LEIGHTON & ASSOCIATES

GEOTECHNICAL BORING LOG

DATE 6/30/93 DRILL HOLE NO. B-31 SHEET 1 OF 3

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Gallagher Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 30" DRIVE WEIGHT 0-30': 5742# DROP 12 IN.

ELEVATION TOP OF HOLE 1033' REF. OR DATUM See Geotechnical Map

LOGGED BY PLD

SAMPLED BY JLH

DEPTH (FEET)	GRAPHIC LOG (E W)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
0								Upper 2 feet of soil removed from drill pad.
		@ 2' B:N10W, 29NE						COLLUVIUM (Qcol)
								@ 0-1' SANDY CLAY: dark brown, slightly moist, firm.
								LANDSLIDE DEBRIS (Qls)
5		@ 5' J:N60E, 75SE						@ 1'-66' Interbedded gray SILTSTONE and brown SANDSTONE: slightly moist to wet, firm to moderately dense; hightly fractured, hightly folded and sheared zones, open fractures, caving and seepages, upper 10 feet weathered.
		@ 9' B:N5W, 23NE						@ 5' Joint 1/4 inch wide infilled with calcium carbonate.
10			1	Push				@ 8'-9' Sheared SILTSTONE.
		@ 12' B:N5E, 35SE						@ 10' DRIVE SAMPLE: SILTSTONE: light tan to light gray, slightly moist, firm; laminar bedding with interbedded light orange SANDSTONE, micaceous.
								@ 10' Landslide debris becomes less weathered.
15								
		@ 17' B:N17W, 20NE						@ 17' Landslide debris becomes firmer.
20			2	1				@ 20' DRIVE SAMPLE: SILTSTONE: light orange to medium gray, slightly moist, moderately firm; laminar bedding, shiny slick surface on fractures within bedding, micaceous with thin interbeds of fine SANDSTONE.
		@ 22' B:N17W, 20NE						
25								@ 28' Landslide debris becomes moist.
		@ 29' J:N65W, vert.						@ 29' Open joint 1/8 inch wide wihtin 2 inch thick SANDSTONE bed. Fracture spacing is 1 to 2 inches.
30								

GEOTECHNICAL BORING LOG

DATE 6/30/93 DRILL HOLE NO. B-31 SHEET 2 OF 3

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Gallagher Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 30" DRIVE WEIGHT 30' - 58': 4302# DROP 12 IN.

ELEVATION TOP OF HOLE 1033' REF. OR DATUM See Geotechnical Map

LOGGED BY PLD

SAMPLED BY JLH

DEPTH (FEET)	GRAPHIC LOG (E W)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION
30			3	3				@ 30' DRIVE SAMPLE: SILTSTONE: Orange, slightly moist, firm; laminar bedding, micaceous.
								@ 32' Slight to moderate seepage continuous to the bottom of the boring.
35								
40			4	5				@ 40'-42' DRIVE SAMPLES: SILTSTONE: Orange wih medium gray, slightly moist, moderately dense; fine SANDSTONE interbeds, micaceous.
			5	4				
			6	3				
45								@ 46' Bedding rolls over to about 70 degrees to the east.
								@ 48'-51' Heavy caving from the north side of boring. Boring wall belled out 3 feet beyond original wall. Material highly folded, polished and sheared.
50		@ 51' B:E-W, 10S	7	2				@ 50' DRIVE SAMPLE: SILTSTONE: Orange w/olive green smooth layers, moist, firm; fine SANDSTONE interbeds. Beds appear to be jumbled.
55		@ 55' B:N35W, 30NE						
60								

GEOTECHNICAL BORING LOG

DATE 6/30/93 DRILL HOLE NO. B-31 SHEET 3 OF 3

PROJECT Pomona Unified School District-Diamond Ranch High School PROJECT NO. 2920205-02

DRILLING COMPANY Gallagher Drilling Co. TYPE OF RIG Bucket

HOLE DIAMETER 30" DRIVE WEIGHT 58'-87': 3102# DROP 12 IN.

ELEVATION TOP OF HOLE 1033' REF. OR DATUM See Geotechnical Map

DEPTH (FEET)	GRAPHIC LOG (N S)	ATTITUDES	TUBE SAMPLE NO.	BLOWS PER FOOT	DRY DENSITY PCF	MOISTURE CONTENT, %	SOIL CLASS. (U.S.C.S.)	GEOTECHNICAL DESCRIPTION LOGGED BY PLD SAMPLED BY JLH
60		@ 61' PRS: E-W, 63S	8	4				@ 60' DRIVE SAMPLE: SILTSTONE: medium gray, moist, firm; laminations are vertical or near vertical in sample, micaceous, some fine SANDSTONE interbeds. @ 61' Bedding is nearly vertical.
65	RS?							UNOXIDIZED ZONE @ 66' SILTSTONE is siliceous and very stiff.
70			9	6				@ 70' DRIVE SAMPLE: SILTSTONE: dark gray, moist, firm to very stiff; light gray SANDSTONE interbeds, micaceous, SILTSTONE has laminar bedding and is jumbled. Base of landslide could not be reached due to water, anticipated to be shallower than the total depth of boring at 80 feet.
75								
80								**TOTAL DEPTH 80 FEET** **DOWN HOLE LOGGED TO 66 FEET** **STANDING WATER AT 66 FEET** **SEEPAGE AT 32 FEET CONTINUOUS TO THE BOTTOM.** **SLIGHT CAVING STARTING AT 40 FEET** **HEAVY CAVING FROM 46 TO 51 FEET** **BACKFILLED 7/1/93**
85								
90								

LEIGHTON & ASSOCIATES

Appendix B

Partial Geotechnical Map and Pertinent Geotechnical Cross Sections

(LAI Geotechnical Investigation)

PROPOSED SOLAR ARRAYS

CALTRANS RIGHT-OF-WAY

POMONA FREEWAY

Square Trail

Seismic Line #3

Seismic Line #4

FAULT C

FAULT D

EAST FAULT

Ss+Slt

Ss+Cg

Ss+Cg+Slt

Col

Qls

Qls A

Qls B

Qls (?)

Tp

Tp Ss+Cg

B-1 T.D. 98'

B-2 T.D. 97' 83'-97'

B-2a T.D. 98'

B-3 T.D. 79'

B-4 T.D. 58'

B-5 T.D. 90'

B-18 T.D. 88' 54', 58'

B-20 T.D. 73'

B-21 T.D. 58'

B-23 T.D. 100' 46', 84'-93'

B-31 T.D. 80' 32'-80'

B-61 T.D. 80' 43'

B-64 T.D. 45'

B-67 T.D. 75' 55'-58'

PB-50 T.D. 68' 43'

PB-52 T.D. 10' (Refusal)

PB-55 T.D. 26' (Refusal)

PB-56 T.D. 66' (Refusal)

PB-57 T.D. 53' (Refusal)

PB-58 T.D. 20' (Refusal)

PB-63 T.D. 65'

PB-66 T.D. 67'

PB-68 T.D. 65' 52', 56'

PB-69 T.D. 6' (Refusal)

PT-118

PT-119

PT-120

RV9 950.85

T-4 T-5 T-6 T-7 T-8 T-9 T-10 T-11 T-14 T-16 T-17 T-30 T-31 T-34 T-35 T-36 T-37 T-44 T-45 T-46 T-47 T-51

A A' B B' C C' D D' E F F' G G' L M M' N O O' P P' Q Q' R R'

3 5 8 9 11 12

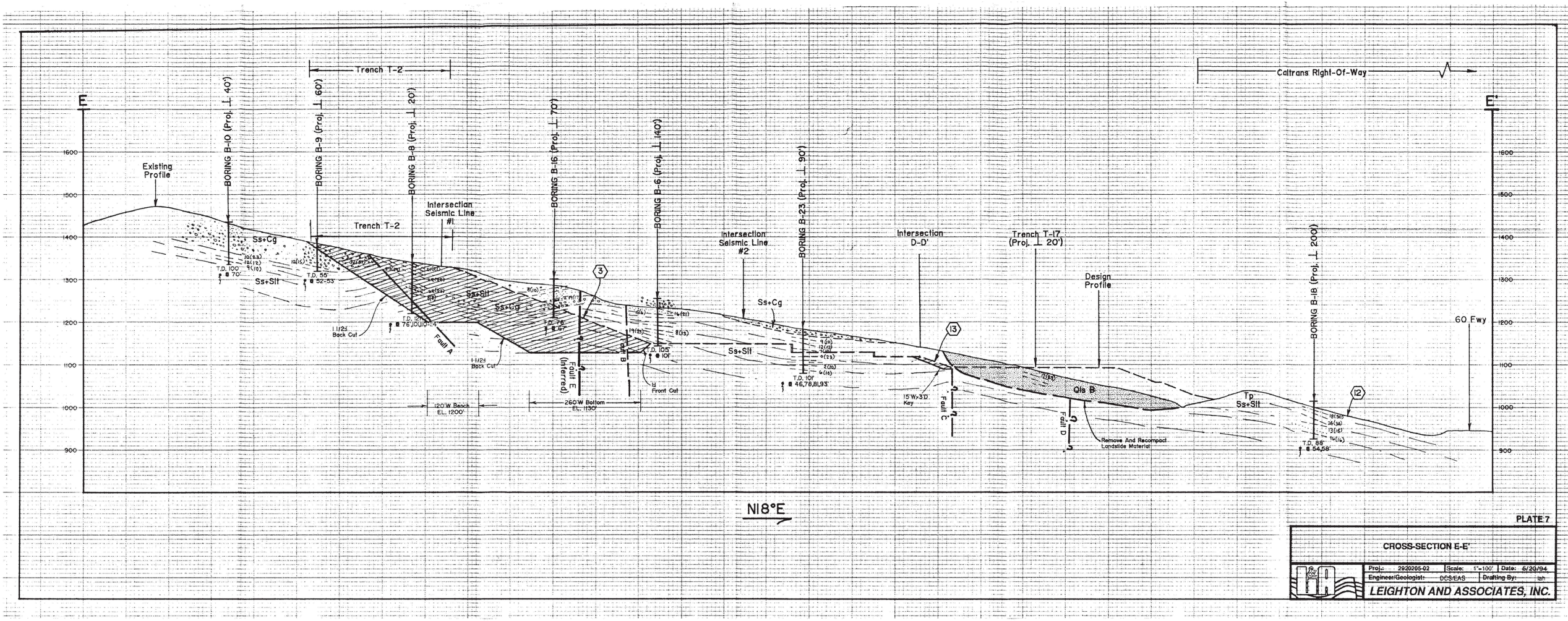


PLATE 7

CROSS-SECTION E-E'

Proj.: 2930205-02	Scale: 1"=100'	Date: 6/20/94
Engineer/Geologist: DCS/EAS	Drafting By: lah	

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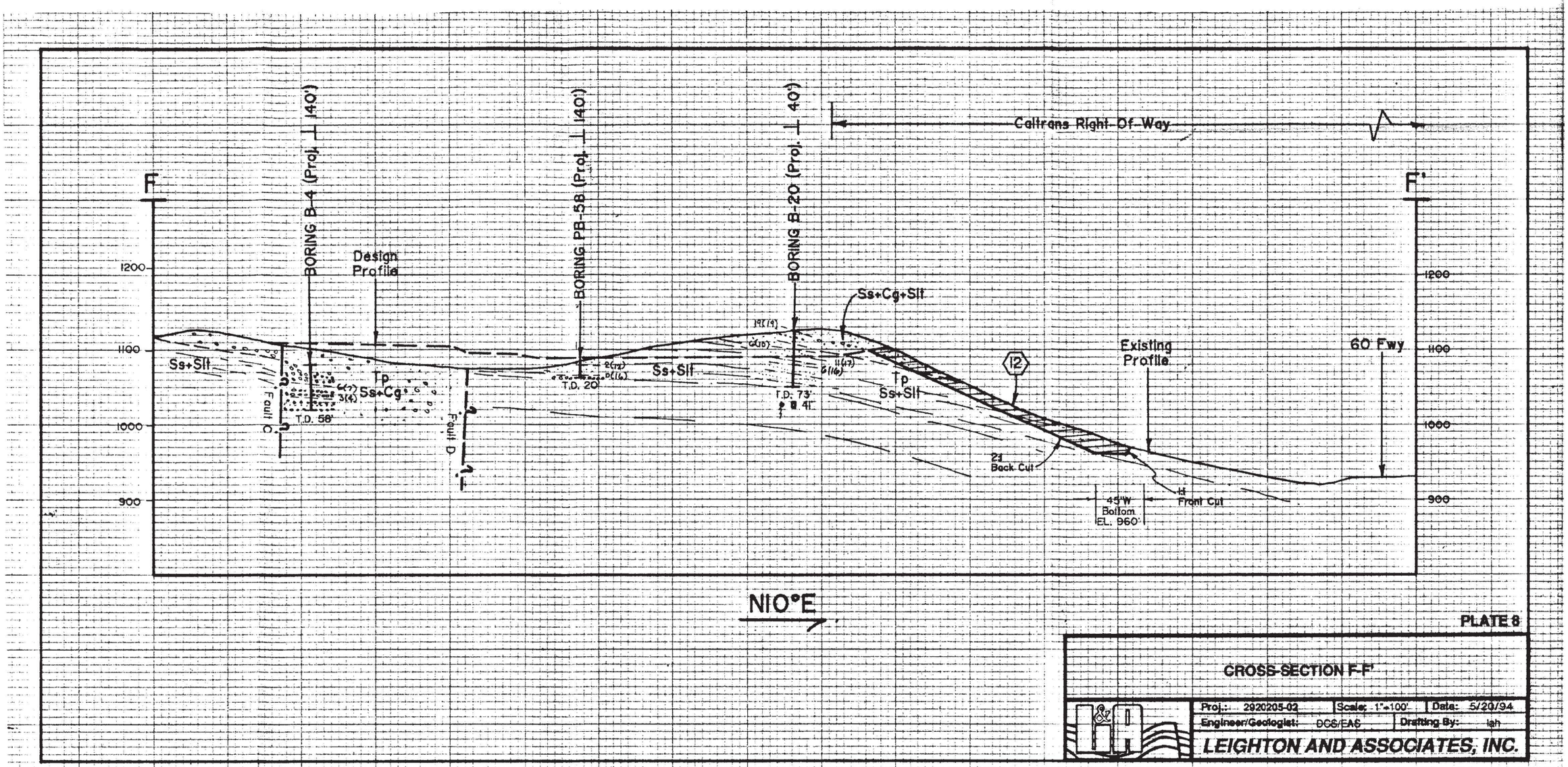


PLATE 8

CROSS-SECTION F-F'

Proj.: 2920205-02	Scale: 1"=100'	Date: 5/20/94
Engineer/Geologist: DCS/EAS	Drafting By: lah	

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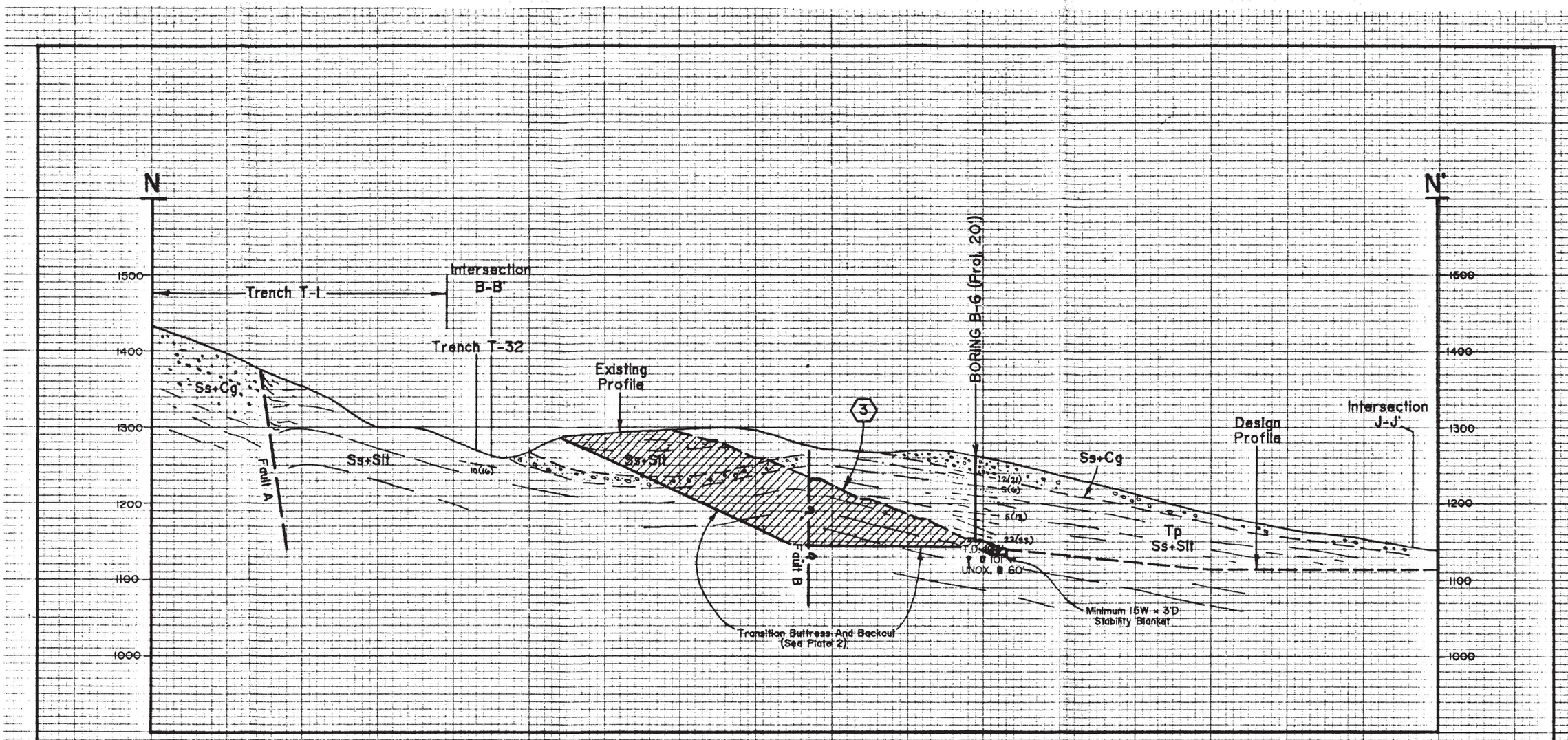


PLATE 16

CROSS-SECTION N-N'

Proj.: 2920205-02	Scale: 1"=100'	Date: 5/20/94	
Engineer/Geologist: DCS/EAS	Drafting By: lph		

LEIGHTON AND ASSOCIATES, INC.

Appendix C

Excerpts from LAI Rough Grading Report

LEIGHTON AND ASSOCIATES, INC.
Geotechnical and Environmental Engineering Consultants

FINAL REPORT OF GEOTECHNICAL OBSERVATION AND TESTING DURING ROUGH GRADING AND PHASE 1 CONSTRUCTION OF THE DIAMOND RANCH HIGH SCHOOL, PHILLIPS RANCH ROAD AND STATE ROUTE 60, CITY OF DIAMOND BAR, LOS ANGELES COUNTY, CALIFORNIA

VOLUME I

June 30, 1998

Project No. 2920205-006

Prepared For:

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SUMMARY OF GEOLOGIC CONDITIONS

Earth Materials

Earth materials encountered during rough grading of the school site included surficial deposits and bedrock. Surficial deposits encountered included alluvium, colluvium, landslide debris and previously placed controlled and uncontrolled fill. Alluvium was present in the bottom of active channels onsite. Colluvium was present at the base of slopes and in swales. Landslide debris was encountered in several areas onsite. Landslide A was exposed in the western portion of the site. Landslide B was exposed in the north-central portion of the site, in the vicinity of the soccer fields. A third landslide was encountered in the vicinity of Slope 12 and the future expansion area adjacent to SR 60. Uncontrolled fill was present primarily along unimproved roads present on the site. Previously placed controlled fill was encountered during grading operations adjacent to Phillips Ranch Road.

Bedrock exposed during rough grading consisted of interbedded siltstone and sandstone of the late Miocene Puente Formation. Conglomerate consisting of gravel and cobble sized, subrounded clasts suspended by a medium- to coarse-grained sandstone matrix, was also exposed extensively over the project site. The siltstone sequences were thinly to moderately bedded, light to dark gray, moist, stiff and moderately to slightly fractured. Sandstone and conglomerate zones were massive to poorly bedded, light brown to gray brown and dense. Several outcrops of siliceous siltstone and hard sandstone and conglomerate were encountered during grading operations. Where possible, these zones were excavated with single shank rippers on a D9 or D10 caterpillar dozer. However, drilling and blasting were required in several areas to facilitate earthwork operations.

Bedrock Structure

Sequences of interbedded siltstone and sandstone were exposed in various areas across the site. In general, the bedding planes within the bedrock unit dipped to the northeast at 5 to 30 degrees. Sequences of massive sandstone and conglomerate were also exposed, primarily in the northeast portion of the site. Local areas of faulting and folding were observed which disrupt this general trend.

Several steeply dipping, northwest-trending, subparallel faults were exposed across the site. These faults are considered to be inactive based upon our observations during the grading operations and during our preliminary investigation. With a few exceptions, the geologic conditions encountered onsite were generally as anticipated and are illustrated on the geotechnical map.

Landslides

Landslide A was a large translational bedrock failure covering most of the western portion of the site. Excavation of the landslide revealed highly broken and fractured bedrock debris mantled by porous colluvium. The basal rupture surface of the slide was marked by a well developed clay shear zone. The limits and condition of the landslide were generally as anticipated. The debris from Landslide A was completely removed until undisturbed bedrock was exposed. Subdrains were constructed in the landslide removal bottom with an outlet provided in the canyon at the toe of the removal (Plate 8).

Landslide B was also a large bedrock failure. However, the landslide was smaller than mapped in our original geotechnical review (Leighton, 1994). The landslide actually covered only the eastern portion of the originally mapped limits. Grading operations on the western portion of the suspected slide exposed a well-bedded sequence of sandstone and siltstone. Continuous bedding, dipping consistently between 9 and 28 degrees to the southeast, was traced across what had previously been mapped as the western limit of Landslide B. This bedding orientation was also observed within the bedrock below Landslide B to the east. Within the actual limits of Landslide B, highly broken and fractured bedrock materials and a well developed, sheared clay basal rupture surface were exposed. Landslide B was completely removed until undisturbed bedrock was encountered. Subdrains were constructed in the removal bottom with an outlet provided to the canyon north of the slide area (Plate 5).

A previously unidentified landslide was encountered in the future expansion area adjacent to SR 60. This slide consisted of highly broken bedrock debris with deep colluvium-filled fracture zones. Colluvium, buried by the landslide, was present near the toe of the slide. This landslide was completely removed until undisturbed bedrock was encountered. Subdrains were constructed along the removal limit back cut, and outlet at the toe of the fill slope adjacent to SR 60 (Plate 5).

Landslide C was mapped in the eastern portion of the parking area by Pioneer Consultants during a previous investigation of the site. Based upon our preliminary investigation, it was our opinion that the landslide was not present as mapped. However, we recommended that the area be mapped in detail during grading to confirm the absence or presence of the landslide. Ingrade geologic mapping of the area following removal operations exposed well-bedded dense sandstone, siltstone and conglomerate with no evidence of a landslide. Continuous bedding was mapped across the previously mapped margins of the queried slide. A syncline was mapped across this portion of the site during rough grading. Bedding in the northern portion of the area dips to the south at 10 to 20 degrees. Toward the south, bedding is folded and dips northerly at 6 to 27 degrees. No landslide was present in this area.

Ground Water and Subdrainage

Perched ground water was encountered following removal operations in several of the canyon areas onsite. Several small, perched water seeps were encountered in the vicinity of the Landslide A removal. A moderate seep (more that 1 gallon per minute) was present in the canyon area north and east of the Landslide B removal. Several small to moderate perched water seeps were present in the future expansion area adjacent to SR 60, below Slope 12. Following removal of compressible soils, subdrain systems were placed in these and all canyon areas of the site. The canyon subdrain systems consisted of 9 cubic feet per linear foot of 3/4-inch crushed gravel, placed in a 3-foot wide by 3-foot deep trench, surrounded by Mirafi 140 filter fabric or an approved equivalent. An 8-inch diameter solid, Schedule 40 PVC pipe provided outlet for the subdrain system in the Landslide A area. This drain outlets into the canyon adjacent to SR 60 at the extreme northwest end of the site (Plate 8). An 8-inch diameter solid PVC pipe also provides outlet for the canyon subdrain system below the soccer fields in the Landslide B area (Plate 5). In addition to the main canyon drain, several lateral drains were constructed following removals to drain low areas or areas where perched water seeps were encountered. A supplemental drain was placed along the north side of the Landslide B area to remove water from specific areas where seeps were encountered. This upper subdrain outlets via 4-inch diameter solid pipe onto a terrace drain on the slope which descends from the expansion area pad to the canyon below.

An extensive subdrain system was constructed to remove water from the expansion site fill area, north of the eastern ball field. A pair of 4-inch diameter pipes provide outlet for the lowest subdrain system placed in this area. This subdrain outlets at the toe of the slope adjacent to the storm drain inlet structure below SR 60. Additional subdrains were placed along the removal back cut in this area every 25 to 30 feet vertically as fill placement progressed. Each subdrain was provided with an outlet to the slope face approximately every 100 feet horizontally (Plate 5).

A 4-inch diameter solid pipe provided outlet for the subdrain placed in the small canyon adjacent to, and east of, the hard court area. An 8-inch diameter pipe outlet was provided for the subdrain system constructed in the canyons under the parking area on the east side of the site. This outlets into the easternmost canyon at the site above the Phillips Ranch Road offramp from the eastbound lanes of SR 60 (Plate 2).

Subdrainage was also provided for all of the stabilized slopes onsite. Heel drains consisting of 9 cubic feet per linear foot of ¾-inch crushed rock, placed in a 3-foot wide, 3-foot deep trench and wrapped with filter fabric were placed in the keys at the toes of the back cuts for Slope Nos. 3, 3A, 4, 5 and 7. A similarly constructed drain was placed at the toe of the front cut for Slope No. 3. The heel and toe drains for Slope No. 3 were tied into the canyon subdrain system constructed in the Landslide A removal area. The heel drains for Slope No. 4 and Slope No. 7 were tied into the subdrain system which drains the parking lot area and the easternmost canyon. The heel drain for Slope No. 5 outlets to the catch basin south of the school entrance road at the intersection with Phillips Ranch Road. Back drains consisting of 3 cubic feet per linear foot of ¾-inch crushed rock placed in a trench and surrounded with Mirafi 140 filter fabric, or an approved equivalent, were constructed along the back cut for the stabilized slopes as filling progressed. These drains were constructed horizontally along the back cut every 25 to 35 vertical feet. Each subdrain was provided with outlets to the slope face using 4-inch diameter PVC Schedule 40, solid pipe. Outlets were provided approximately every 100 feet horizontally along the back cut. Backdrains were provided for Slopes 3, 3A, 4, 5, 7, 10, 12, 13, and 14.

All subdrains constructed onsite during rough grading were surveyed by Tri-Star, the surveyor under contract with Mitzel. The subdrain locations are shown on the As-Graded Geotechnical Maps, Plates 1 through 8.

SOIL ENGINEERING CONDITIONS

Site Preparation

Prior to grading, the site was cleared of brush and trees. Most organic material was hauled offsite, however, some debris remained in the canyon bottoms. During removal operations, remaining organic material was removed from fill materials by hand labor and disposed of offsite.

Removal Operations

Compressible surficial materials were removed during grading operations until competent unweathered bedrock was encountered. In canyon areas and in areas where relatively thick accumulations of surficial soils were present, this required dedicated removal operations with heavy equipment. Where the soils were relatively thin, removal operations were accomplished as a consequence of normal benching operations.

Landslides A, B and the newly discovered landslide in the expansion area were completely removed to undisturbed bedrock.

Previously placed fill was encountered during grading of the cul-de-sac drop-off area adjacent to the entry road at the east end of the site. This fill was part of the stability fill constructed for the east facing slope adjacent to Phillips Ranch Road. The fill appeared to be relatively dry and loose. However, it is located in a nonstructural slope area east of the cul-de-sac. Therefore, this material was left in place

Fill Placement

Fill materials were spread in thin level lifts and moisture-conditioned as necessary. Compaction of each lift was achieved using sheepsfoot rollers and/or by wheel-rolling with heavy equipment. The fill slopes along the northern edge of the site, which descend to the SR 60 alignment, were compacted by backrolling with a sheepsfoot roller as filling progressed. After trimming, the slopes were rolled with a vibratory sheepsfoot and grid-roller using a side boom dozer to achieve the required compaction. Other slopes onsite were overfilled a minimum of 3 feet, then trimmed back to a compacted core. Portions of these slopes were also rolled with a vibratory sheepsfoot and grid-roller, as necessary to achieve the required compaction.

Appendix D

Laboratory Test Data

(LAI Geotechnical Investigation and Rough Grading)

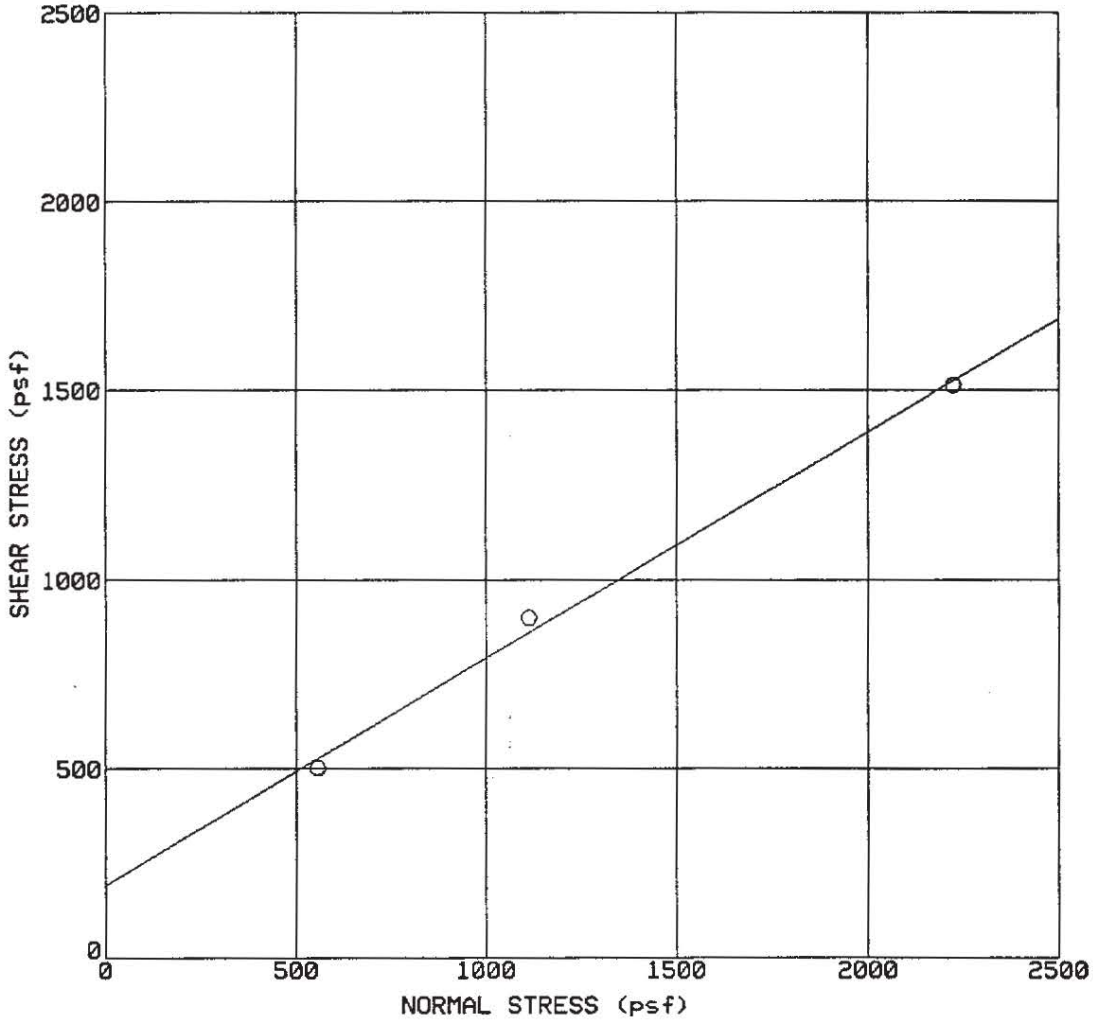
SAMPLE LOCATION	SOLUBLE SULFATE (%)	INITIAL MOISTURE (%)	COMPACTED DRY DENSITY (pcf)	FINAL MOISTURE (%)	VOLUMETRIC SWELL (%)	EXPANSION INDEX	EXPANSION CLASSIFICATION
North Gym Pad		12.8	99.5	22.0	1.2	12	Very Low
Wall Caisson	.200	14.2	95.5	29.7	5.9	59	Medium
Caisson Area	<.0150	11.4	103.9	24.0	6.2	62	Medium
SW Gym Pad	.400	10.9	106.1	21.4	3.2	32	Low
North Gym Pad	<.0150	10.0	108.7	20.1	2.3	23	Low
SE Gym Pad	.200	11.0	105.9	21.6	2.3	23	Low
SE Hardcourt	.200	13.0	98.9	25.0	5.7	57	Medium
Hardcourt	.100	11.4	104.0	23.1	6.3	63	Medium
NW Hardcourt	.150	11.4	104.7	23.6	7.0	70	Medium
Slope 13	<.0150	25.0	71.8	52.8	8.0	80	Medium
E of A1		6.5	101.5	25.0	4.4	44	Low
S of Bldg. D		2.6	102.5	29.7	8.4	84	Medium
		10.7	101.8	29.0	8.0	80	Medium
		11.8	101.7	28.3	7.1	71	Medium
Mechanical Rm S of 11C		4.6	105.0	23.1	6.7	67	Medium

*TEST METHOD: UBC 29-2

EXPANSION INDEX AND SOLUBLE SULFATE TEST RESULTS

Project No. 2920205-006

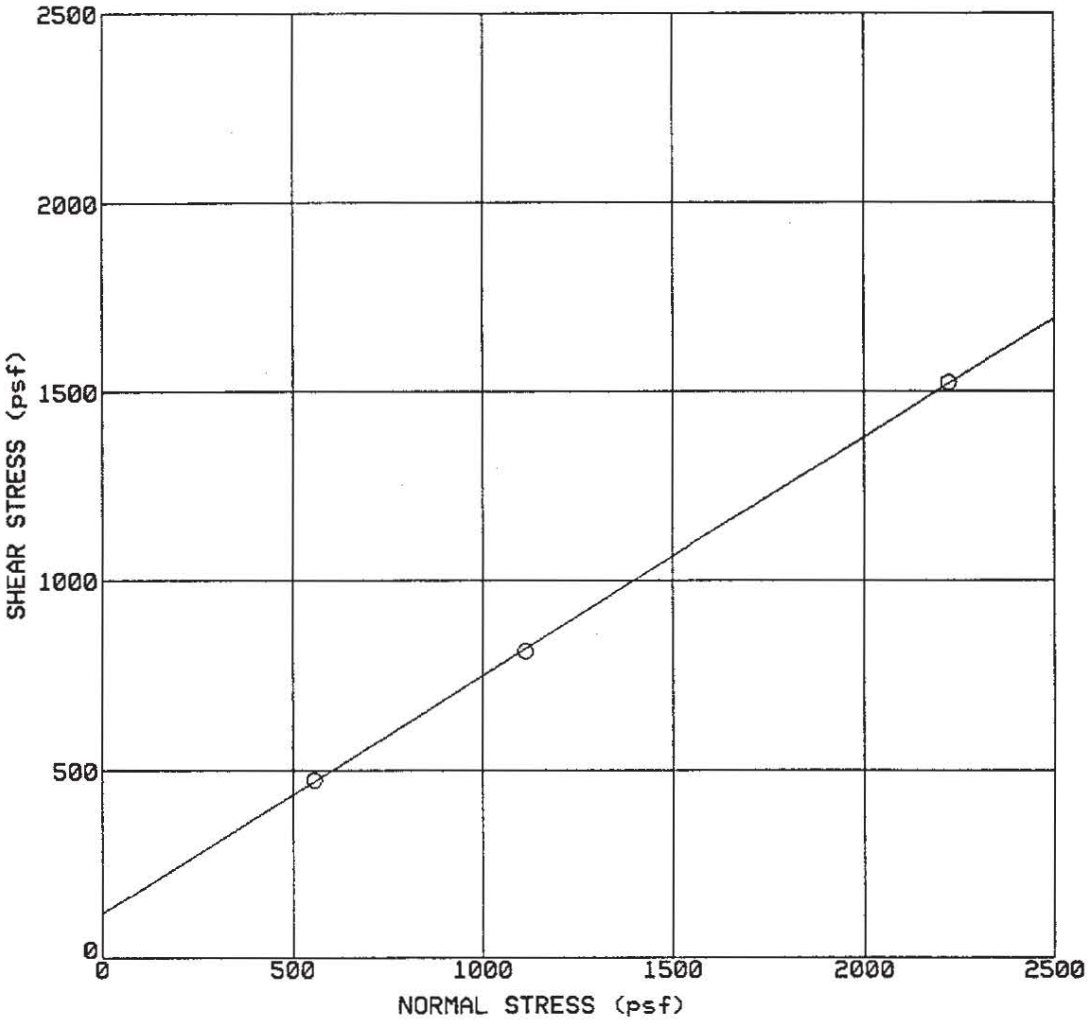
Figure No. B-3



Log No.	B-11	Before Test:	
Sample No.	Bag-2	Dry Density (pcf)	95.9
Depth (ft)	25.0	Moisture Content (%):	29.5
Soil Type	Ss		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	31.0	
	Cohesion (psf)	190.0	

DIRECT SHEAR
ASTM D 3080-90

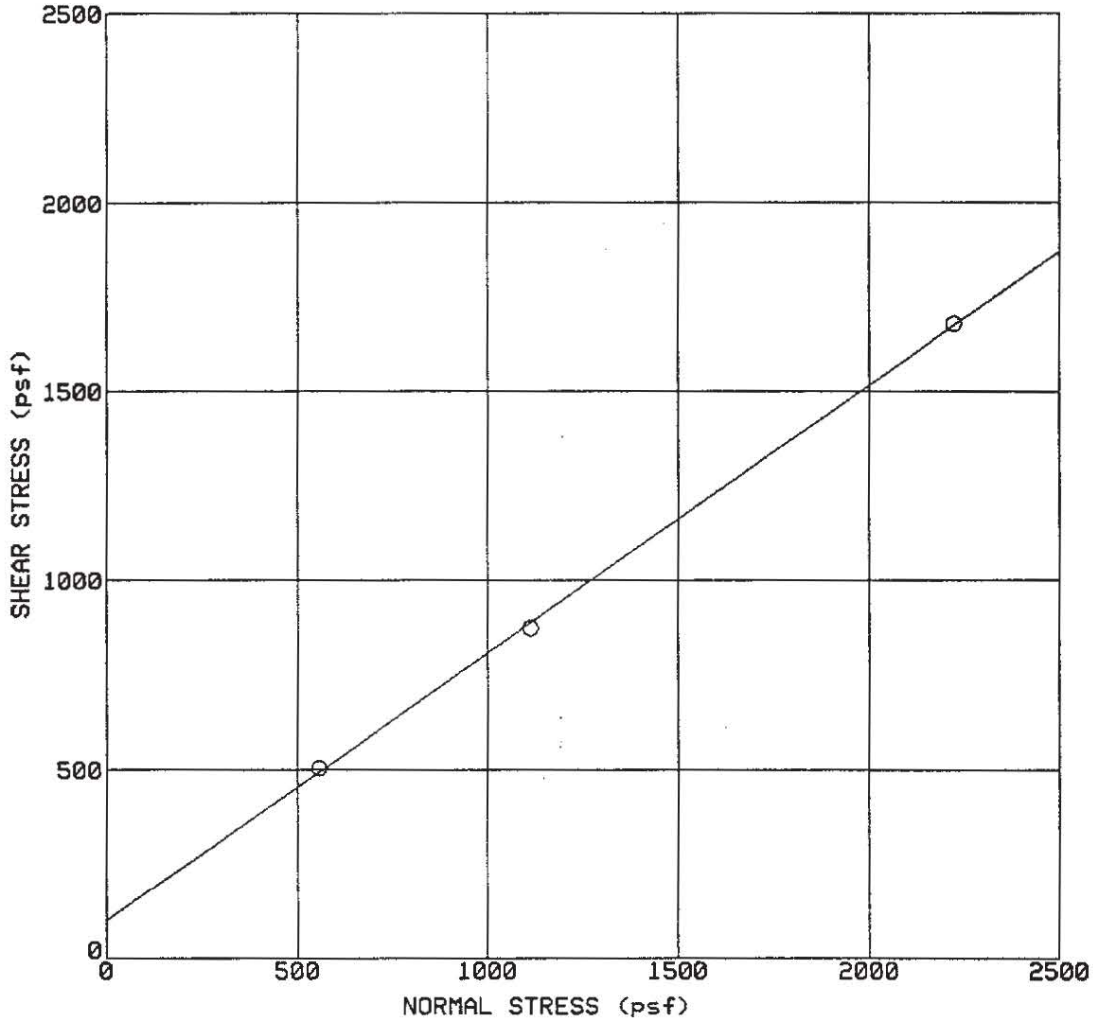
Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-4



Log No.	B-13	Before Test:	
Sample No.	Bag-1	Dry Density (pcf)	108.4
Depth (ft)	13.0	Moisture Content (%):	15.9
Soil Type	Ss		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	32.0	
	Cohesion (psf)	120.0	

DIRECT SHEAR
ASTM D 3080-90

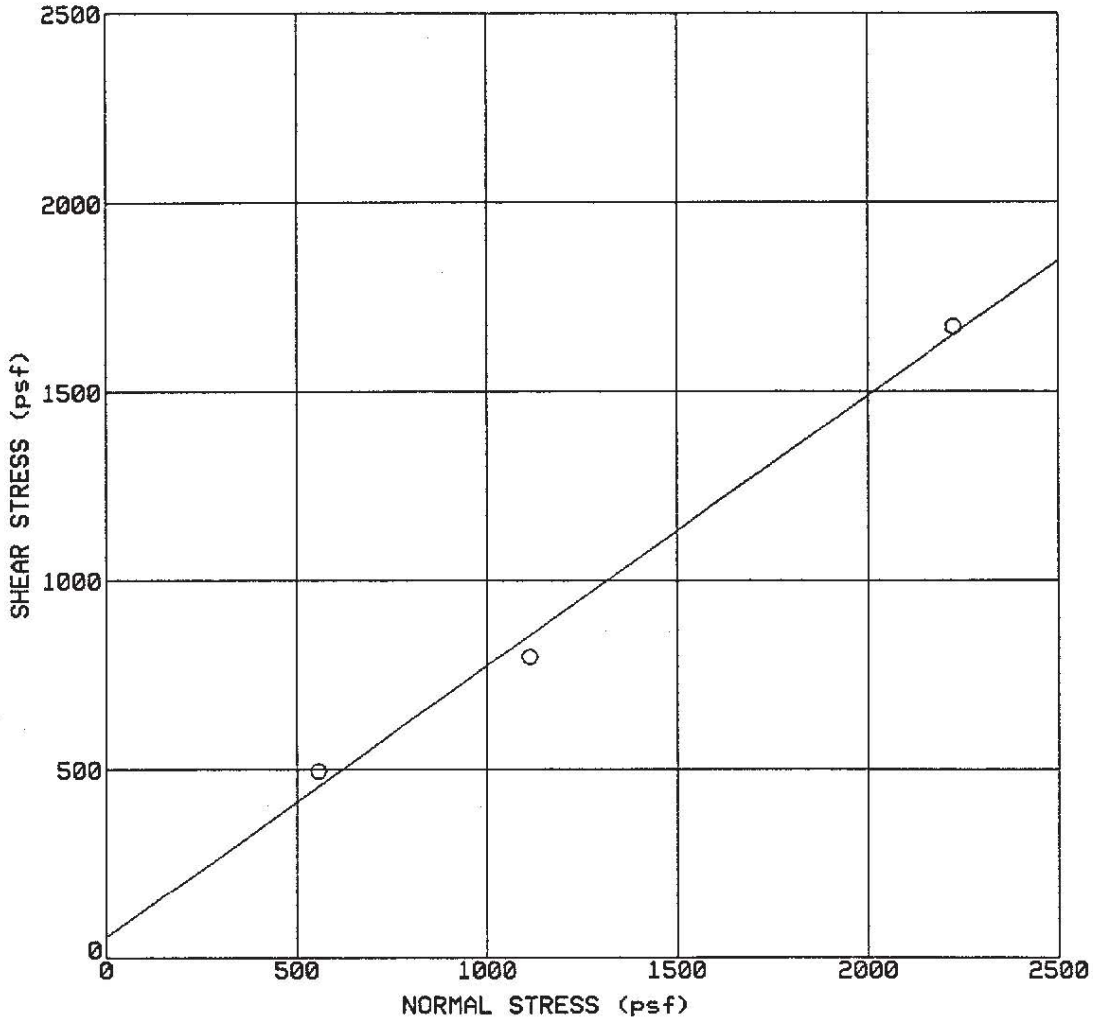
Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-5



Log No.	B-13	Before Test:	
Sample No.	Bag-2	Dry Density (pcf)	104.4
Depth (ft)	44.0	Moisture Content (%):	22.0
Soil Type	Ss/Slt		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	35.0	
	Cohesion (psf)	100.0	

DIRECT SHEAR
ASTM D 3080-90

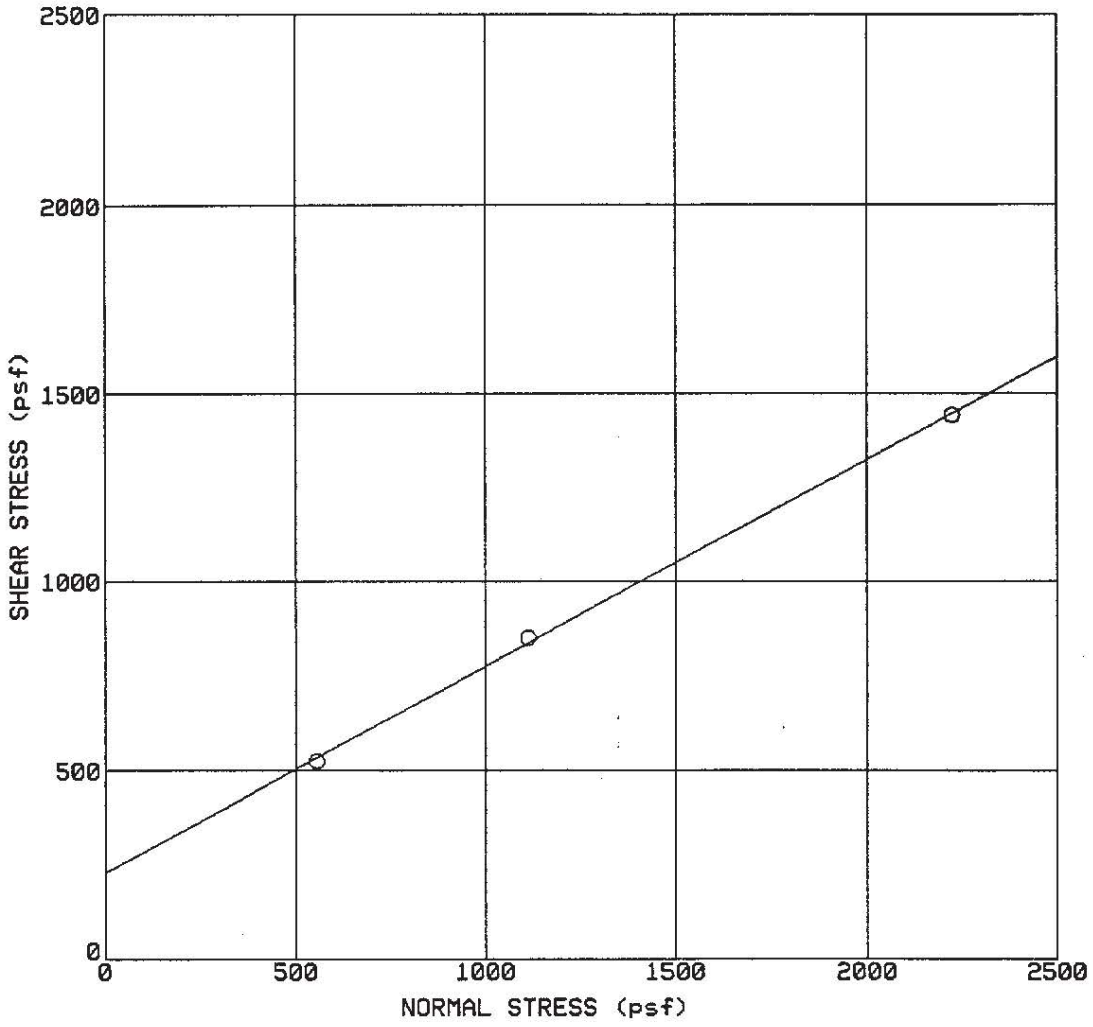
Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-6



Log No.	B-14	Before Test:	
Sample No.	Bag-1	Dry Density (pcf)	100.8
Depth (ft)	43.0	Moisture Content (%):	24.9
Soil Type	Ss		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	35.5	
	Cohesion (psf)	55.0	

DIRECT SHEAR
ASTM D 3080-90

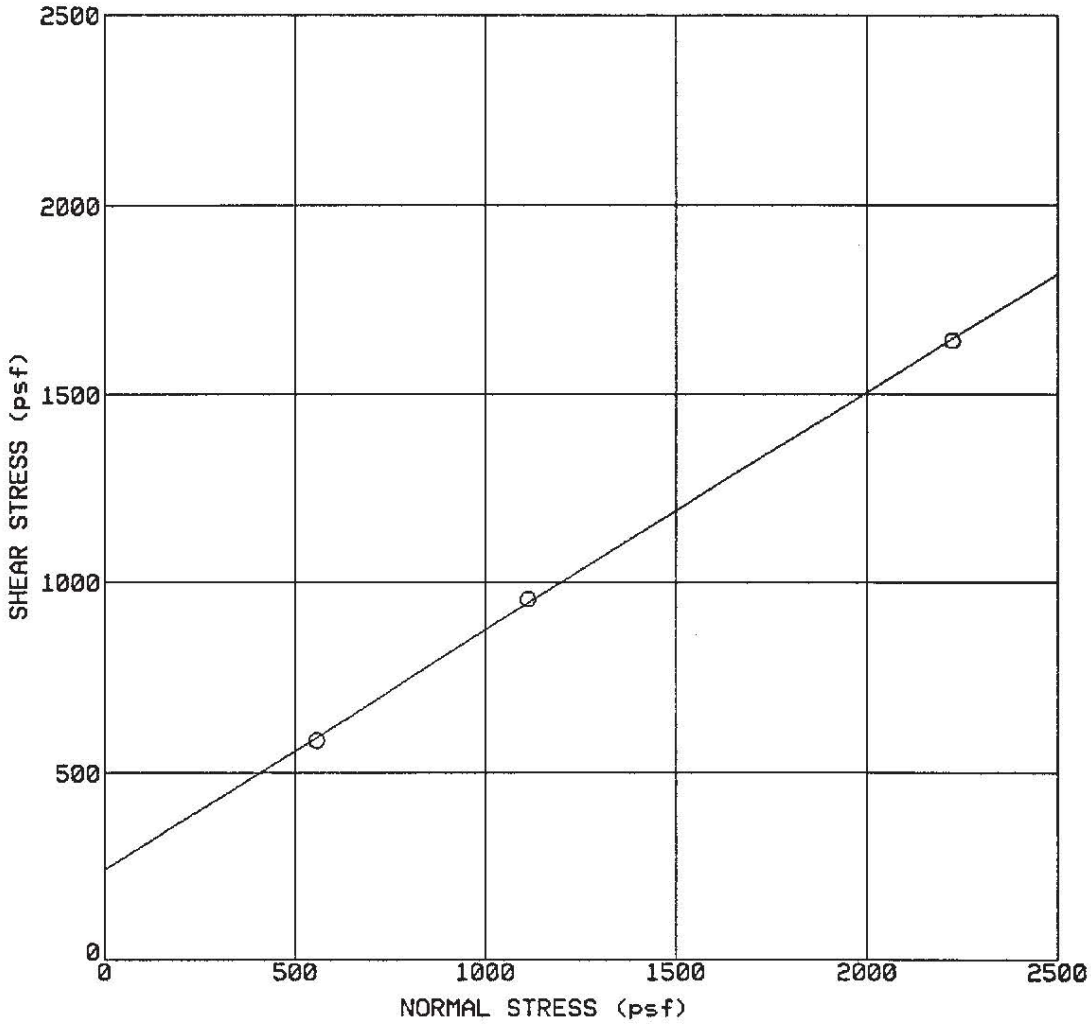
Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-7



Log No.	B-15	Before Test:	
Sample No.	Bag-1	Dry Density (pcf)	91.7
Depth (ft)	25.0	Moisture Content (%):	33.3
Soil Type	Slt		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	28.5	
	Cohesion (psf)	225.0	

DIRECT SHEAR
ASTM D 3080-90

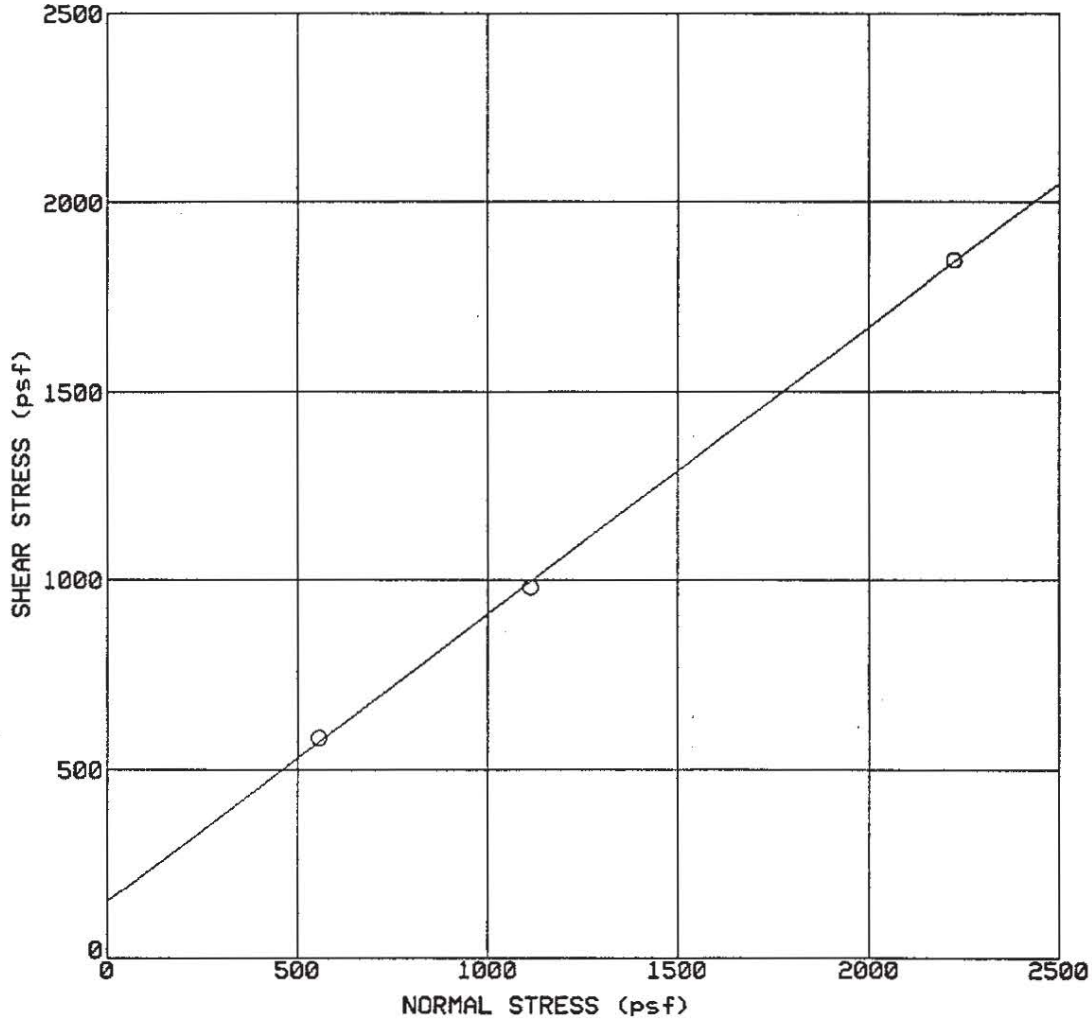
Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-8



Log No.	B-23	Before Test:	
Sample No.	Bag A	Dry Density (pcf)	98.0
Depth (ft)	50.0	Moisture Content (%):	26.4
Soil Type	Slt		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	32.0	
	Cohesion (psf)	240.0	

DIRECT SHEAR
ASTM D 3080-90

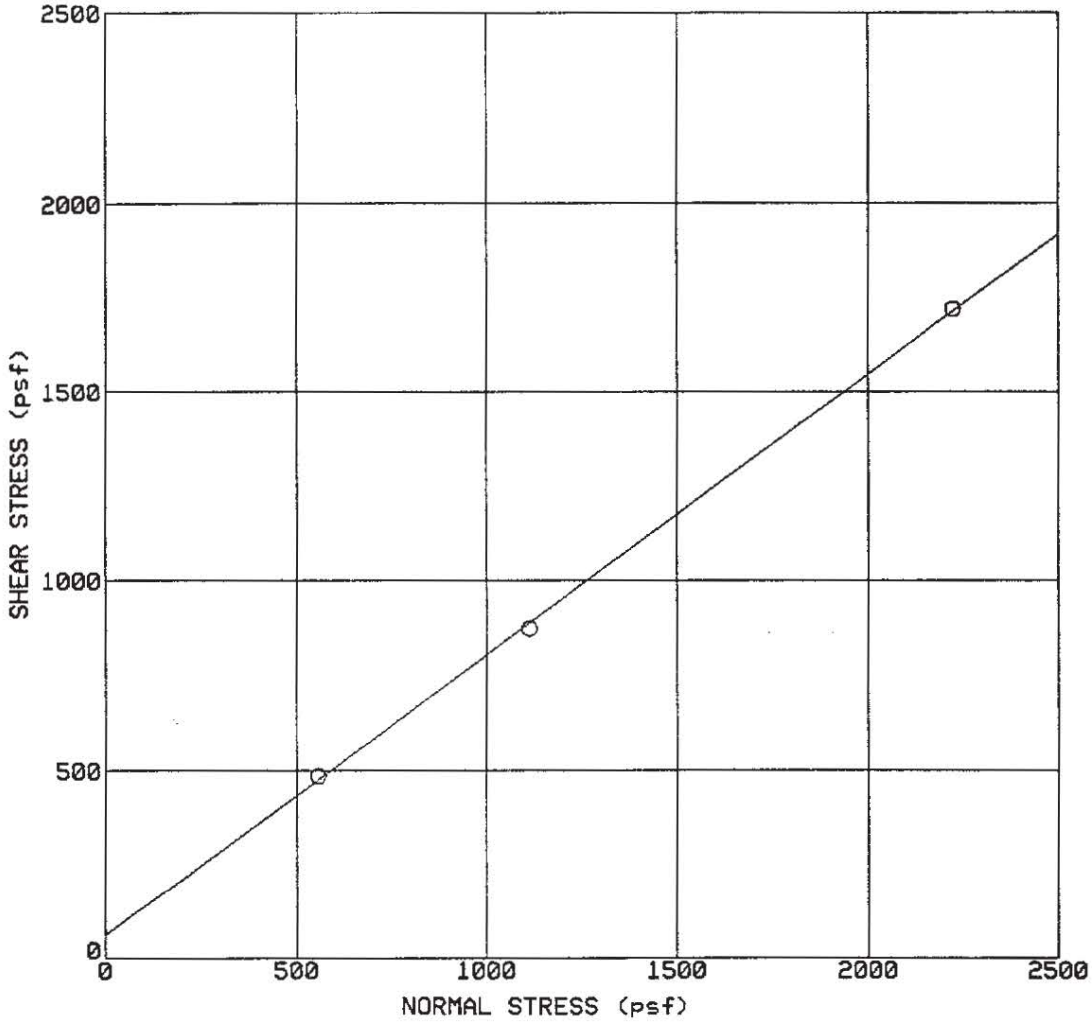
Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-9



Log No.	B-25	Before Test:	
Sample No.	Bag 1	Dry Density (pcf)	97.2
Depth (ft)	37.0	Moisture Content (%):	26.8
Soil Type	Slt & Ss		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	37.0	
	Cohesion (psf)	150.0	

DIRECT SHEAR
ASTM D 3080-90

Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-10



Log No.	B-28	Before Test:	
Sample No.	Bag A	Dry Density (pcf)	111.1
Depth (ft)	60.0	Moisture Content (%):	17.2
Soil Type	Slt & Ss		
Remarks	Remolded to 90% RC (Ultimate)		
	Friction Angle (deg.)	36.5	
	Cohesion (psf)	60.0	

DIRECT SHEAR
ASTM D 3080-90

Project No. 2920205-02
Project Name Diamond Ranch High School
Date 5/20/94 Figure No. E-11

AP Engineers

Materials, Environmental, and Geotechnical Testing

CORROSION TEST RESULTS

AP Job Number 96-0812
Date August 20, 1996

Client Name: Leighton and Associates
Project Name: PUSD/Diamond Ranch H.S.
Project No.: 2920205-006

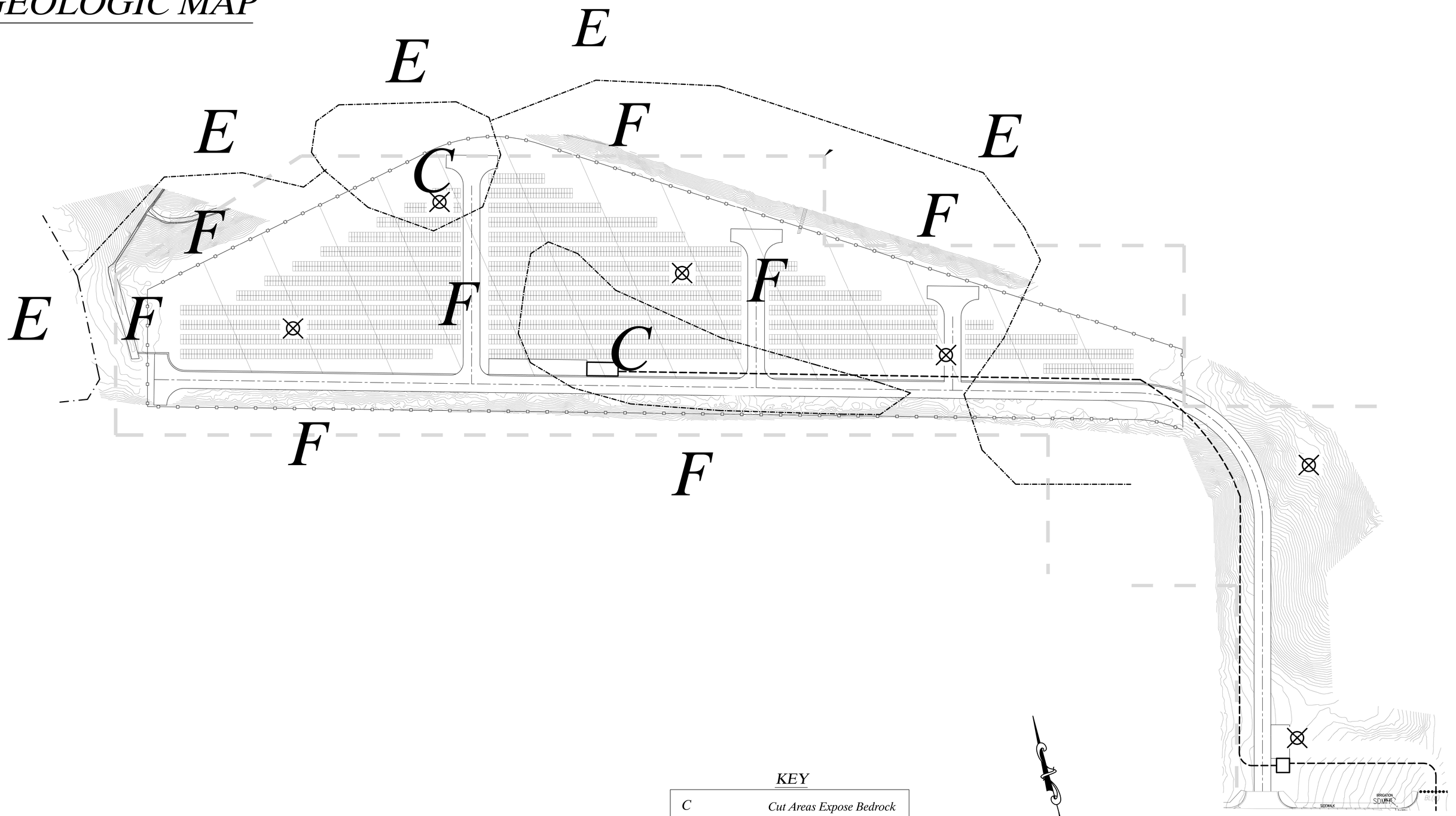
Boring No.	Sample No.	Depth (ft)	Soil Type	Resistivity (ohm-cm)		pH	Sulfate Content (ppm)	Chloride Content (ppm)
				As-Received	Minimum			
	2		Gray Silty Sand	—	540	7.0	NR	NR
	4		Gray Sandy Silt	—	750	5.3	NR	NR
	6		Gray Silty Sand	—	530	3.8	NR	NR
	8		Lt Brn Silty Sand	—	650	6.5	NR	NR

NOTES:

Resistivity Test and pH: California Test Methods 532 and 643
Sulfate Content : California Test Method 417
Chloride Content : California Test Method 422
ND = Not Detectable
NA = Not Sufficient Sample
NR = Not Request

2603 Pomona Boulevard, Pomona, CA 91768

GEOLOGIC MAP



KEY

C	Cut Areas Expose Bedrock
E	Natural Areas
F	Engineered Fill Areas

GEOLOGIC MAP

100 Diamond Ranch Road
Pomona, California

GLOBAL GEO-ENGINEERING, INC

PROJECT NO.: 10380-04	DATE: January 2025	PLATE NO.: 1