PITTSBURG UNIFIED SCHOOL DISTRICT

HILLVIEW JUNIOR HIGH SCHOOL
TRACK & FIELD MODERNIZATION PROJECT

BID ADDENDUM NO. 1
June 29, 2026

PROJECT: **Hillview Junior High School – Track & Field Modernization Project**
333 Yosemite Dr, Pittsburg, CA 94565

OWNER: Pittsburg Unified School District
3200 Loveridge Road, Pittsburg, CA 94565

Notice is hereby given to all prospective bidders that plans and specifications on the subject project are modified as hereinafter set forth. This Addendum shall be attached to and form a part of the plans and specifications. All bidders must acknowledge receipt of this addendum on the Bid Form. In case of difference with previous addenda or communications, this addendum takes precedence.

It is the responsibility of all bidders to notify all subcontractors from whom they request bids and from whom they accept bids of all changes contained in this addendum.

PROJECT MANUAL

1. **Item No. PM-1**
   Reference: N/A
   Attachment: Mandatory Pre-Bid Conference & Walkthrough Sign-In Sheet
   Description: Pre-Bid Conference sign-in sheet

2. **Item No. PM-2**
   Reference: N/A
   Attachment: Mandatory Pre-Bid Conference Agenda
   Description: Pre-Bid Conference agenda

3. **Item No. PM-3**
   Reference: DOCUMENT 00 21 13 – **INSTRUCTIONS TO BIDDERS**
   Attachment: ASK-01: Construction Staging Plan
   Description: Contractor shall provide temporary construction fencing and wind screening per attached ASK-01.
   Please refer to ASK-01 for site access.

4. **Item No. PM-4**

   Reference: DOCUMENT 00 31 19 – **EXISTING CONDITIONS**
   Attachment: "Geotechnical Engineering and Geologic Hazards Study, Hillview Junior High School Replacement Campus" prepared by Atlas Technical Consultants LLC, dated April 4, 2023
   "Geotechnical Site Characterization Study, Proposed Development – Modernization & Addition Project, or a Replacement Campus Project, Hillview Junior High School, 333 Yosemite Drive, Pittsburg, California 94025, prepared by Geosphere Consultants, Inc., dated June 17, 2019
   Description: Please find and incorporate findings from the attached reference geotechnical observations and recommendations.

DRAWINGS

1. **ITEM NO. 01**

   Reference: A1.02 – ENLARGED PROPOSED FIELD SITE PLAN
   Attachment: none
   Description: Revise Keynote 01 to read as follows:
   "PROVIDE & INSTALL HYDROSEED MIX AT RE-GRADED PLAY FIELD INTERIOR, TYP. SEE CIVIL FOR EXTENTS OF RE-GRADING. HYDROSEED MIX SHALL MATCH PROJECT SPECIFICATIONS FOR SOD."

RFI REPONSES:

1. **Question/Issue:** Is there a geotechnical report prepared for this project? If yes, could you please share a copy?

   Response: No. We are using the Geotech. Reports for the Replacement Campus Project, provided in the initial bid package.

2. **Question/Issue:** Plans show concrete appears to be limited to curbs. Should we include concrete sampling, testing, and compression cylinders? If yes, how many curb pours are anticipated?

   Response: The concrete curbs are not structural, so no concrete sampling or testing needed. While we anticipate the work can be done in one pour, contractor shall be responsible for determining means and methods of providing work as specified in the contract documents.

3. **Question/Issue:** Sheet A1.02 Detail 1 references lime treatment of the upper 18" per geotech recommendation. Please confirm whether lime treatment is included in the contract scope and provide any related geotech recommendations or specifications.

   Response: Lime treatment shall be provided below the paved track interior by the contractor per the contract documents and recommendations in Section 6.7.2 in attached "Geotechnical Engineering and Geologic Hazards Study, Hillview Junior High School Replacement Campus" by Atlas Technical Consultants.

ATTACHMENTS:

Project Manual:

- **Pre-Bid Conference Sign-In Sheet**
- **Pre-Bid Conference Agenda**
- **"Geotechnical Engineering and Geologic Hazards Study, Hillview Junior High School Replacement Campus" prepared by Atlas Technical Consultants LLC, dated April 4, 2023**
- **"Geotechnical Site Characterization Study, Proposed Development – Modernization & Addition Project, or a Replacement Campus Project, Hillview Junior High School, 333 Yosemite Drive, Pittsburg, California 94025, prepared by Geosphere Consultants, Inc., dated June 17, 2019**

Project Drawings:

- **ASK-01 – Construction Staging Plan**

END OF BID ADDENDUM #1 ITEMS

Pre-Bid Conference & Walkthrough Sign-In Sheet

Date: Wednesday, 06/24/2026 @ 2:30 PM (PST) at

Hillview Junior High School, 333 Yosemite Drive, Pittsburg, CA

Hillview JHS – Track & Field Modernization Project

Print Name	Signature	Company Name	Email Address	Phone #
E. KEITH HOLTSLANDER	E. Keith Holtslander	PUSD	KHOLTSLANDER@PITTSBURGUSD.NET	925-473-2428
SEAN VANDERMEY		PUSD	SVANDERMEY@PITTSBURGUSD.NET	925-473-2428
CHRIS BRYSON	CBryson	BHM	chrisb@bhmconstruction.com	916.412 8053
Jared Baugh		PG&E	Jared@PG&E.Biz	925-766-2458
DIVYA·D& LASYA	D.Divya	Adithyaconstruction	info@adithyaconstruction.com	925-905-6901
Juan Orozco		Modernscapes Innovations	Modernscapes.Innovations@gmail.com	925-325-4946
Andrew Bandera		JPB Design Inc	G.d.s.jpbdesign@gmail.com	916-549-6259
Jose Castro	Jose Castro	Marina landscape	GAlmanza@marinaco.com	(925)529-7919
ed Perez		KYA	Ed.Perez@theKyagroup.com	9168768 950
Melissa McKenzie		PLUM ARCHITECTS	melissa@plumarchitects.com	415-314-7812
Brad Somerday		McGuire and Hester	estimating@mcguireandhester.com	510-632-7676
MIKE BARROS		PUSD	MBARROS@PITTSBURG USD.NET	925-963-4884

Pre-Bid Conference & Walkthrough

Wednesday, 06/24/2026 @ 2:30 PM (PDT)
Hillview Junior High School, 333 Yosemite Drive, Pittsburg, CA
Hillview JHS – Track & Field Modernization Project

CONFERENCE AGENDA –

I. Introduction of Project Team Members:

Sean Vandermey – PUSD Director of Facilities Management
Keith Holtslander – PUSD Project Manager
Donna Fentanes – PUSD Facilities Specialist
Kati Mejia – PUSD Special Projects Accountant
Matthew Belasco – PUSD Director of MO&T Dept.
Mike Barros – PUSD Supervisor of M&O Dept.
Benjamin Trotter – PUSD Supervisor of M&O Dept.
Roberta Wahl – PLUM Architects
Melissa Mackenzie – PLUM Architects
TBD – PUSD Project Inspector
TBD – Geotechnical Observations & Materials Testing Contact

II. Schedule:

A. Friday, July 17, 2026: Pre-Bid RFI's due by 5:00 PM (PST). Pre-Bid RFI's are to be submitted in writing to Melissa Mackenzie at melissa@plumarchitects.com, with a copy to Keith Holtslander at kholtslander@pittsburgusd.net.
B. Thursday, July 23, 2026 @ 2:00 PM (PST): Bids Due
C. August 14, 2026: Notice of Award
D. August 24, 2026: Notice to Proceed
E. August 24, 2026: On-Site Construction Work Start
F. November 20, 2026: On-Site Construction Work Completion
G. December 18, 2026: Contract Completion

III. Requirements of the Bid:

A Preparation of Bid Forms – Complete all bid forms; the bids must be signed in the name of the bidder, and submitted in a sealed envelope bearing the name of the bidder and the name of the Project.
B. Bid Security – Each bid shall be accompanied by a Bid Bond, or a Certified Check or Cashier's Check made payable to the District as described in the Contract Documents.
C. Designated Subcontractors List, Site Visit Certification and Non-Collusion Declaration are required to accompany Bid.
D. Delivery of Bids – **2:00 PM (PST) on Thursday, July 23, 2026**. Bids will be received at the **District Site Support Services Center, 3200 Loveridge Road, Pittsburg, CA 94565**.
E. Insurance Requirements – See General Conditions 00 72 13 Article 13 for Insurance and Bonds, and Special Conditions, 00 73 13, Article 6 for Insurance Policy Limits.
F. Fingerprinting Requirements – See Special Conditions, Article 9 for the specifics.

G. Note that the District's PSA with the Local Trades Council will be applicable to this Project if the bid dollar amount total is $1M or higher.

H. SEWUP/OCIP Requirements – This Project will be subject to the District's SEWUP/OCIP through Keenan & Associates if the bid dollar amount total is $1M or higher. The contacts @ Keenan & Associates are Dulce Castaneda at dcastaneda@keenan.com or 310-212-0363, ext. 2007, and Karen Villanueva at kvillanueva@keenan.com or 408-441-0754, ext. 6105.

IV. Site Walk:

A. Area of Work and Site Access

V. Questions and Answers:

GEOTECHNICAL ENGINEERING AND GEOLOGIC HAZARDS STUDY

HILLVIEW JUNIOR HIGH SCHOOL REPLACEMENT CAMPUS

PREPARED FOR:

Mr. James Larry Scott
Pittsburg Unified School District
Facilities Planning & Management
3200 Loveridge Road
Pittsburg, California 94565-5122

PREPARED BY:

Atlas Technical Consultants LLC
2001 Crow Canyon Road, Suite 210
San Ramon, California 94583

April 4, 2023

2001 Crow Canyon Road, Suite 210
San Ramon, CA 94583
(925) 314-7100 | oneatlas.com

April 4, 2023

Atlas No. 91-64513-PW

MR. JAMES LARRY SCOTT
PITTSBURG UNIFIED SCHOOL DISTRICT
FACILITIES PLANNING & MANAGEMENT
3200 LOVERIDGE ROAD
PITTSBURG, CALIFORNIA 94565-5122

Subject: **Geotechnical Engineering and Geologic Hazards Study**
Hillview Junior High School Replacement Campus
333 Yosemite Drive, Pittsburg, California 94595

Dear Mr. Scott:

Atlas Technical Consultants LLC (Atlas) has completed a Geotechnical Engineering and Geologic Hazards Study for the proposed new junior high school replacement campus project to be located at 333 Yosemite Drive in Pittsburg, California. Transmitted herewith are the results of our findings, conclusions, and recommendations for the design and construction of the foundation support, interior concrete slabs, site development and grading, drainage, and pavements for this project. In general, the proposed improvements at the site are considered feasible from a geotechnical as well as a geological standpoint provided the recommendations of this report are implemented in the design and construction of the project.

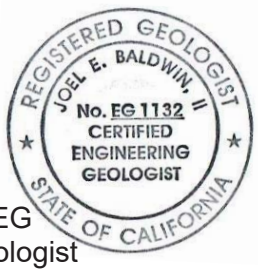
Should you or members of the design team have questions or need additional information, please contact us by telephone at (925) 314-7100, or by e-mail at nick.anastasio@oneatlas.com or corey.dare@oneatlas.com. We greatly appreciate the opportunity to be of service to the Pittsburg Unified School District (District) and to be involved in the design of this project.

Respectfully submitted,

ATLAS TECHNICAL CONSULTANTS LLC

Nick Anastasio, PE
Project Manager

Corey T. Dare, PE, GE
Principal Geotechnical Engineer



Joel E. Baldwin II, PG, CEG
Principal Engineering Geologist
(Exp. 02/28/2025)

Distribution: PDF to Addressee; lscott@pittsburgusd.net
PDF to Mr. Keith Holtslander, Pittsburg USD; kholtslander@pittsburgusd.net

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TABLES

FIGURES

APPENDICES

1 INTRODUCTION

1.1 Purpose and Scope

The purpose of this study was to evaluate the subsurface conditions and geologic hazards at the site and prepare geotechnical recommendations for development of the proposed school project. This study provides recommendations for foundation design, seismic design parameters, site preparation, grading, drainage, utility trench backfilling, retaining walls and pavements. This study was performed in accordance with the scope of work outlined in our proposal dated November 23, 2022, with latest revisions dated January 18, 2023.

The scope of this study included the review of available previous geotechnical and geologic literature for the site area, review of a Geotechnical Engineering Report prepared by Kleinfelder West, Inc., dated March 29, 2010, for an area adjacent to the proposed development located at the synthetic turf playfield, review of a Geotechnical and Geological Characterization Study for the eastern side of the site prepared by our predecessor company Geosphere Consultants, Inc. (Geosphere) dated June 17, 2019, a geologic hazards (geohazards) evaluation of the site, geotechnical field exploration, laboratory testing of selected samples retrieved from the borings, engineering analysis, and preparation of this report. The conclusions and recommendations presented in this report are based on the data acquired and analyzed during this study, and on prudent engineering judgment, and experience. This study did not include an assessment of potentially toxic or hazardous materials that may be present on or beneath the site.

We understand that this project is under the jurisdiction of the Division of State Architect (DSA) and the geologic hazards portion of the report will be reviewed by the California Geological Survey (CGS). Therefore, the report has been prepared in accordance with the requirements of Title 24, Part 1, Section 7-117 of the 2022 California Administrative Code; Title 21, Part 2 (California Building Code); and CGS Note 48 (2019).

1.2 Site Description

Hillview Junior High School is located northeast of Yosemite Drive between San Juan Drive and Harbor Street at the general location indicated on Plate 1, *Site Vicinity Map*. This map also shows the Kirker Creek channel, situated approximately 50 feet southeast of the site, which locally travels in a southwest to northeast direction toward New York Slough. The proposed project site is generally surrounded by a lower jogging track with an internal soccer field and multi-use field areas on the east, by the existing campus to the west, by a synthetic turf playfield to the north,

and by Yosemite Drive to the south, as shown on Plate 2, *Site Plan*. The project site currently consists of an existing school building, paved parking and playground areas, a sports court and multi-use field areas. The site vicinity generally descends gently northeast towards New York Slough with elevations ranging from +132 to +138 feet based on Google Earth Pro elevations. The average geographic coordinates of the proposed building sites used for engineering analysis are 38.0031 degrees north latitude and 121.8881 degrees west longitude.

1.3 Proposed Development

Based on the information provided, we understand the proposed project consists of the construction of a replacement campus for the existing Hillview Junior High School at the subject address. As shown on Plate 2, *Development Plan*, three new replacement buildings are proposed, which will consist of a new one-story, modular gym building with an approximate footprint of 16,624 square feet (sf), a new one-story, multi-purpose building with an approximate footprint of 14,623 sf, and a new two-story main classroom building with an approximate footprint of 38,487 sf. The new buildings will be constructed on the south-central portion of the campus on the east side of the existing school buildings. The existing high school building will be demolished as part of the campus redevelopment. Other development at the site includes new parking and driveway areas on both the west and east side of the new main classroom building adjoining Yosemite Drive.

Design details such as foundation structural loads and final grade elevations were not available at the time this study was conducted. We anticipate that the new building grades will be similar to that of the existing buildings; therefore, cuts and fills should be relatively minor (i.e., less than 2 feet) as required to establish new site drainage.

1.4 Validity of Report

This report is valid for three years after publication. If construction begins after this time period, Atlas should be contacted to confirm that the site conditions have not changed significantly. If the proposed development or structural loads differs considerably from that described above, Atlas should be notified to determine if additional recommendations are required. Additionally, if Atlas is not involved during the geotechnical aspects of construction, this report may become wholly or in part invalid; since Atlas' geotechnical personnel need to verify that the subsurface conditions anticipated preparing this report are similar to the subsurface conditions revealed during

construction. Atlas's involvement should include foundation and grading plan review; observation of foundation excavations; and site grading observation and testing.

2 PROCEDURES AND RESULTS

2.1 Literature Review

Pertinent geologic and geotechnical literature pertaining to the site area was reviewed. These included various publications and maps issued by the United States Geological Survey (USGS), California Geological Survey (CGS), California Division of Mines and Geology (CDMG), California Department of Water Resources (DWR), Contra Costa County, and other government agencies, as listed in the References section.

2.2 Field Exploration

In order to characterize the subsurface conditions beneath the potential improvement areas, a field exploration program was conducted, which consisted of drilling 10 test borings, designated as B-1 through B-10, on February 17, 2022, as observed by staff engineers under the supervision of a California-registered Geotechnical Engineer. Borings were drilled at accessible locations around and between existing buildings, in existing pavement areas and in landscape areas. The locations of the borings relative to the currently proposed improvements are shown on Plate 2, *Development Plan*. Plate 3, *Site Plan,* Plate 6a, *Cross Sections A-A' & B-B' and* Plate 6b, *Cross Section C-C'*, shows the location of the borings with respect to existing site conditions.

The borings were drilled to total depths ranging from approximately 4.5 to 45 feet below the existing ground surface using two B-24 truck mounted rigs with 4-inch diameter solid-stem augers for Borings B-1 through B-10. Following completion of drilling, the boreholes were backfilled with a neat cement grout in accordance with Contra Costa County Environmental Health requirements.

Atlas representatives visually classified the materials encountered in the borings according to the Unified Soil Classification System as the borings were advanced. Relatively undisturbed soil samples were recovered at selected intervals using a 3-inch outside diameter, Modified California split spoon sampler containing 6-inch-long brass liners, and a 2-inch outside diameter, Standard Penetration Test (SPT) sampler. The samplers were driven by means of a 140-pound automatic trip hammer with an approximate 30-inch fall. Resistance to penetration was recorded as the number of hammer blows required to drive the sampler the final foot of an 18-inch drive. All of the field blow counts recorded using Modified California (MC) split spoon sampler were converted in

the final logs to equivalent SPT blow counts using appropriate modification factors suggested by Burmister (1948), i.e., a factor of 0.65 for samplers with inner diameter of 2.5 inches. Therefore, all blow counts shown on the final boring logs are either directly measured (SPT sampler) or equivalent SPT (MC sampler) blow counts.

The boring logs with descriptions of the various materials encountered in each boring, a key to the boring symbols, and select laboratory test results are included in Appendix A. Ground surface elevations indicated on the soil boring logs were estimated to the nearest foot using Google Earth Pro.

2.3 Laboratory Testing

Laboratory tests were performed on select samples to determine some of the physical and engineering properties of the subsurface soils. The results of the laboratory testing are either presented on the boring logs, and/or are included in Appendix B. The following soil tests were performed for this study:

Dry Density and Moisture Content (ASTM D2216 and ASTM 2937) – In-situ dry density and/or moisture tests were conducted on select samples to measure the in-place dry density and moisture content of the subsurface materials. These properties provide useful information for evaluating the physical characteristics of the subsurface soils. Test results are shown on the boring logs.

Atterberg Limits (ASTM D4318 and CT204) - Atterberg Limits tests were performed on select samples of cohesive soils encountered at the site. Liquid Limit, Plastic Limit, and Plasticity Index are useful in the classification and characterization of the engineering properties of soil and help to evaluate the expansive characteristics of the soil and determine the USCS soil classification. Test results are presented in Appendix B, and on the boring logs.

Particle Size Analysis (Wet and Dry Sieve, ASTM D6913, D1140, and CT202) - Sieve analysis testing, including fines content measurements, was conducted on select samples to measure the soil particle size distribution and/or the total percentage of fines (i.e., percent passing the USCS No. 200 sieve). This information is useful for characterizing the soil type according to USCS, and to assist in the evaluation of liquefaction susceptibility of granular soils. Test results are presented in Appendix B and on the boring logs.

Direct Shear (modified ASTM D3080) - Direct shear testing was performed on one sample of onsite granular soil materials to measure the angle of internal friction and cohesion of the tested material. This data can be utilized in developing allowable bearing capacities, retaining wall design parameters, and strength characteristics of the materials. The direct shear specimen was wetted to near saturation and consolidated under 1,000, 3,000 and 5,000 psf normal (axial) loads prior to and during testing. Test results are presented in Appendix B.

R-Value Test (ASTM D2844 and CT301) – A R-value test was conducted on a bulk composite sample of near-surface clayey materials collected from cuttings generated from Boring B-10 between depths of 0 to 4.5 feet to provide data on prospective pavement subgrade materials for use in new vehicular pavement section design. Test results are presented in Section 6.9 and in Appendix B.

Soil Corrosivity, Redox (ASTM D1498), pH (ASTM D4972), Resistivity (ASTM G57), Chloride (ASTM D4327), and Sulfate (ASTM D4327) - Soil corrosivity testing is performed to determine the effects of constituents in the soil on buried steel and concrete. Water-soluble sulfate testing is required by the California Building Code (CBC) and International Building Code (IBC). Soil corrosivity test results are summarized in Appendix B and are discussed in Section 4.3.

3 GEOLOGIC AND SEISMIC OVERVIEW

3.1 Geologic Setting

The site is located in the central portion of the Coast Ranges geomorphic province of California. The Coast Ranges extend from the Transverse Ranges in southern California to the Oregon border and are comprised of a northwest-trending series of mountain ranges and intervening valleys that reflect the overall structural grain of the province. The ranges consist of a variably thick veneer of Cenozoic volcanic and sedimentary deposits overlying a Mesozoic basement of sedimentary, metamorphic, and basic igneous Franciscan Formation and primarily marine sedimentary rocks of the Great Valley Sequence. East-dipping sedimentary rocks of the Coast Ranges are flanked on the east by sedimentary rocks of the Great Valley geomorphic province (Page, 1966).

Regionally, the site is located northeast of San Francisco Bay, near the northern flanks of Mt. Diablo at the northwestern end of the Diablo Range. The site is mapped as being underlain by Pleistocene-epoch alluvial gravel and sand (Qoa). Underlying bedrock, as exposed in the Los

Medanos Hills south of the site, are mapped as the Pliocene to early Pleistocene-epoch Oro Loma Formation, consisting of interbedded pebble conglomerate, sandstone and claystone. The mapped geologic units in the site vicinity per Dibblee and Minch (2006), Geologic Map of the Vine Hill & Honker Bay quadrangles, Contra Costa & Solano Counties, California, are shown on Plate 4, *Site Vicinity Geologic Map*.

3.2 Geologic Evolution of the Northern Coast Ranges

The project site is located within the tectonically active and geologically complex northern Coast Ranges, which have been shaped by continuous deformation resulting from tectonic plate convergence (subduction) beginning in the Jurassic period (about 145 million years ago). Eastward thrusting of the oceanic plate beneath the continental plate resulted in the accretion of materials onto the continental plate. These accreted materials now largely comprise the Coast Ranges. The dominant tectonic structures formed during this time include generally east-dipping thrust and reverse faults.

Beginning in the Cenozoic time period (about 25 to 30 million years ago), the tectonics along the California coast changed to a transpressional regime and right-lateral strike-slip displacements as well as thrusting were superimposed on the earlier structures resulting in the formation of northwest-trending, near-vertical faults comprising the San Andreas Fault System. The northern Coast Ranges were segmented into a series of tectonic blocks separated by major faults including the San Andreas, Hayward, Concord, and Calaveras. Active faults with Holocene movement (last 11,000 years) do not lie within the limits of the site. The site is not mapped within an Alquist-Priolo Earthquake Fault Zone.

3.3 Regional Faulting and Tectonics

Regional transpression has caused uplift and folding of the bedrock units within the Coast Ranges. This structural deformation occurred during periods of tectonic activity that began in the Miocene and continues today. The site is in a seismically active region that has experienced periodic, large magnitude earthquakes during historic times. This seismic activity appears to be largely controlled by displacement between the Pacific and North American crustal plates, separated by the San Andreas Fault zone located approximately 40 miles southwest of the site. This plate displacement produced regional strain that is concentrated along major faults of the San Andreas Fault System including the San Andreas, Hayward, and Concord Faults in this area.

The site is located in a seismically active region dominated by major faults of the San Andreas Fault System. Major active faults include the aforementioned San Andreas Fault; the Hayward Fault, located approximately 21 miles southwest of the site; the Concord-Green Valley Fault, located on the order of 7¾ miles southwest of the site; the Calaveras Fault, the northernmost mapped portion of which is estimated to be on the order of 14 miles southwest of the site; and the Greenville--Clayton-Marsh Creek Fault, the northernmost mapped portion of which is estimated to be on the order of 3½ miles southwest of the site. Other active faults include the Mt. Diablo Thrust Fault, the northern end of which is estimated to be located on the order of 11 miles southwest of the site, and the West Napa Fault, the southern end of which is located about 23 miles northwest of the site. The site location relative to these and other active and potentially active faults in the southern San Francisco Bay Area is shown on Plate 5, *Regional Fault Map*.

The Working Group on California Earthquake Probabilities (WGCEP, 2015), in conjunction with the United States Geological Survey (USGS), has evaluated the probabilities of significant earthquakes occurring in the Bay Area over the next 30 years. The WGCEP report indicates that there is a 72 percent probability that at least one magnitude 6.7 or greater earthquake will occur in the San Francisco Bay region before 2044. This probability is an aggregate value that considers seven principal Bay Area fault systems and unknown faults (background values).

A discussion of these faults, ordered by increasing distance from the site, follows. The Regional Fault Map has also identified a few bedrock faults in the vicinity of the planned site. These faults are inactive faulted contacts between adjacent geologic units and do not represent any fault rupture hazard.

3.3.1 Greenville-Marsh Creek-Clayton Fault

The northwest-trending Greenville-Marsh Creek-Clayton Fault system lies within the Diablo Range and extends from Arroyo Mocho southeast of Livermore, across the eastern edge of the Livermore Valley and the northeast edge of Mt. Diablo into the Clayton Valley area. On the east side of Mt. Diablo, the fault has been referred to as the Marsh Creek Fault, connecting to the Clayton Fault in the Clayton Valley. The fault zone has been divided (CGS, 2002) into two segments, Greenville-North and Greenville-South. The site is located approximately 3½ miles northeast of the northern segment of the Greenville-North Fault; the slip rate of this segment is estimated to be about 2 mm/year and has been assigned a moment magnitude (M_{max}) of 6.6 (CGS, 2002).

3.3.2 Concord - Green Valley Fault

The north to northwest trending Concord Fault is concealed by surficial deposits from where it splays off the Calaveras Fault near the northwest flank of Mt. Diablo and extends along the eastern side of the Ygnacio Valley northward into the Green Valley Fault. The site is located approximately 7¾ miles northeast of the southern segment of the Concord Fault; the slip rate of this fault is estimated to be about 4 mm/year and has been assigned a moment magnitude (M_{max}) of 6.6 (CGS, 2002). According to Wallace (1990), the fault segment between Walnut Creek and Suisun Bay is creeping.

The Green Valley Fault extends northward from Suisun Bay up to just west of Lake Curry, northeast of Napa. The slip rate of the Green Valley Fault (south segment) is estimated to be about 5 mm/year and has been assigned a moment magnitude (M_{max}) of 6.2 (CGS, 2002). According to Wallace (1990), the southeastern segment of the Green Valley Fault is creeping.

The Working Group on California Earthquake Probabilities (WG15) Uniform California Earthquake Rupture Forecast model UCERF3 has estimated that there is a 3 and 7 percent probability of at least one magnitude 6.7 or greater earthquake occurring before 2044 along the Concord and Green Valley faults, respectively.

3.3.3 Mt. Diablo Thrust Fault

The northwest trending Mt. Diablo Fault extends from near the Alamo and Walnut Creek border along Highway 680, extending southward to the vicinity of Cottonwood Canyon, in northern Dublin. The Mt. Diablo Fault is not currently mapped as active by CGS, but fault coordinates have been published. The fault is different from the majority of Bay Area faults in that it is not a strike-slip fault exhibiting horizontal plate motion, but rather a “blind thrust” fault. A blind thrust fault is a compressional fault without apparent surface expression. In the case of the Mt. Diablo Fault, the compression is caused by the differential horizontal motions of the Concord and Greenville faults which abut Mt. Diablo. The fault locations for this blind thrust fault are inferred. The 1994 Northridge earthquake is a recent example of faulting on a blind thrust fault.

The site is located on the order of 11 miles northeast of the estimated northern end of the Mt. Diablo Fault. The slip rate of the Mt. Diablo Thrust Fault is estimated to be about 2 mm/year and has been assigned a moment magnitude (M_{max}) of 6.7 (CGS, 2002). The 2007 Working Group on California Earthquake Probabilities (WGCEP2007) estimated a one percent (1%) probability of at

least one magnitude 6.7 or greater earthquake occurring on the Mt. Diablo Thrust Fault occurring before 2037 (USGS, 2008).

3.3.4 Calaveras Fault

The Calaveras Fault trends northwesterly about 123 km in length from near Hollister, extending to north of the Danville area. The Calaveras Fault has been divided into three segments, the Northern, Central, and Southern segments. The site is located approximately 14 miles northeast of the end of the northern segment of the Calaveras Fault. The slip rate on the north segment of the Calaveras Fault is estimated to be about 6 mm/year and has been assigned a moment magnitude (M_{max}) of 6.8 (CGS, 2003). UCERF3 has estimated that there is an eight percent (8%) probability of at least one magnitude 6.7 or greater earthquake occurring before 2044 along the northern segment of the Calaveras Fault.

3.3.5 Hayward Fault

The Hayward Fault trends northwesterly on the order of 88 km from the Milpitas area to San Pablo Bay. The Hayward Fault has been divided into two main segments, the Northern and Southern segments. The Rodgers Creek Fault, considered as a possible extension of the Hayward Fault, extends northward from beneath San Pablo Bay up to near Healdsburg, where it is aligned with the Healdsburg Fault zone, currently considered to be inactive. The site is located approximately 21 miles northeast of the northern segment of the Hayward Fault. The slip rate on this segment of the Hayward Fault is estimated to be about 9 mm/year and has been assigned a moment magnitude (M_{max}) of 6.4 (CGS, 2003). UCERF3, the earthquake forecast model developed by the Working Group on California Earthquake Probabilities (USGS, 2015) has estimated that there is an 18 and 26 percent probability of at least one magnitude 6.7 or greater earthquake occurring before 2044 along the Northern and Southern segments, respectively, of the Hayward Fault.

3.3.6 West Napa Fault

The northwest-trending West Napa Fault zone extends from just south of American Canyon northwest to Yountville, with an older, probably inactive strand extending along the southwestern edge of the Napa Valley to the vicinity of St. Helena. The site is located approximately 23 miles southeast of the southern segment of the West Napa Fault. The slip rate of the West Napa Fault is estimated to be about 1 mm/year and has been assigned a moment magnitude (M_{max}) of 6.5 (CGS, 2002). UCERF3 has estimated that there is a seven percent (7%) probability of at least

one magnitude 6.7 or greater earthquake occurring before 2044 occurring along the West Napa Fault.

3.3.7 San Andreas Fault

The northwest-trending San Andreas Fault runs along the western coast of California extending on the order of 625 miles from the north near Point Arena to the Salton Sea area in southern California (Jennings, 1994). The fault zone has been divided into 11 segments. The site is located about 40 miles northeast of the Peninsula segment. The slip rate on the Peninsula segment of the San Andreas Fault is estimated to be about 17 mm/year and has been assigned a moment magnitude (M_{max}) of 7.1 (CGS, 2003). The Working Group on California Earthquake Probabilities (2015) Uniform California Earthquake Rupture Forecast model UCERF3 has estimated that there is a 9 and 13 percent probability of at least one magnitude 6.7 or greater earthquake occurring before 2044 along the North Coast and Peninsula segments, respectively, of the San Andreas Fault.

3.4 Historic Seismicity

As discussed above, the San Francisco Bay Area is subject to a high level of seismic activity. Within the period of 1800 to 2000 there were an estimated 20 earthquakes exceeding a Richter magnitude of 6.0 within an approximate 100-mile radius of the site, with seven exceeding 6.5, four exceeding 7.0 and one exceeding 7.5. There have been six major Bay Area earthquakes since 1800. Those were in 1836 and 1868 on the Hayward-Rodgers Creek Fault, in 1861 on the Calaveras Fault, and in 1838, 1906, and 1989 on or near the San Andreas Fault.

The San Francisco Bay Area is reported to have experienced shaking from on the order of 57 earthquakes of magnitude 5.5 or greater during the period of 1800 to 2000, occurring at various distances away from the project site. Of those, 17 were greater than Magnitude 6.0, seven exceeded 6.5, four exceeded 7.0 and one was greater than 7.5. Of the major earthquakes known to have affected the area, the 1868 Hayward earthquake likely caused the most damage in the East Bay with at least 30 deaths in the region. The 1906 San Francisco earthquake also caused property and structural damage in the East Bay. The 1989, Magnitude 6.9 Loma Prieta earthquake, centered near Aptos near the Santa Cruz Mountain Segment of the San Andreas Fault, caused moderately strong ground shaking in the site area. Other more recent significant earthquakes such as the 2014 South Napa Earthquake also caused notable ground shaking in the area.

4 SUBSURFACE CONDITIONS

4.1 Subsurface Soil Conditions

During our subsurface exploration program, we investigated the subsurface soils and evaluated soil conditions to a maximum depth of about 45 feet below the existing ground surface utilizing solid-flight augers. Based on our collected data, the area of the proposed new construction in unpaved areas and below existing pavement sections where present is generally underlain by medium dense to very dense, alluvial soils consisting of interbedded layers of medium dense to very dense silty to clayey sands, with stiff to hard sandy clays of generally moderate to high plasticity. Soils within the foundation support zone (i.e., uppermost 10 feet of soil profile) in the area of the proposed school buildings generally consisted of medium dense to very dense silty sands and stiff to very stiff clays with variable amounts of sand.

Atterberg Limit tests of surficial soil samples recovered within the upper 5 feet of various borings are included in Table 1 below.

Table 1: Summary of Atterberg Limits Results

Sample ID	Liquid Limit	Plasticity Index	Overall Plasticity	Expansion Potential
B-1 @ 2.5’	32	20	Medium	Moderate
B-5 @ 2.5’	38	22	Medium	Moderate
B-9 @ 3’	38	25	Medium	Moderate

Based on these results, the near-surface soils in the portion of the site where the new school buildings have been proposed to be built are considered to have a medium plasticity and a moderate expansion (shrink/swell) potential. Additional details of soils encountered in the exploratory borings, including laboratory test results, are included in the boring logs in Appendix A, and laboratory test summaries are presented in Appendix B. Generalized subsurface cross sections through the proposed new building areas are presented in Plate 6a, *Cross Sections A-A’, B-B’ and* Plate 6b *Cross Sections C-C’.*

4.2 Groundwater Conditions

Free groundwater was not encountered in any of our borings to the depths explored of 45 feet (Elevation +87). The borings were backfilled with a neat cement grout in accordance with Contra Costa County Environmental Health drilling permit requirements shortly after drilling. We note that the borings may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. Our predecessor company Geosphere (2019) encountered groundwater

in one boring in the lower track area east of the proposed development area at a depth of 42 feet, corresponding to an elevation of +77.

Groundwater levels can vary in response to time of year, variations in seasonal rainfall, tidal influence, well pumping, irrigation, and alterations to site drainage. A detailed investigation of local groundwater conditions was not performed and is beyond the scope of this study. A small-scale depth to historic high groundwater level map provided in the *Seismic Hazard Zone Report for the Honker Bay 7.5-Minute Quadrangle* (CGS, 2019) indicated the historic high groundwater depth at the proposed development area to be on the order of 40 feet.

4.3 Corrosion Testing

A sample collected from the upper 5 feet of the soil profile at Boring B-5 was tested to measure sulfate content, chloride content, redox potential, pH, resistivity, and presence of sulfides. Test results are included in Appendix B and are summarized on the following table.

Table 2: Summary of Corrosion Test Results

Soil Description	Sample Depth (feet)	Sulfate (mg/kg)	Chloride (mg/kg)	Redox (mV)	Resistivity (ohm-cm)	Sulfide	pH
Dark Yellowish Brown CLAY with Sand	1-5	64	2	488	948	Negative	7.6

Water-soluble sulfate can affect the concrete mix design for concrete in contact with the ground, such as shallow foundations, piles, piers, and concrete slabs. Section 4.3.1 in American Concrete Institute (ACI) 318, as referenced by the CBC, provides the following evaluation criteria:

Table 3: Sulfate Evaluation Criteria

Sulfate Exposure	Water-Soluble Sulfate in Soil, Percentage by Weight or (mg/kg)	Sulfate in Water, ppm	Cement Type	Max. Water Cementitious Ratio by Weight	Min. Unconfined Compressive Strength, psi
Negligible	0.00-0.10 (0-1,000)	0-150	NA	NA	NA
Moderate	0.10-0.20 (1,000-2,000)	150-1,500	II, IP (MS), IS (MS)	0.50	4,000
Severe	0.20-2.00 (2,000-20,000)	1,500-10,000	V	0.45	4,500
Very Severe	Over 2.00 (20,000)	Over 10,000	V plus pozzolan	0.45	4,500

The water-soluble sulfate content was measured to be 64 mg/kg or 0.0064% by dry weight in the surficial soil sample, suggesting the site soil should have negligible impact on buried concrete structures at the site. However, we note that water-soluble sulfate concentrations can vary due to the addition of fertilizer, irrigation, and other possible development activities.

Table 4.4.1 in ACI 318 suggests use of mitigation measures to protect reinforcing steel from corrosion where chloride ion contents are above 0.06% by dry weight. The chloride content was measured to be 2 mg/kg or 0.0002% by dry weight in the surficial soil sample. Therefore, the test result for chloride content does not suggest a corrosion hazard for mortar-coated steel and reinforced concrete structures due to high concentration of chloride.

In addition to sulfate and chloride contents described above, pH, oxidation reduction potential (Redox), and resistivity values were measured in the soil sample. For cast and ductile iron pipes, an evaluation was based on the 10-Point scaling method developed by the Cast Iron Pipe Research Association (CIPRA) and as detailed in Appendix A of the American Water Works Association (AWWA) publication C-105 and shown on Table 4.3.3.

Table 4: Soil Test Evaluation Criteria (AWWA C-105)

Soil Characteristics	Points		Soil Characteristics	Points
Resistivity, ohm-cm, based on single probe or water-saturated soil box.			**Redox Potential, mV**	
<700	10		>+100	0
700-1,000	8		+50 to +100	3.5
1,000-1,200	5		0 to 50	4
1,200-1,500	2		Negative	5
1,500-2,000	1		**Sulfides**	
>2,000	0		Positive	3.5
PH			Trace	2
0-2	5		Negative	0
2-4	3		**Moisture**	
4-6.5	0		Poor drainage, continuously	2
6.5-7.5	0		Fair drainage, generally moist	1
7.5-8.5	0		Good drainage, generally dry	0
>8.5	5			

When total points on the AWWA corrosivity scale are at least 10, the soil is classified as corrosive to cast and ductile iron pipe and use of cathodic corrosion protection is often recommended.

Assuming fair site drainage, the tested soil sample had a total score of 9 points, indicating a low to moderate corrosive rating.

These results are preliminary and provide information only on the specific soil sampled and tested. Other soil at the site may be more or less corrosive. Providing a complete assessment of the corrosion potential of the site soils are not within our scope of work. For specific long-term corrosion control design recommendations, we recommend that a California-registered professional corrosion engineer evaluate the corrosion potential of the soil environment on buried concrete structures, steel pipe coated with cement-mortar, and ferrous metals.

5 GEOLOGIC HAZARDS

5.1 Seismic Induced Hazards

Seismic hazards resulting from the effects of an earthquake generally include ground shaking, liquefaction, lateral spreading, dynamic settlement, fault ground rupture and fault creep, and tsunami and seiche inundation. The site is not necessarily impacted by all of these potential seismic hazards. These potential seismic hazards are discussed and evaluated in the following sections in relation to the planned construction.

5.1.1 Ground Shaking

The site will likely experience moderate to strong ground shaking from a major earthquake originating from a number of significant faults in the greater San Francisco Bay Area, such as the San Andreas, Hayward-Rodgers Creek, Calaveras, and Concord-Green Valley faults. Earthquake intensities vary throughout the greater Bay Area depending upon the magnitude of the earthquake, the distance of the site from the causative fault, the type of materials underlying the site and other factors.

In addition to shaking of the structures, strong ground shaking can induce other related phenomena that may have an effect on structures, such as liquefaction and dynamic densification settlement, adjacent seismic slope failure, and lurching or lateral spreading.

5.1.2 Liquefaction Induced Phenomena

Research and historical data indicate that soil liquefaction generally occurs in saturated, loose granular soil (primarily fine to medium-grained, clean sand deposits) during or after strong seismic ground shaking and is typified by a loss of shear strength in the affected soil layer, thereby causing

the soil to flow as a liquid. However, because of the higher inter-granular pressure of the soil at greater depths, the potential for liquefaction is generally limited to the upper 40 feet of the soil. Potential hazards associated with soil liquefaction below or near a structure include loss of foundation support, lateral spreading, sand boils, and areal and differential settlement.

The site has been mapped by CGS as being outside a zone of liquefaction potential requiring site-specific evaluation. The soils encountered in our borings consisted primarily of medium dense to very dense sands and very stiff to hard clays. In addition, no groundwater was encountered in any of our borings to a maximum depth explored of 45 feet. Therefore, based on the information collected during the field investigation, laboratory test results, and types of soils encountered in the borings within the project site, in our opinion, the potential for liquefaction at the project site is essentially nil due to the absence of a sustained groundwater table within the uppermost 45 feet of the soil profile.

5.1.3 Lateral Spreading

Lateral spreading involves both vertical and lateral ground movement, with some vertical component, as a result of liquefaction. In addition to liquefaction, a free face or slope is necessary in most cases for lateral spreading to occur. Lateral spreading can occur on relatively flat sites with slopes less than 2 percent under certain circumstances and manifest itself at the ground surface in the form of cracking and settlement. Lateral spreading can occur in areas located within close proximity to an open face which are supported by underlying liquefiable soil under or close to the open face. Under a lateral spreading condition, soils which liquefy lose strength and the slope moves towards the open face. Any structures or improvements located within close proximity to the slope can also move and possibly be destabilized.

In our opinion, based on available information, the site is not considered to be significantly susceptible to lateral spreading. The closest open slope face to the site is that of the Kirker Creek channel, which is on the order of 400 feet southeast of the closest proposed building and estimated to be 15 to 20 feet deep. However, the lack of potential liquefaction at the site due to the relatively deep groundwater table suggests the potential for lateral spreading toward the adjacent open creek channel to be very low.

5.1.4 Dynamic Compaction (Settlement)

Dynamic densification or settlement is a process in which unsaturated, relatively clean, loose sandy soils are densified by the vibratory motion of a strong seismic event. Encountered onsite soils were found to primarily consist of clayey soils and medium dense to very dense silty to clayey sands. Some of the encountered silty sand layers contained a relatively low percentage of fines (i.e., around 15 percent), so were therefore conservatively analyzed for potential dynamic settlement using computer program Liquefy Pro, developed by CivilTech Software to perform our liquefaction analysis. Borings B-1, B-5, B-6 and B-9 were identified as representative of the soil profile to at least 35 feet in depth and containing sufficient granular materials possibly susceptible to potential dynamic settlement, and therefore selected for analysis. Clean sands and silty sands with fines content of 15 percent or less were considered for analysis purposes to be susceptible to dynamic settlement.

Table 5 presents a summary of our analysis results. Calculation spreadsheets and graphic printouts of our analyses are presented in Appendix C of this report.

Table 5: Dynamic Settlement Analysis Results

Boring	Calculated Dynamic Compaction Settlement (inches)
B-1	0.17 (total); 0.08 to 0.11 (differential)
B-5	0.90 (total); 0.45 to 0.60 (differential)
B-6	0.88 (total); 0.44 to 0.59 (differential)
B-9	0.31 (total); 0.15 to 0.21 (differential)

The analysis results suggest that dynamic settlements under the design earthquake loading in reality would be significantly less than 1 inch under design earthquake loading and calculated to occur below a depth of 10 feet.

5.1.5 Fault Ground Rupture and Fault Creep

The State of California adopted the Alquist-Priolo Earthquake Fault Zone Act of 1972 (Chapter 7.5, Division 2, Sections 2621 – 2630, California Public Resources Code), which regulates development near active faults for the purpose of preventing surface fault rupture hazards to structures for human occupancy. In accordance with the Alquist-Priolo Act, the California Geological Survey established boundary zones or Earthquake Fault Zone surrounding faults or fault segments judged to be sufficiently active, well-defined, and mapped for some distance. Structures for human occupancy within designated Earthquake Fault Zone boundaries are not

permitted unless surface fault rupture and fault creep hazards are adequately addressed in a site-specific evaluation of the development site.

The site is not currently within a designated Earthquake Fault Zone as defined by the State (Hart and Bryant, 1997). The closest mapped Earthquake Fault Zone to the site is associated with the Concord Fault, located about 8 miles southwest of the site, as indicated on Plate 5. Since the site is not within or near an Earthquake Fault Zone, in our opinion, the potential for fault ground rupture and fault creep hazards at the site is essentially nil.

5.1.6 Tsunami and Seiche Inundation

Tsunamis are long-period sea waves generated by seafloor movements from submarine earthquakes or volcanic eruptions that rapidly displace large volumes of water. Coastal communities along the Pacific Ocean are particularly susceptible to such phenomena. The site is not located near the Pacific Ocean, The California Emergency Management Agency tsunami inundation maps do not include any mapped potential tsunami inundation zones east of the Benicia-Martinez Bridge. In addition, the site is situated at about El. +132 or higher. Therefore, the potential for tsunami inundation at the site is considered to be nil.

Earthquake-induced waves generated within enclosed bodies of water are called seiches. The closest significant body of water to the project site is Contra Loma Reservoir, located approximately 3¾ miles southeast of the site. Therefore, the site is not considered to be susceptible to seiches.

5.2 Other Hazards

Potential geologic hazards other than those caused by a seismic event generally include consolidation settlement, expansive and collapsible soils, corrosive soils, landslides, flooding and dam inundation, and regional subsidence. Corrosive soils are discussed in Section 4.3. These and other potential hazards are discussed and evaluated in the following sections.

5.2.1 Consolidation Settlement

Consolidation occurs as a result of water being squeezed out from a saturated soil as internal pore water pressures induced by an external load are dissipated over time. As the water moves out from the soil, the solid particles re-align into a denser configuration with settlement resulting. Consolidation typically occurs as a result of new buildings or fills being placed over them, but consolidation can also occur from groundwater withdrawal. Consolidation of clayey soils is usually

a long-term process, where-by the water is squeezed out of the soil matrix with time. Sandier soils consolidate relatively rapidly with an introduction of a load.

Since significantly compressible, saturated, cohesive layers were not encountered at the site, and applied new building loads or additional new fill placement would not induce consolidation of the underlying unsaturated stiff clays to an extent that would significantly affect the development of relatively lightly loaded school buildings or related structures, consolidation settlement is not anticipated to be a factor in project design.

5.2.2 Expansive Soils

The subsurface deposits encountered during the field exploration program included an intermittent surficial layer of stiff to hard sandy clay along with generally medium dense to very dense silty to clayey sand. Visual observation of select samples and laboratory tests conducted for this study indicated the more cohesive soils encountered to be of medium plasticity, and the near-surface soils to have moderate expansion potential with moisture variation. In addition, local variation in near-surface soils should also be considered to be possible, as nearby borings by others for the synthetic turf field immediately northwest of the site encountered near-surface fat clays of high expansion potential. Expansive soils may impact the performance of foundations and site flatwork, as expansive soil pressures may develop that can manifest primarily as seasonal heaving and settlement effects.

Since the expansion potential of the near-surface soils can be locally high (i.e., Plasticity Index greater than 25 but less than 40), potential expansive soil pressures can and should conservatively be accounted for in the design of the project elements, and design recommendations to account for potential expansive soil effects are presented in this report. Such measures include supporting interior floor slabs and critical exterior flatwork on a layer of non-expansive engineered fill, bottoming footings slightly deeper than normal, and moisture conditioning subgrades prior to exterior concrete slab construction.

5.2.3 Collapsible Soils

Collapsible soils typically consist of loose fine sandy and silty soils that have been laid down by the action of flowing water, usually in alluvial fan deposits. Terrace deposits and fluvial deposits can also contain collapsible soil deposits. The soil particles are usually bound together with a mineral precipitate. The loose structure is maintained in the soil until a load is imposed on the soil

and water is introduced. The water breaks down the inter-particle bonds and the newly imposed loading densifies the soil. The potential for collapsible soils underlying the site is considered essentially nil based on the primarily medium dense to very dense granular soils and the stiff to hard clay soils encountered during our field exploration.

5.2.4 Landsliding/Slope Stability

Landslides can occur under a variety of loading conditions, including both static and seismic, but involve sloping ground. The general topography of the site as well as the surrounding area is relatively flat. Therefore, the site is not considered to be prone to landsliding.

5.2.5 Flooding and Dam Inundation

According to a published Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for Sacramento County that covers the site, as shown on Plate 8, *Flood Hazard Map*, the project site is mapped as within Zone X, or areas with a 0.2% annual chance flood hazard.

Determining the actual flooding potential of the site is beyond our area of engineering expertise and should be evaluated by the project civil engineer to determine if any specific flood protection measures are warranted for the project. A flood specialist should be contacted if a more in-depth flooding analysis is desired.

Based on the Department of Water Resources' California Dam Breach Inundation Maps, the nearest mapped dam failure inundation area is associated with Antioch Reservoir to the southeast. However, the inundation zone consists of a relatively narrow path directly north from the Reservoir to the New York Slough/Sacramento River, the nearest point of which is located at Contra Loma Boulevard about 3.3 miles east of the site. Contra Loma Reservoir, located about 0.5 miles to the west of Antioch Reservoir, does not have a published dam inundation map, but in any case, from a topographic standpoint, inundation from any dam failure would not impact the project site. Therefore, the potential for site inundation from dam failure is judged to be essentially nil.

5.2.6 Regional Subsidence

Withdrawal of groundwater and other fluids (i.e., petroleum and the extraction of natural gas) from beneath the surface has been linked to large-scale land subsidence and associated cracking on the ground surface. Other causes for ground cracking and subsidence include the oxidation and resultant compaction of peat beds, the decline of groundwater levels and consequent compaction

of aquifers, hydro-compaction and subsequent settlement of alluvial deposits above the water table from irrigation, or a combination of any of these causes. Regional subsidence has not been documented as occurring within the City of Pittsburg, and has not reportedly experienced significant regional settlement, so regional subsidence is not anticipated to have a significant effect on the future performance of the project.

5.2.7 Other Geologic Hazards

Due to the site's location and geology, subsurface soil conditions, groundwater levels and land use factors, the site in our opinion is not subject to the potential geologic hazards of hazardous gases (e.g., Radon-222 gas), naturally occurring asbestos (NOA), volcanism, cyclic softening of soils or loss of unique geologic features.

6 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are based upon the analysis of the information gathered during the course of this study and our understanding of the proposed improvements.

6.1 Conclusions

The site is considered geotechnically suitable for the proposed improvements provided the recommendations of this report are incorporated into the design and implemented during construction. The predominant geotechnical and geological issues that need to be addressed at this site are summarized below.

Seismic Ground Shaking – The site is located within a seismically active region and expected to be subjected to moderately strong to very strong ground shaking during the life of new structures. As a minimum, new building designs should consider the effects of seismic activity in accordance with the latest edition of the California Building Code (CBC).

Expansive Soils – Some of the surficial soils encountered in our explorations, as well as adjacent explorations advanced at the synthetic turf field site to the north by Kleinfelder, were found to be moderately to highly expansive. Where such soils are not removed by site grading, measures to accommodate moderately to locally highly expansive soils should be implemented, such as keeping subgrade surfaces moist before placement of concrete or pavement sections; deeper than normal, shallow foundations; use of a non-expansive fill layer below interior floor slabs and

exterior flatwork as appropriate; or removal of locally highly expansive soils (i.e., fat clays) if encountered below slabs, or concrete flatwork.

Demolition of Existing Infrastructure – Demolition of existing Hillview Junior High school buildings are scheduled for the site in order to make room for the proposed new school campus, and have the potential for generation of undocumented fills. Any demolition excavations (e.g., from removing old foundations, utilities, etc.) should be backfilled with suitable soil compacted as engineered fill in accordance with the recommendations presented in this report in all areas to receive structures, pavements or flatwork. All below-grade demolition and backfill operations in such areas must be observed and properly backfilled with engineered fill, and be specifically confirmed during construction by the project geotechnical engineer. Related unanticipated fill or soft soils encountered in the bottoms of foundation excavations, if encountered, will need to be removed to suitable undisturbed native soils as approved in the field by the geotechnical engineer.

Potentially Unstable Subgrade Soils – Clayey near-surface soils were encountered in many of the test borings performed for this project. These soils in many instances were found to be near-saturated, and where freshly exposed, particularly in areas currently covered by buildings, flatwork or pavements, may be unstable under construction equipment loads, and may require mitigation by methods ranging from removal to drier materials to chemical stabilization in order to prepare subgrades for buildings or additional fill or new pavement sections. Methods for subgrade stabilization are provided in our Site Preparation and Grading section.

Other potential geotechnical considerations, including those that should not significantly impact the project are explained below.

Winter Construction – If grading occurs in the winter rainy season, appropriate erosion control measures may be required, and weatherproofing of the structural pads should be considered. Winter rains may also impact foundation excavations and underground utilities.

Groundwater – Groundwater at the site is anticipated to be sufficiently deep so as not be problematic with placement and/or construction of foundation improvements to the existing buildings and most utility trenches, except for occurrence of possible unanticipated perched groundwater in excavations due to local seasonal or surface seepage from irrigation or rainfall collected in trench backfills or other more granular subsurface soil pockets.

6.2 Seismic Design Parameters

The proposed project should be designed to resist the seismic forces generated by earthquake shaking in accordance with the provisions of the 2022 California Building Code (CBC) and local design practice.

The proposed project should be designed in accordance with local design practice to resist the lateral forces generated by ground shaking associated with a major earthquake occurring within the central portion of California. The subsurface materials encountered in the borings generally consisted of alluvial soils, generally consisting of interbedded layers of gravel, sand, and clay, to the maximum depth explored. Therefore, it is our opinion that a Site Class D classification (stiff soil) is appropriate for characterizing potential earthquake ground shaking conditions and seismic design considerations for the site, per ASCE/SEI 7-16 (Chapter 20). The geographic coordinates of the site improvements used for analysis were 38.0031 north latitude and 121.8881 degrees west longitude.

Based on ASCE 7-16, Section 11.4.8, a ground motion hazard analysis is required for structures on Site Class "D" with S_1 greater than or equal to 0.2 (unless Exceptions are taken). Since the project site is mapped as S_1 equal to 0.624, a site-specific ground motion analysis in accordance with CBC 2022 and ASCE 7-16, Section 21.2.1.2, is required for the site. However, assuming that Exception No. 2 will be taken by the structural engineer in accordance with ASCE 7-16, Section 11.4.8, the following values obtained using the SEOC/OSHPD seismic hazard mapping web site based on the ASCE/SEI 7-16 Standard may be used for structural design, as required by the 2022 CBC.

Table 6: Seismic Coefficients Based on 2022 CBC (per ASCE 7-16)
Center of Proposed Campus

Item	Value	2022 CBC Source[R1]	ASCE 7-16 Table/Figure[R2]
Site Class	D	Table 1613.3.2	Table 20.3-1
Mapped Spectral Response Accelerations Short Period, S_S 1-second Period, S_1	 1.833 g 0.624 g		 Figure 22-1 Figure 22-2
Site Coefficient, F_a	1.0	Table 1613.3.3(1)	Table 11.4-1
Site Coefficient, F_V	1.7	Table 1613.3.3(2)	Table 11.4-2
MCE (S_{MS})	1.833 g	Equation 16-37	Equation 11.4-1
MCE (S_{M1})	1.061 g	Equation 16-38	Equation 11.4-2

Item	Value	2022 CBC Source[R1]	ASCE 7-16 Table/Figure[R2]
Site Class	D	Table 1613.3.2	Table 20.3-1
Design Spectral Response Acceleration Short Period, S_{DS} 1-second Period, S_{D1}	 1.222 g 0.707 g	 Equation 16-39 Equation 16-40	 Equation 11.4-3 Equation 11.4-4
Peak Ground Acceleration, PGA_M	0.835 g		Equation 11.8-1

R1 California Building Standards Commission (CBSC), "California Building Code," 2022 Edition.
R2 U.S. Seismic "Design Maps" Web Application, https://geohazards.usgs.gov/secure/designmaps/us/application.php
R3 F_V value shall be used only for calculation of T_S.

ASCE 7-16 Tables 11.6-1 and 11.6-2 indicate that the Seismic Design Category for all Occupancy Categories is "D".

6.3 Site Preparation and Grading

Site grading should be performed in accordance with these recommendations. During the standard pre-construction conference held at the jobsite with representatives from the owner, general contractor, grading contractor, and the geotechnical engineer prior to starting the clearing operations at the site, geotechnical considerations affecting grading operations should be included as part of the standard meeting agenda. Following demolition of the existing structures and backfill of all excavations in structural fill areas with engineered fill, site grading is generally anticipated to consist of minor cuts and fills as needed to construct the new building pads and to establish drainage grades for surrounding pavements, flatwork and other site features.

6.3.1 Site Preparation

Site preparation (clearing) should consist of the removal of all existing structures and foundations associated with the existing school buildings within the project area, stripping of all existing vegetation and organic topsoil, removing any existing undocumented fill where encountered, pavement sections, and other deleterious materials within the proposed development area. At the landscape architect's option, the grading contractor may reuse stripped soils containing organics, but free of trash, contaminated soil and construction debris as non-structural, non-engineered fill in landscape areas only. For planning and estimating purposes, the average thickness of required stripping in existing landscape areas can be assumed to be 3 inches.

The geotechnical engineer's representative should observe and confirm the adequacy of site clearing operations during construction prior to engineered fill placement and observe and confirm all backfilling operations for any excavations to remove deleterious material. Loose, soft,

undocumented fills in structure areas, or otherwise unsuitable soils where encountered should be excavated until firm native soil is exposed to the satisfaction of the geotechnical engineer. Holes resulting from the removal of any existing foundations, existing utilities, underground obstructions or root balls that would extend below the proposed finish grade should be cleaned of remaining loose material or undocumented fills to expose firm soil. The resulting over-excavated surfaces should be scarified, moisture conditioned, and then backfilled using compacted engineered fill, or an alternate material acceptable to the Geotechnical Engineer, such as a flowable sand-cement slurry or other approved Controlled Density Fill (CDF; also known as Controlled Low Strength Material, or CLSM).

Existing underground utilities where encountered will need to be properly abandoned and/or entirely removed if impacting any proposed building, pavement or flatwork areas. In general, utility pipelines less than 4 inches in diameter to be abandoned may be left in place provided they will not be in close proximity to new foundation elements or interfere with new utilities. Such pipes should be plugged at the ends with concrete or sand-cement slurry. Larger utility pipelines or pipelines that underlie new foundations should be removed and replaced with engineered fill or left in place and completely grouted with flowable sand-cement slurry or CLSM.

6.3.2 Engineered Fill Materials and Placement

The Geotechnical Engineer should receive samples of and approve all proposed import fill materials prior to use on site. Imported soil for engineered fill should be free of environmental contaminants, organic materials, and debris. Imported select fill should be relatively non-expansive, having a Plasticity Index of 12 or less, an R-Value greater than 40, and contain a sufficient fines content (generally between 5 and 12 percent) so the soil can bind together and stand vertical in foundation excavations. Import general fill soil for mass grading, if needed, should be at least of comparable quality as the existing onsite soils, and in any case shall be approved by the Geotechnical Engineer prior to use on the project. Additionally, imported materials for engineered fill should not contain rocks or lumps greater than 6 inches in maximum size, and should have at least 95 percent smaller than 3 inches in maximum size. On site soils having an organic content of less than 3 percent by weight and meeting the size requirements for import fill can be reused as engineered, non-select fill as approved by the Geotechnical Engineer.

Following excavation to the required grades, subgrades in areas to receive engineered fill, as well as subgrades for slabs-on-grade, flatwork, or pavements, should be scarified to a depth of at least

8 inches; moisture conditioned, and compacted to the requirements for engineered fill presented in Section 6.3.3. Engineered fill should be moisture conditioned and thoroughly mixed during placement to provide uniformity in each layer. To achieve satisfactory compaction of the subgrade and engineered fill materials, it may be necessary to adjust the water content at the time of construction. This may require addition of water to soils that are too dry, or that scarification and aeration be performed for soils that are too wet.

The fill material should be evenly spread and compacted in relatively uniform lifts not exceeding 8 inches in pre-compacted (i.e., loose lift) thickness. Smaller lifts may be necessary to achieve the minimum required compaction using lighter weight compaction equipment. Moisture conditioning may be more difficult to achieve during cold, wet periods of the year, or during extreme temperatures and after precipitation events. The final compacted surface should be firm and unyielding and should be protected from damage caused by traffic or weather. Soil subgrades should be kept moist during construction.

In areas where space limitations preclude performing mechanical compaction, CLSM may be used in place of soil. Required compressive strength of CLSM would depend on whether future excavatability would be required. In general, excavatable CLSM should have a maximum 28-day unconfined compressive strength on the order of 50 to 150 psi. CLSM may also be used as overexcavation backfill below footing excavations as well as for over-excavated winterized footing excavations for bottom protection prior to concrete pour (i.e., rat slabs).

6.3.3 Project Compaction Recommendations

The following table provides the recommended compaction requirements for this project. Not all soils, aggregates and scenarios listed below may be applicable for this project. Specific grading recommendations are discussed individually within applicable sections of this report.

Table 7: Project Compaction Requirements

Description	Min. Percent Relative Compaction (per ASTM D1557)	Recommended Minimum Percent Above (or Below) Optimum Moisture Content
Fill Areas, Engineered Fill, Onsite Soil	90	3
Fill Areas, Engineered Fill, Select Fill	90	2
Building Pads, Onsite Soil – Scarified Subgrade prior to Fill	90	3
Building Pads, Onsite Soil – Structural General Fill	90	3
Building Pads, Baserock or Select (non-expansive) Engineered Fill	90	± 2
Building Pads – Treated Soil	90	2
Vehicular Pavement, Subgrade, Upper 8”	95	3
Vehicular Pavement, Onsite Soil or Fill (8” or deeper)	90	3
Vehicular Pavement, Class 2 Baserock	95	2
Concrete Flatwork, Subgrade Soil	90	3
Concrete Flatwork, Baserock	90	± 2
Underground Utility Backfill	90	3
Underground Utility Trench Backfill, Upper 3’ Feet below Existing Pavement Sections (where applicable)	95	3

6.3.4 Building Pad Grading

New pad subgrade soil or areas of the pad requiring fill to meet pad grade after site stripping, or after excavation/over-excavation if required, should be scarified to a depth of at least 8 inches, moisture conditioned as needed, and compacted to the project compaction requirements listed on Table 7 as determined based on ASTM D1557 (Modified Proctor). Onsite soils meeting the fill requirements indicated in Section 6.3.2 may be reused as structural, non-select fill within the limits of the building pads.

Due to locally potentially highly expansive surficial material, the top of the building pads should consist of a minimum 12-inch-thick layer of import, non-expansive, select fill, assuming a reinforced concrete floor slab designed per Section 6.7.1, *Interior Concrete Floor Slabs*, is used. As an alternative to the select fill layer, the uppermost 12 inches of pad subgrade may consist of chemically stabilized (lime treated) soil as discussed in Section 6.3.6, *Site Winterization and Unstable Subgrade Conditions*. Building pad preparation should extend a minimum 5-foot

distance beyond the perimeter of any building footprint, or to the edge of connected outdoor covered areas and adjoining flatwork, whichever is greater.

New fill should be moisture conditioned and thoroughly mixed during placement to provide uniformity in each layer. Fill should be placed in accordance with the recommendations presented in Section 6.3.2. The completed pad surfaces should be firm and unyielding and should be protected from damage caused by traffic or weather. Soil subgrades should be kept moist during construction.

6.3.5 Grading Pavement and Flatwork Areas

Pavement and flatwork areas at design subgrade elevation after cut, or subgrades to receive engineered fill should be scarified to a depth of 8 inches below existing grade or final subgrade, whichever is lower, moisture conditioned and compacted per Section 6.3.3. Where unsuitable supporting subgrade soils such as described in Section 6.3.1 are encountered, such materials shall be over-excavated to the satisfaction of the geotechnical engineer and backfilled with engineered fill. Where seasonal movement of concrete flatwork is a potential design issue, placement of a non-expansive fill layer below such flatwork should be considered to reduce the potential for such seasonal movement, as discussed in Section 6.7.2. Where required, engineered fill should be placed and compacted to reach design subgrade elevation per Section 6.3.3. Once the compacted finished subgrade has been reached, we recommend that baserock in paved areas be placed as soon as practical after grading to protect the subgrade soil from drying. Alternatively, the subgrade should be kept moist by watering until the baserock is placed.

Rubber-tired heavy equipment, such as a full water truck, should be used to proof load exposed subgrade areas where pumping is suspected. Proof loading will determine if the subgrade soil is capable of supporting construction equipment without excessive pumping or rutting. Additional recommendations for flatwork subgrade preparation are presented in Section 6.7, *Concrete Slabs-on-Grade*. Stable subgrades under proof loading are required before placement of pavement section baserock and surface course (i.e., asphalt pavement or Portland cement concrete). Where pavement subgrades are shown to be unstable under proof loading, depending on the construction schedule, potential remedial measures include scarifying, drying and re-compaction of the subgrade soils; excavation and removal of unstable, saturated subgrade soils to firm and unyielding underlying soil, and backfilling with engineered fill; or the remedial measures discussed in Section 6.3.6, *Site Winterization and Unstable Subgrade Conditions*.

6.3.6 Site Winterization and Unstable Subgrade Conditions

If grading occurs in the winter rainy season, or where subgrade soils are freshly exposed after removal of existing buildings, pavement, and flatwork, unstable and unworkable subgrade conditions may be locally present, and compaction of onsite soils may not be feasible. Such conditions may also occur after near-saturated surficial expansive clay soils are freshly exposed and not given sufficient time to dry out by reworking. In such cases, these conditions may be remedied using soil admixtures, such as lime-cement or a multi-spectrum mix such as Quicklime Plus. A 5 percent mixture of lime-cement based on a dry soil unit weight of 105 pcf is recommended for planning purposes. Treatment may vary between 12 to 18 inches, depending on the severity of the instability and the anticipated construction equipment loads. More detailed and final recommendations can be provided during construction if needed. Stabilizing subgrade in small, isolated areas can generally be accomplished with the approval of the Geotechnical Engineer by over-excavating 1 foot, placing Tensar TriAx TX-140 or equivalent geogrid on the soil, and then placing 12 inches of Class 2 baserock on the geogrid. Alternatively, a woven stabilization geotextile such as Mirafi RS580i may be placed on the over-excavated surface, and the over-excavation then backfilled with baserock. The upper 6 inches of the baserock in either case should be compacted to at least 90 percent relative compaction (95 percent in pavement areas).

6.3.7 Site Drainage

Final grading should be designed to provide drainage away from structures and the top of slopes. Soil areas within 10 feet of proposed structures or as applicable from the site condition should slope at a minimum of 5 percent away from the building. Adjacent concrete flatwork should slope a minimum 2 percent away from the building. Roof leaders and downspouts should not discharge directly into landscape areas adjacent to buildings and should instead discharge onto paved surfaces sloping away from the structures or into a closed pipe system channeled away from the structure to an approved collector or outfall.

6.4 Utility Trench Construction

6.4.1 Trench Backfilling

Utility trenches may be backfilled with onsite selected soil above the utility bedding and shading materials. If rocks or concrete larger than 4 inches in maximum size are encountered, they should be removed from the fill material prior to placement in the utility trenches. Utility bedding and

shading compaction requirements should be in conformance with the requirements of the local agencies having jurisdiction and as recommended by the pipe manufacturers. Jetting of trench backfill is not recommended. Compaction recommendations are presented in Table 7. Backfill should be generally placed in loose lifts of 12 inches or less; however, thicker lifts may be permitted if the specified minimum compaction can be demonstrated based on our field observation combined with confirmation testing.

If rain is expected and the trench will remain open, the bottom of the trench may be lined with 1 to 2 inches of gravel. This would provide a working surface in the trench bottom. The trench bottom may have to be sloped to a low point to pump the water out of the trench.

6.4.2 Pipe Bedding and Shading

Pipe bedding material is placed in the utility trench bottom to provide a uniform surface, a cushion, and protection for the utility pipe. Shading material is placed around the utility pipe after installation and testing to protect the pipe. Bedding and shading material and placement are typically specified by the pipe manufacturer, agency, or project designer. Agency and pipe manufacturer recommendations may supersede our suggestions. These suggestions are intended as guidelines and our opinions based on our experience to provide the most cost-effective method for protecting the utility pipe and surrounding structures. Other geotechnical engineers, agency personnel, contractors, and civil engineers may have different opinions regarding this matter.

Bedding and Shading Material - The bedding and shading material should be the same material to simplify construction. The material should be clean, uniformly graded, fine to medium grained sand. We suggest that bedding and shading material contain less than 3 percent fines with 100 percent passing the No. 8 sieve. Coarse sand, angular gravel or baserock should be avoided since this type of shading material may bridge when backfilling around the pipe, possibly creating voids, and may be too stiff as bedding material. Open graded gravel should be avoided for shading since this material contains voids, and the surrounding soil could wash into the voids, potentially causing future ground settlement. However, open graded gravel may be required for bedding material when water is entering the trench. This would provide a stable working surface and a drainage path to a sump pit in the trench for water in the trench. The maximum size for bedding material should be limited to about ¾ inch.

Bedding Material Placement - The thickness of the bedding material should be minimized to reduce the amount of trench excavation, soil export, and imported bedding material. Two to three inches for pipes less than 8-inches in diameter and about 4 to 6 inches for larger pipes are suggested. Bedding for very large diameter pipes is typically controlled by the pipe manufacturer. Compaction is not required for thin layers of bedding material. The pipe needs to be able to set into the bedding and walking on a thin layer of bedding material should sufficiently compact the sand. Rounded gravel may be unstable during construction, but once the pipe and shading material is in place, the rounded gravel will be confined and stable.

Shading Material Placement – Jetting is not recommended since the type of shading material is unknown when preparing the geotechnical report and agencies typically do not permit jetting. If the sand contains fines or if the sand is well graded, jetting will not work. Additionally, if too much water is used during jetting, this could create a wet and unstable condition. The shading material should be able to flow around and under the utility pipe during placement. Some compaction effort along the sides of the pipe should be made by the contractor to consolidate the shading material around the pipe. A minimum thickness of about 6 inches of shading material should be placed over the pipe to protect the pipe from compaction of the soil above the shading material. The contractor should provide some compaction effort to densify the shading material above the pipe. Relative compaction testing is not usually performed on the shading material. However, the contractor is ultimately responsible for the integrity of the utility pipe.

6.5 Temporary Excavation Slopes and Shoring

Where temporary excavation slopes are required, the Contractor should incorporate all appropriate requirements of OSHA/ Cal OSHA into the design of any temporary construction slopes used during construction. Excavation safety regulations are provided in the OSHA Health and Safety Standards for Excavations, 29 CFR Part 1926, Subpart P, and apply to excavations greater than 5 feet in depth.

The Contractor, or his specialty subcontractor, should design temporary construction slopes to conform to the OSHA regulations and should determine actual temporary slope inclinations based on the subsurface conditions exposed at the time of construction. For pre-construction planning purposes, the subsurface materials in the areas of the site where excavation may take place may be assumed to consist of a stiff clay to medium dense silty-sand mix categorized as OSHA Type B with temporary slope inclination of no steeper than 1:1 (horizontal to vertical). This maximum

slope ratio is assumed to be uniform from top to toe of the slope. The type of slope material and actual temporary construction slopes should be confirmed or adjusted during construction by a person who is trained as a “competent person” as designated by OSHA and directly responsible to the grading contractor.

If temporary slopes are left open for extended periods of time, exposure to weather and rain could have detrimental effects such as sloughing and erosion on surficial soils exposed in the excavations. We recommend that all vehicles and other surcharge loads be kept at least 10 feet away from the top of temporary slopes, and that such temporary slopes are protected from excessive drying or saturation during construction. In addition, adequate provisions should be made to prevent water from ponding on top of the slope and from flowing over the slope face. Desiccation or excessive moisture in the excavation could reduce stability and require shoring or laying back side slopes.

6.6 Foundation Recommendations

6.6.1 Shallow Foundations

The proposed buildings can be supported on conventional continuous and isolated spread footings bearing on undisturbed native material and/or properly placed and compacted fill. Footings should be founded a minimum of 24 inches below lowest adjacent finished grade subgrade elevation, as applicable. Continuous footings should have a minimum width of at least 18 inches, and isolated column footings should have a minimum width of at least 24 inches. In addition, footings located adjacent to other footings or utility trenches should bear below an imaginary 1.5:1 (horizontal to vertical) plane projected upward from the bottom edge of the adjacent footings or utility trenches. Footing reinforcement should be determined by the project Structural Engineer.

Footings should be designed for the following allowable bearing pressures, assuming design Factors-of-Safety of 3.0, 2.0 and 1.5 for dead loads, dead plus live loads and total loads, respectively, from the calculated ultimate bearing pressure.

Table 8: Allowable Bearing Pressures for Spread Footings

Load Condition	Allowable Net Bearing Pressure (psf)
Dead Load	2,800
Dead plus Live Loads	4,200
Total Loads (including wind or seismic)	5,600

If Allowable Stress Design (ASD) is used by the structural engineer, the allowable bearing pressure for all loads (including seismic) shall be limited to the recommended ultimate bearing capacity (i.e., 8,400 psf) divided by the applicable overstrength factor.

If site preparation and foundation observation services are conducted as outlined in the Geotechnical Study report, static vertical settlement is expected to be less than 1 inch for footings bearing within the materials described in the report and designed to the aforementioned allowable bearing pressures. We estimate differential settlement may be on the order of about ½ to ⅔ the total settlement over a span of about 60 feet. Static settlements should be expected to occur relatively rapidly as the loads are applied. In addition, seismic settlements less than 1 inch occurring as a result of a design earthquake may also be considered in design as appropriate.

Atlas personnel should be retained to observe and confirm that footing excavations prior to formwork and reinforcing steel placement bear in undisturbed native or engineered fill soils suitable for the recommended maximum design bearing pressure. If unsuitable bottom soil such as undocumented fill or loose soil is present, the excavation should be deepened until suitable supporting material is encountered. The over excavation should be backfilled using engineered soil or lean concrete (or a sand-cement slurry mix acceptable to the Geotechnical Engineer) up to the bottom of the footing concrete.

Footing excavations should have firm bottoms and be free from excessive slough prior to concrete or reinforcing steel placement. Care should also be taken to prevent excessive wetting or drying of the bearing materials during construction. Extremely wet or dry or any loose or disturbed material in the bottom of the footing excavations should be removed prior to placing concrete. If construction occurs during the winter months, a thin layer of concrete (sometimes referred to as a rat slab) could be placed at the bottom of the footing excavations. This will protect the bearing soil and facilitate removal of water and slough if rainwater fills the excavations.

6.6.2 Pier Foundations for Light Poles, Signs, Fences and Minor Structures

As an alternative to spread footing foundations designed in accordance with Section 6.6.1, foundations for light poles, signs, fences, or other minor structures may alternatively consist of drilled pier foundations deriving their vertical supporting capacity through skin friction between the side surfaces of the foundations and the adjacent soil. For design purposes, the allowable skin friction for gravity loads may be assumed to be 350 psf for the portion of pier embedded in

competent native soils or engineered fills. The contribution of the uppermost 3 feet of pier should be neglected. This value assumes a safety factor of 2 and may be increased by one-third for seismic or transient loads. Uplift loads should be limited to two-thirds of these values.

6.6.3 Lateral Resistance

Shallow footing foundations can resist lateral loads with a combination of bottom friction and passive resistance. An ultimate coefficient of friction of 0.35 between the base of the foundation elements and underlying material is recommended. In addition, an *ultimate* passive resistance equal to an equivalent fluid weighing 420 pounds per cubic foot (pcf) acting against the foundation may be used for lateral load resistance against the sides of footings perpendicular to the direction of loading where the footing is poured neat against undisturbed material. The top foot of passive resistance at foundations not adjacent to pavement or hardscape should be neglected. In order to fully mobilize this passive resistance, a lateral footing deflection on the order of 1 to 2 percent of the embedment of the footing is required. If it is desired to limit the amount of lateral deflection to mobilize the passive resistance, a proportional safety factor should be applied. The friction between the bottom of a slab-on-grade floor and the underlying soil should not be utilized to resist lateral forces.

Lateral resistance for drilled pier foundations may be estimated for onsite soils using an *allowable* passive resistance equal to an equivalent fluid weighing 280 pcf acting against the foundation for lateral load resistance against the sides of foundations perpendicular to the direction of loading where the foundation is poured neat against undisturbed material. For pier foundations, this passive pressure can be assumed to act across 2 times the pier diameter.

6.7 Concrete Slabs-on-Grade

6.7.1 Interior Concrete Floor Slabs

Non-structural concrete slab-on-grade floors should generally be a minimum of 5 inches in thickness and should be reinforced in accordance with the structural engineer's recommendation, but as a minimum should be reinforced using No. 4 steel reinforcing bars spaced 18 inches center-to-center each way. Slab jointing design should also be the responsibility of the structural engineer. The floor slab should be underlain by a minimum 12 inches of non-expansive, select fill such as Class 2 aggregate base compacted to the requirements noted in Table 7, or alternatively, the select fill layer may consist of a 12-inch-thick layer of onsite lime treated soil provided the lime

treatment is applied to a single 12-inch-thick layer at the time of treatment. Building pad and floor slab subgrade construction recommendations are presented in Section 6.3.4.

Slab-on-grade concrete floors with moisture sensitive floor coverings may require protection from moisture transmission through the slab from the underlying subgrade soils. Geotechnical engineers are not experts in the protection of floor coverings from underslab moisture, and if of significant importance, an expert in concrete slab construction familiar with moisture transmission issues through concrete slabs should be consulted for specific slab moisture protection design. However, we provide the following general discussion on typical types of moisture protection used in local construction.

Primary protection from moisture transmission through floor concrete is typically provided by a moisture retarder consisting of a relatively impermeable vapor retarder placed between the subgrade soil and the bottom of the concrete slab. A capillary break consisting of at least 4 inches of free-draining gravel, such as ¾-inch, clean, crushed, uniformly graded gravel with less than 3 percent passing No. 200 sieve, or equivalent, has also been used by designers below the vapor retarder. The vapor retarder should be at least 10-mil thick and should conform to the requirements for ASTM E 1745 Class C Underslab Vapor Retarders (e.g., Griffolyn Type 65, Griffolyn Vapor Guard, Moistop Ultra C, or equivalent). If additional protection is desired by the owner, a higher quality vapor barrier conforming to the requirements of ASTM E 1745 Class A, additionally with a water vapor transmission rate less than or equal to 0.006 gr/ft^2/hr (i.e., 0.012 perms) per ASTM E 96 (e.g., 15-mil thick “Stego Wrap Class A”), or to Class B (Griffolyn Type 85, Moistop Ultra B, or equivalent) may be used in place of a Class C retarder.

The vapor retarder or barrier should be placed directly under the slab. A sand layer is not required over the vapor retarder from a geotechnical standpoint. If sand on top of the vapor retarder is required by the design structural engineer, we suggest the thickness be minimized to less than 1 inch. If construction occurs in the winter months, water may pond within the sand layer since the vapor retarder may prevent the vertical percolation of rainwater.

ASTM E1643 should be utilized as a guideline for the installation of the vapor retarder. During construction, all penetrations (e.g., pipes and conduits,) overlap seams, and punctures should be completely sealed using a waterproof tape or mastic applied in accordance with the vapor retarder

manufacturer's specifications. The vapor retarder or barrier should extend to the perimeter cutoff grade beam or footing.

6.7.2 Exterior Concrete Flatwork (Non-Vehicular)

Exterior concrete flatwork intended for pedestrian traffic should be at least 4 inches thick and supported on either compacted native subgrade or a baserock layer constructed in accordance with the applicable recommendations presented in Sections 6.3.2 and 6.3.4. Since highly expansive soils may underlie some or all of the planned flatwork, where seasonal vertical movement may be a design issue, such flatwork should be underlain by a layer of non-expansive fill. A non-expansive fill (NEF) layer 12 inches thick may reduce, but not necessarily eliminate seasonal vertical movement due to moisture content variation and increasing the NEF layer to 24 inches or treating the uppermost 18 inches of subgrade soils with quicklime would essentially remove the potential for seasonal movement.

Alternatively, where flatwork subgrades are protected from significant seasonal moisture variation such as where flatwork is cut off from external moisture sources such as irrigation or seasonal rainfall, the flatwork may be placed directly on onsite native subgrade soil pre-saturated to a moisture content of 3 to 5 percent above optimum moisture content immediately before concrete placement.

The buildings should preferably have a concrete apron around the building perimeter to reduce the potential for surface water percolating down through the soil adjacent to the building. Landscaping adjacent to buildings should generally be avoided. Typically, landscape areas directly adjacent to buildings are surrounded by concrete flatwork, which can prevent irrigation and rainwater from flowing away from the building. The ponded water trapped by the surrounding flatwork could percolate down or possibly laterally through perimeter foundation construction joints or pipe sleeves and travel beneath the floor slab. In cases where landscaping is highly desired, drainage can be provided in these areas, but the top of the drains should be located below the building pad subgrade elevation.

6.8 Retaining Walls

6.8.1 Lateral Earth Pressures

The following recommended lateral earth design pressures are based on the assumption that on-site soils will be used as wall backfill. For a level backfill condition, unrestrained walls (i.e., walls

that are free to deflect or rotate) should be designed to resist an active equivalent fluid pressure of 40 pounds per cubic foot. Restrained walls for a level backfill condition should be designed to resist an at-rest equivalent fluid pressure of 40 pounds per cubic foot, plus an additional uniform lateral pressure of 8H pounds per square foot (psf), where H = height of backfill above the top of the wall footing, in feet.

For seismic design of walls greater than 6 feet in retained height, where a seismic increment is required, unrestrained walls and restrained walls with level backfill should be designed to resist an additional uniform load equal to 14H psf. This seismic load should be added to the *unrestrained* condition in both cases. A seismic increment is not required for site walls retaining less than 6 feet.

Walls with inclined backfill should be designed for an additional equivalent fluid pressure of 1 pound per cubic foot for every 2 degrees of slope inclination from horizontal. Walls subjected to surcharge loads should be designed for an additional uniform lateral pressure equal to 0.33 times the anticipated surcharge load for unrestrained walls, and 0.50 times the anticipated surcharge load for restrained walls.

The lateral earth pressures herein do not include any factor-of-safety and are not applicable for submerged soils/hydrostatic loading. Additional recommendations may be necessary if submerged conditions are to be included in the design.

6.8.2 Wall Foundations

Retaining walls may generally be founded on spread footing foundations based on recommendations presented in Section 6.6.1.

Atlas personnel should be retained to observe and confirm that foundation excavations bear in soils suitable for the design bearing pressure or axial loads. If unsuitable soil is present, the footing excavation should be deepened until suitable supporting bearing material is encountered.

6.8.3 Wall Drainage

The aforementioned recommended lateral pressures assume that walls are fully back drained to prevent the build-up of hydrostatic pressures. To reduce the potential for hydrostatic loading on retaining walls due to possible seasonal subsurface groundwater seepage, a subsurface drain

system may be considered for construction behind the walls. Alternatively, the walls can be designed to accommodate an additional hydrostatic pressure increment.

If used, the drain system should consist of a minimum 12-inch width of free-draining granular soils containing less than 5 percent fines (by weight) passing a No. 200 sieve placed adjacent to the wall. The free-draining granular material should be graded to prevent the intrusion of fines (e.g., a Caltrans Class 2 permeable material) or encapsulated in a suitable filter fabric. A drainage system consisting of either weep holes or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. An impervious soil should be used in the upper layer of backfill to reduce the potential for water infiltration. As an alternative, a prefabricated drainage structure such as a geocomposite drain (e.g., MiraDRAIN 6000) may be used as a substitute for the granular backfill adjacent to the wall.

The wall drainage system should be sloped to discharge by gravity to an adjacent storm drain system or other appropriate facility.

6.8.4 Wall Backfill Compaction

Wall backfill less than 5 feet deep should be compacted to at least 90 percent relative compaction using light compaction equipment. Structural backfill greater than a depth of 5 feet should be compacted to at least 95 percent relative compaction. Landscape backfill may have lower compaction requirements (e.g., 85 percent). If heavy compaction equipment is used, the walls should be appropriately designed to withstand loads exerted by the heavy equipment, and/or temporarily braced. Over compaction or surcharge from heavy equipment too close to the wall may cause excessive lateral earth pressures which could result in outward wall movement.

6.9 Pavement Design

Recommendations for the design of asphalt concrete pavement sections were developed in accordance with the procedures outlined in the latest edition of the Caltrans Highway Design Manual. The Caltrans design method uses Traffic Indices (TI) to represent anticipated wheel loads and frequency of usage for a given design life. A design life of 20 years is typically used in California. Factors such as surface and subsurface drainage have an effect on the overall life of a pavement section.

An R-value of less than 5 was obtained from laboratory testing performed on samples of typical near-surface onsite materials from B-10. Per Caltrans analysis procedures, an R-value of 5 was

used for determining the design sections. Traffic Indices (TI) of 4.5, 5.0 and 6.0 were considered for parking areas, car only traffic, and truck/bus traffic entrance and driveway lanes, respectively. Based on assumed conditions and data analysis, the following are recommended structural thicknesses for onsite asphalt concrete (AC) pavement sections.

Table 9: Recommended Pavement Design Sections

Traffic	Asphalt Concrete (in)	Class 2 AB (in)	Total Section (in)
Parking Areas (4.5)	2.5	9.0	11.5
Car only Traffic (5.0) (Approximate ESAL = 7,000)	3.0	10.0	13.0
Truck/Bus Traffic (6.0) (Approximate ESAL = 30,000)	3.5	13.0	16.5

Asphalt concrete pavement should be designed and constructed per Caltrans standards. The asphalt pavement should be placed in minimum 1½-inch-thick compacted lifts and maximum 3-inch-thick lifts.

If desired, pavement section AB design thicknesses may be reduced by chemically treating the pavement subgrades using a lime-cement admixture mixed with the uppermost 12 inches of pavement subgrade. Depending on the time of year of site grading, such treatment may be also useful for subgrade stabilization to attain the recommended pavement subgrade compaction prior to pavement section construction. Recommended structural asphalt concrete (AC)/ aggregate base (AB) pavement sections on lime-treated subgrade assuming an R-value of 40 were developed based on aforementioned TI values and presented on Table 10.

Table 10: Recommended Pavement Design Alternatives (Lime-Treated Subgrade)

Traffic Index	Asphalt Concrete (in.)	Class 2 AB (in.)	Total Section (in.)
4.5	2.5	6.0*	8.5
5.0	3.0	6.0*	9.0
6.0	3.5	6.0	9.5

* Minimum recommended aggregate base thickness

If the lighter pavements (TI = 4.5 or less) are planned to be placed prior to, or during construction, the traffic indices and pavement sections may not be adequate for support of what is typically more frequent and heavier construction traffic. Therefore, if the pavement sections will be used for construction access, a heavier pavement section should be considered.

Design based on the aforementioned traffic indices should provide the design pavement life with only a normal amount of pavement maintenance.

AB for use in flexible pavements should conform to Caltrans Standard Specification Sections 26-1.02A and 26-1.02B (2010) for Class 2 AB. AB from recycled sources offered by AB suppliers as well as AC grindings mixed with existing baserock, and meeting Class 2 specifications can be utilized in lieu of virgin Class 2 AB upon approval of the Geotechnical Engineer. AB used in pavement sections should be compacted to a minimum 95 percent relative compaction (ASTM D1557) and should be firm and unyielding at the time of asphalt concrete placement.

Periodic maintenance extends the service life of the pavement and should include crack sealing, surface sealing and patching of any deteriorated areas. Also, thicker pavement sections could be used to reduce the required maintenance and extend the service life of the pavement. The owner/user may also consider placing signs at entryways to deter heavy duty trucks from light duty pavement areas, or extend concrete curbs to a depth of 12 inches below the pavement subgrade.

Minimizing subgrade saturation is an important factor in maintaining subgrade strength. Water allowed to pond on or adjacent to pavements could saturate the subgrade and cause premature pavement deterioration. The pavement should be sloped to provide rapid surface drainage, and positive surface drainage should be maintained away from the edge of the paved areas. Design alternatives which could reduce the risk of subgrade saturation and improve long-term pavement performance include crowning the pavement subgrades to drain toward the edges, rather than to the center of the pavement areas; and installing surface drains next to any areas where surface water could pond.

Properly designed and constructed subsurface drainage will reduce the time subgrade soils are saturated and can also improve subgrade strength and performance. In areas where there will be irrigation adjacent to pavements, improved pavement performance could be achieved by installing perimeter drains for the pavements, or curb cutoffs extending below the pavement baserock section.

6.10 Plan Review

We recommend that Atlas be provided the opportunity to review the final project plans prior to construction. The purpose of this review is to assess the general compliance of the plans with the

recommendations provided in this report and confirm the incorporation of these recommendations into the project plans and specifications.

6.11 Observation and Testing During Construction

We recommend that Atlas be retained to provide observation and testing services during site preparation, mass and finish grading, underground utility construction, foundation excavation, and to observe final site drainage. This is to observe compliance with the design concepts, specifications and recommendations, and to allow for possible changes in the event that subsurface conditions differ from those anticipated prior to the start of construction.

7 LIMITATIONS AND UNIFORMITY OF CONDITIONS

The recommendations of this report are based upon the soil and conditions encountered in the borings. If variations or undesirable conditions are encountered during construction, Atlas should be contacted so that supplemental recommendations may be provided.

This report is issued with the understanding that it is the responsibility of the owner or his representatives to see that the information and recommendations contained herein are called to the attention of the other members of the design team and incorporated into the plans and specifications, and that the necessary steps are taken to see that the recommendations are implemented during construction.

The findings and recommendations presented in this report are valid as of the present time for the development as currently proposed. However, changes in the conditions of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Accordingly, the findings and recommendations presented in this report may be invalidated, wholly or in part, by changes outside our control. Therefore, this report is subject to review by Atlas after a period of three (3) years has elapsed from the date of issuance of this report. In addition, if the currently proposed design scheme as noted in this report is altered Atlas should be provided the opportunity to review the changed design and provide supplemental recommendations as needed.

Recommendations are presented in this report which specifically request that Atlas be provided the opportunity to review the project plans prior to construction and that we be retained to provide

observation and testing services during construction. The validity of the recommendations of this report assumes that Atlas will be retained to provide these services.

This report was prepared upon your request for our services, and in accordance with currently accepted geotechnical engineering practice. No warranty based on the contents of this report is intended, and none shall be inferred from the statements or opinions expressed herein.

The scope of our services for this report did not include an environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around this site. Any statements within this report or on the attached Plates, logs or records regarding odors noted or other items or conditions observed are for the information of our client only.

8 REFERENCES

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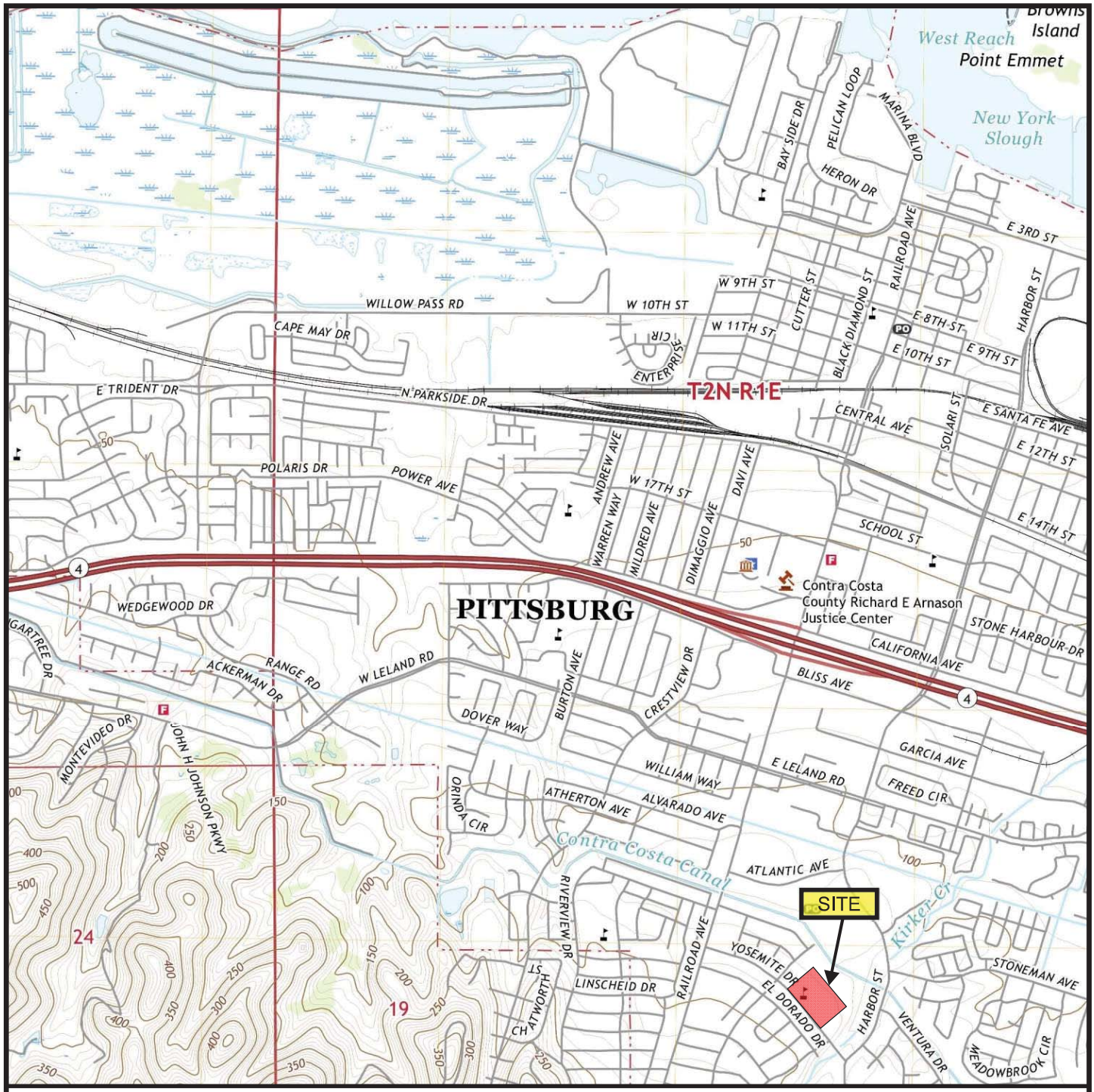
Publications may have been used as general reference and not specifically cited in the report text.

PLATES

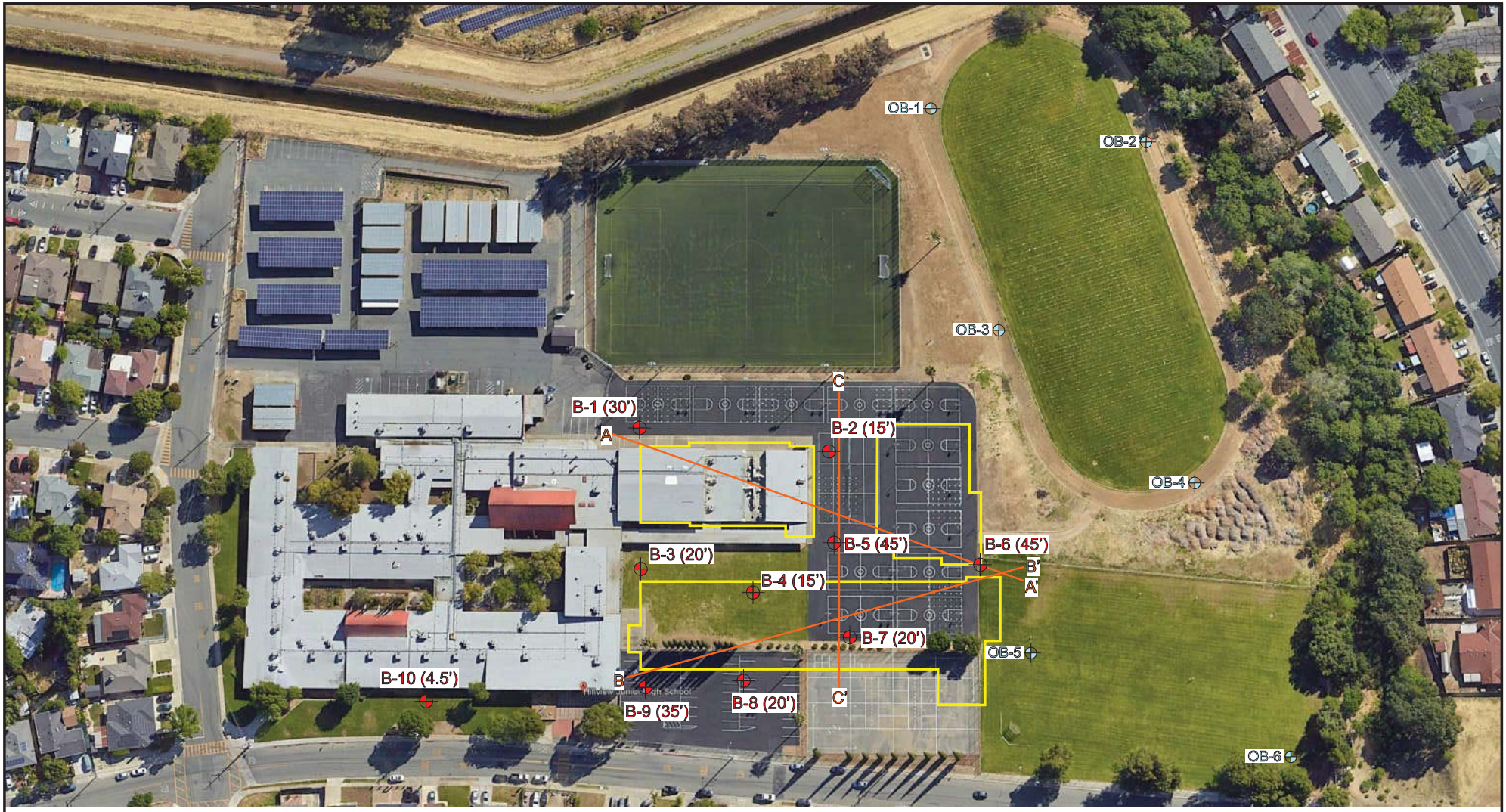
Plate 1 – Site Vicinity Map
Plate 2 – Development Plan
Plate 3 – Site Plan
Plate 4 – Site Vicinity Geologic Map
Plate 5 – Regional Fault Map
Plate 6a – Cross Sections A-A' & B-B'
Plate 6b – Cross Sections C-C'
Plate 7 – Seismic Hazards Zones Map
Plate 8 – Flood Hazard Zones Map



Source: Honker Bay Quadrangle California 7.5-Minute Series (2022)

ATLAS

Site Vicinity Map		
PUSD - Hillview Junior High School 333 Yosemite Drive Pittsburg, California 94565		
91-64513-PW	March 2023	Plate 1



100 ft.
Scale

Sources: 1. Google Earth Image (2022)

Explanation

B-1 - Approximate Geotechnical Boring Location (2023)

OB-1 - Approximate Old Boring Location (Geosphere 2019)

A A' - Line of Cross Section A-A'

- Proposed Limits of Improvements

ATLAS

Job No.: 91-64513-PW

Approved: NAA

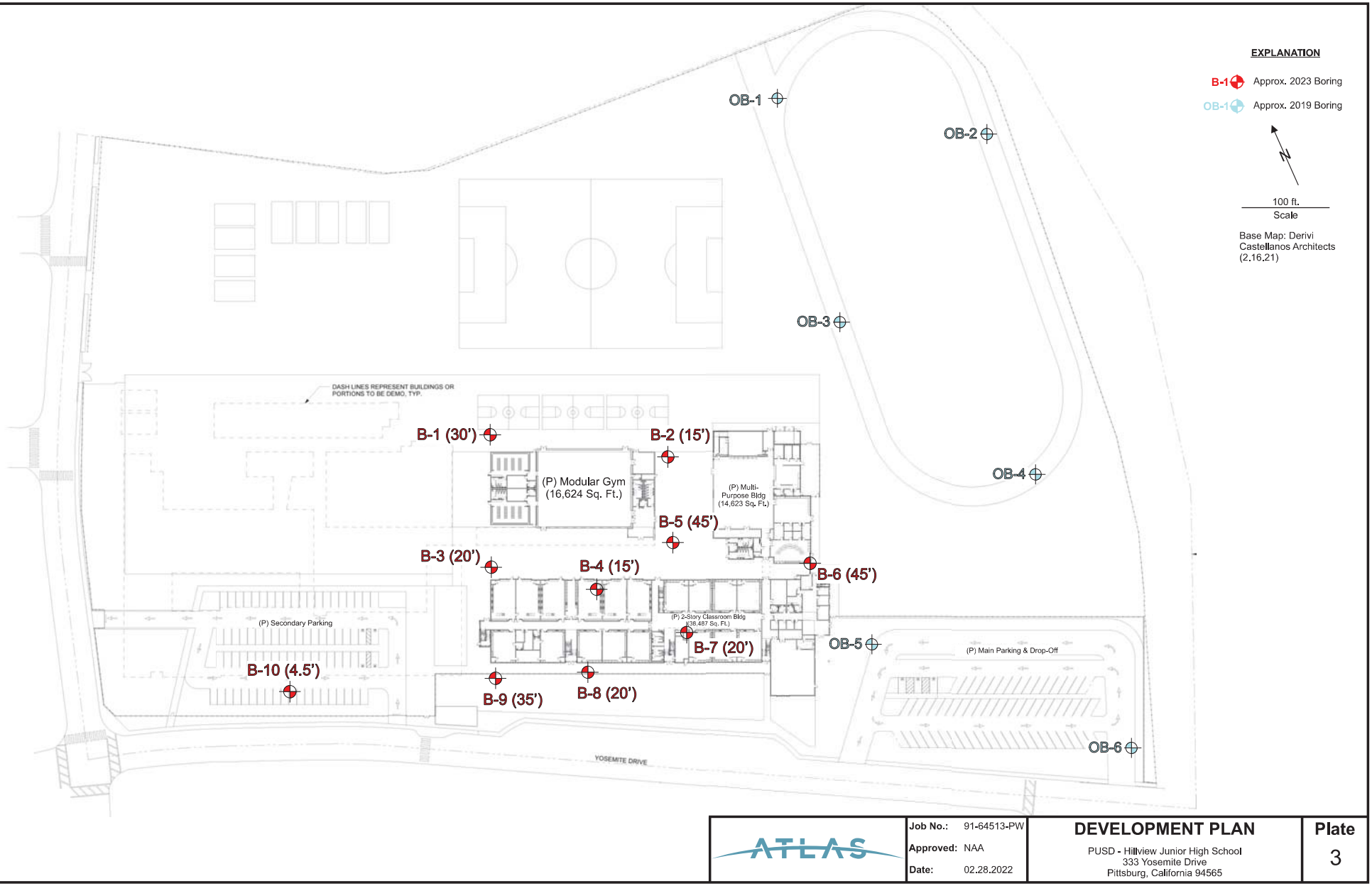
Date: 02.28.23

SITE PLAN

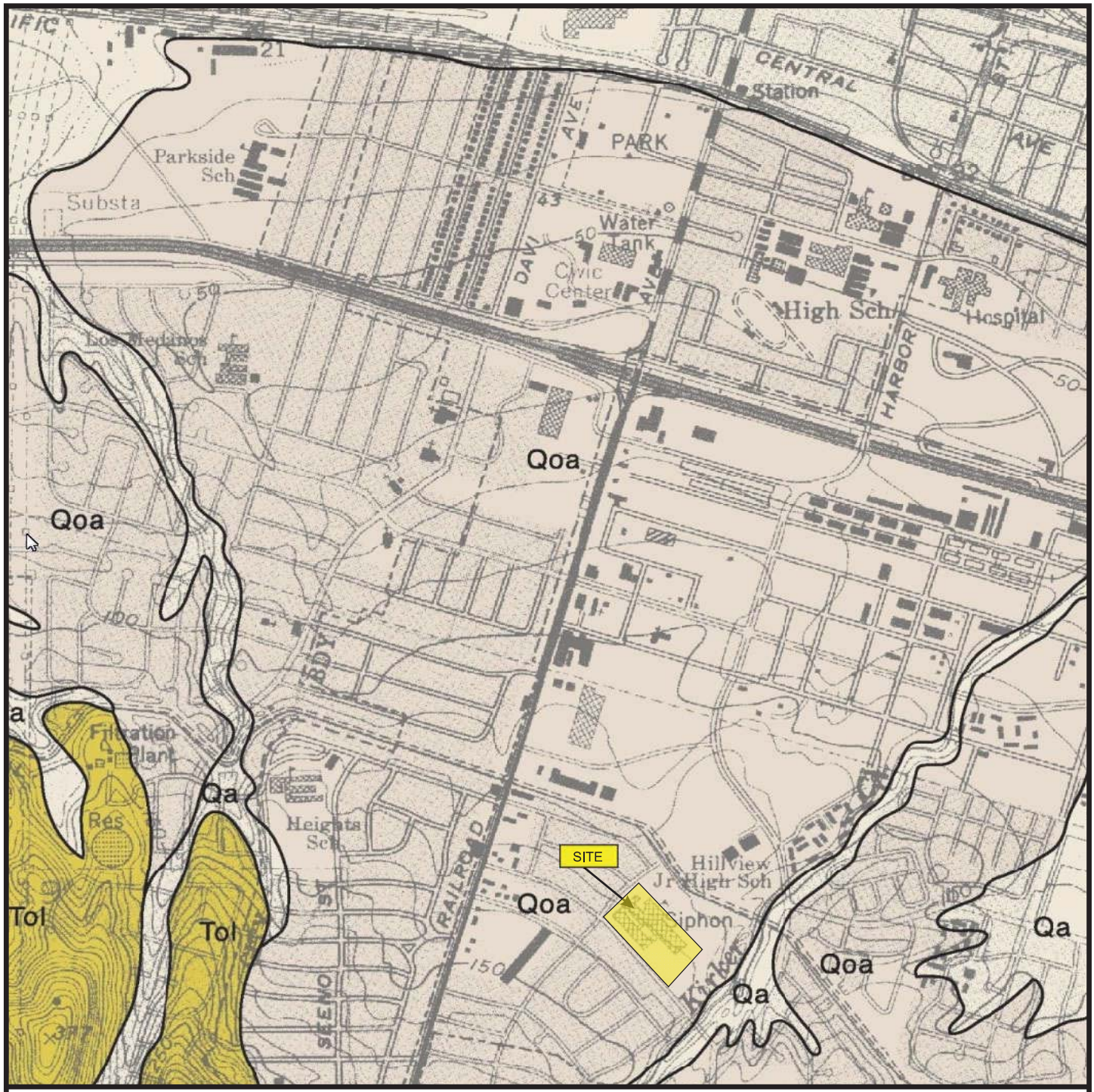
PUSD - Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94565

Plate

2



ATLAS	Job No.: 91-64513-PW Approved: NAA Date: 02.28.2022	**DEVELOPMENT PLAN** PUSD - Hillview Junior High School 333 Yosemite Drive Pittsburg, California 94565	**Plate** 3



af - Artificial Fill

Qa - Alluvial pebble gravel, sand, clay (Holocene)

Qoa - Alluvial gravel and sand (Pleistocene)

Tol - Pebble Conglomerate (Pliocene/Pleistocene)

Dibblee & Minch, Vine Hill & Honker Bay Quadrangles, 2006.

N

SCALE

1000 0 1000 2000

Feet

ATLAS

Site Vicinity Geologic Map

PUSD - Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94565

91-64513-PW	March 2023	Plate 4

DESCRIPTION	
ON LAND	OFFSHORE
Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.

Geologic Time Scale			Years Before Present (Approx.)	Fault Symbol	Recency of Movement
Quaternary	Late Quaternary	Historic			
		Holocene	200		
			11,700		
	Early Quaternary	Pleistocene	700,000		
			1,600,000		
Pre-Quaternary			4.5 billion (Age of Earth)		

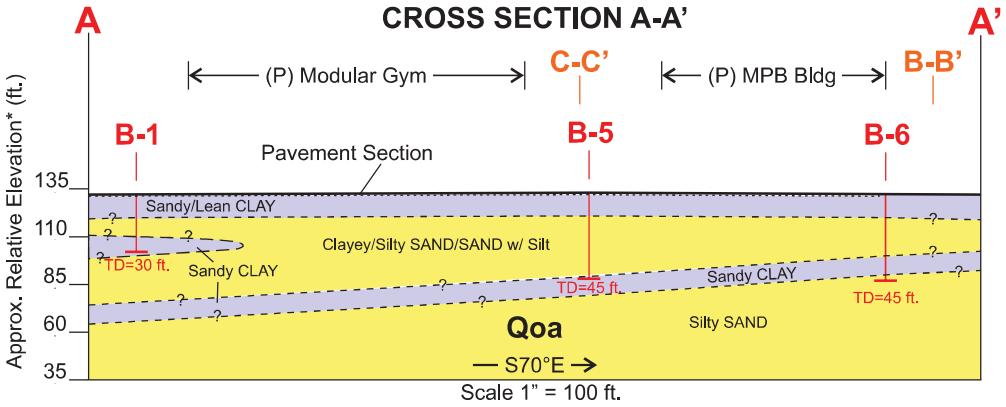
Scale

1/4" = 1 mi. 0 4 mi.

Base Map Reference: California Geological Survey - 2010 Fault Activity Map of California

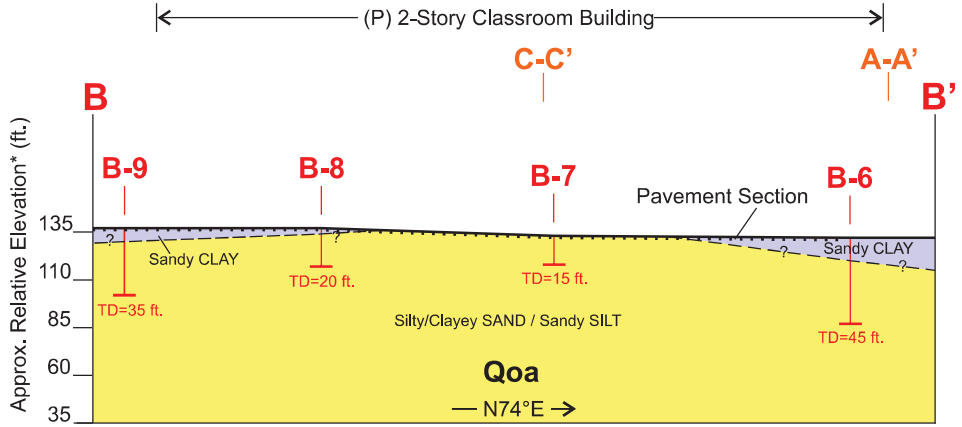
Hillview Junior High School Campus Improvements 333 Yosemite Drive, Pittsburg, California 94565	91-64513-PW	March 2023
ATLAS	Regional Fault Map	Plate 5

CROSS SECTION A-A'



Scale 1" = 100 ft.

CROSS SECTION B-B'



Scale 1" = 100 ft.

EXPLANATION

Qoa Old Alluvial deposits (Pleistocene)

▽ Water level post drilling

*approx. elevation from Boring Logs

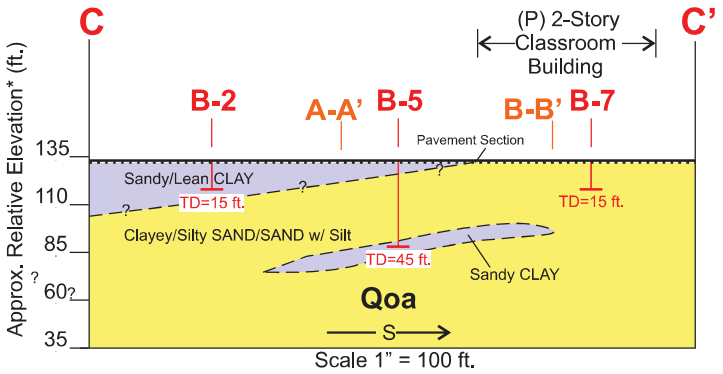
ATLAS

Cross Sections A-A' & B-B'

PUSD - Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94565

91-64513-PW	March 2023	Plate 6a

CROSS SECTION C-C'



EXPLANATION

Qoa Old Alluvial deposits (Pleistocene)

▽ Water level post drilling

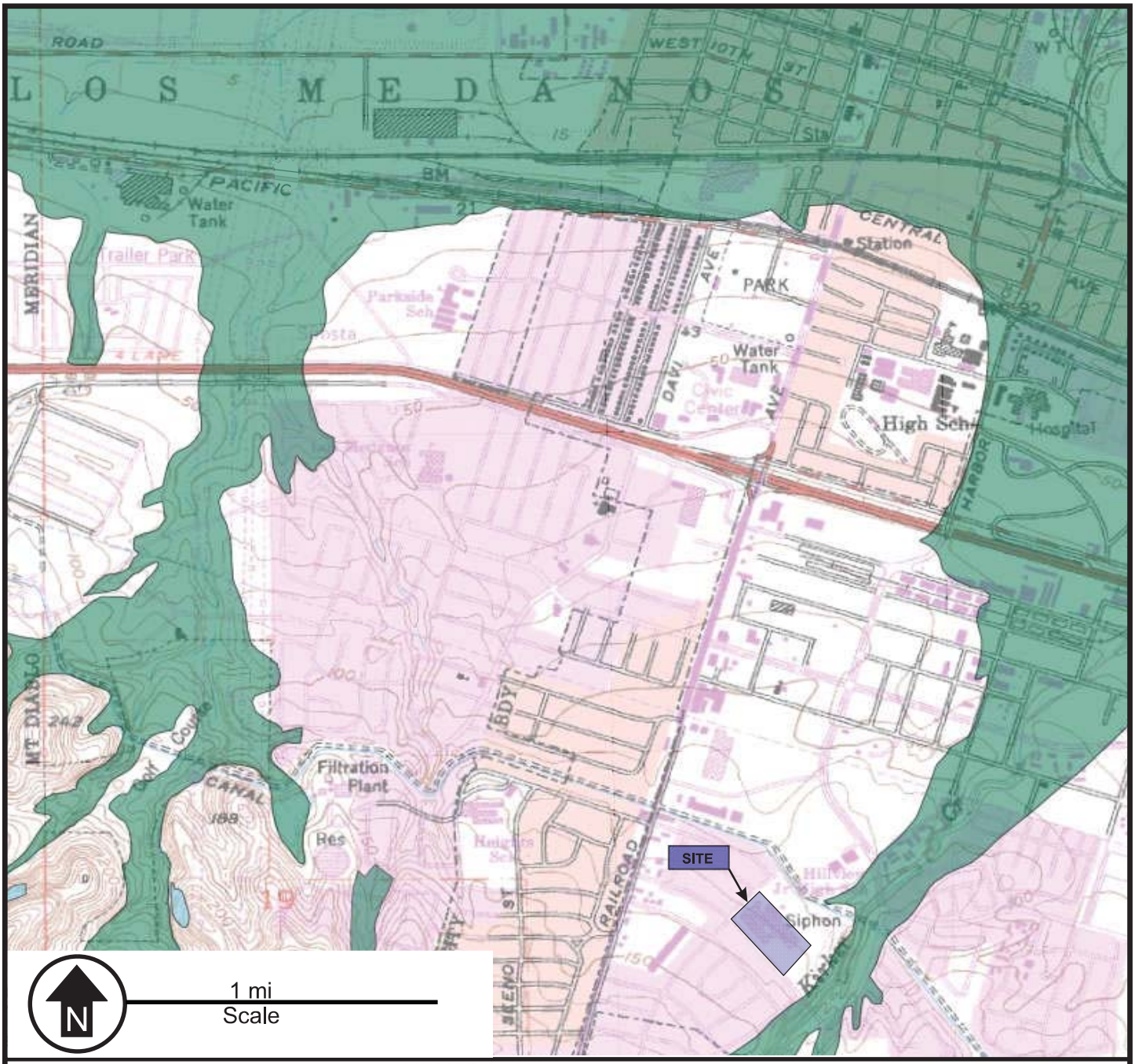
*approx. elevation from Boring Logs

ATLAS

Cross Section C-C'

PUSD - Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94565

91-64513-PW	March 2023	Plate 6b



MAP EXPLANATION

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Reference: California Geological Survey - Seismic Hazard Zones Honker Bay Quadrangle (2018)

ATLAS

Seismic Hazards Zones Map

PUSD - Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94025

91-64513-PW	March 2023	Plate 7

EXPLANATION

Regulatory Floodway. **Zone AE**

Special Flood Hazard Areas subject to inundations by the 1% Annual Chance Flood Hazard, with Base Flood Elevations determined. **Zone AE**

0.2% Annual Chance Flood Hazard; areas of 1% annual chance flood with average depth less than 1 foot or with drainage areas of less than one square mile. **Zone X**

N

500 ft.
Scale

FEMA (effective 09.30.2015)

ATLAS

Job No.: 91-64513-PW
Approved: NAA
Date: 03.01.2023

FLOOD HAZARD ZONES MAP

PUSD - Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94565

Plate
8

APPENDIX A

FIELD EXPLORATION

Key to Boring Log Symbols
Boring Logs

UNIFIED SOIL CLASSIFICATION (ASTM D-2487)

Material Types	Criteria for Assigning Soil Group Names			Group Symbol	Soil Group Names	Legend
Coarse Grained Soils	Gravels >50% of Coarse Fraction Retained on No. 4 Sieve	Clean Gravels <5% Fines	Cu≥4 and 1≤Cc≤3	GW	Well-Graded Gravel	
			Cu<4 and/or [Cc<1 or Cc>3]	GP	Poorly-Graded Gravel	
		Gravels with Fines >12% Fines	Fines Classify as ML or MH	GM	Silty Gravel	
			Fines Classify as CL or CH	GC	Clayey Gravel	
>50% Retained on No. 200 Sieve	Sands ≥50% of Coarse Fraction Passes on No. 4 Sieve	Clean Sands <5% Fines	Cu≥6 and 1≤Cc≤3	SW	Well-Graded Sand	
			Cu<6 and/or [Cc<1 or Cc>3]	SP	Poorly-Graded Sand	
		Sands and Fines >12% Fines	Fines Classify as ML or MH	SM	Silty Sand	
			Fines Classify as CL or CH	SC	Clayey Sand	
Fine Grained Soils	Silts and Clays Liquid Limits<50	Inorganic	PI>7 and Plots≥"A" Line	CL	Lean Clay	
			PI>4 and Plots<"A" Line	ML	Silt	
		Organic	LL (Oven Dried)/LL(not Dried <0.75)	OL	Organic Silt	
≥50% Passes No. 200 Sieve	Silts and Clays Liquid Limits≥50	Inorganic	PI Plots≥"A" Line	CH	Fat Clay	
			PI Plots<"A" Line	MH	Elastic Silt	
		Organic	LL (Oven Dried)/LL(Not Dried <0.75)	OH	Organic Clay	
Highly Organic Soils		Primarily Organic Matter, Dark in Color and Organic Odor		PT	Peat	

PENETRATION RESISTANCE (RECORDED AS BLOWS/0.5 FEET)

SAND AND GRAVEL		SILT AND CLAY		
RELATIVE DENSITY	N-VALUE (BLOWS/FOOT)*	CONSISTENCY	N-VALUE (BLOWS/FOOT)*	COMPRESSIVE STRENGTH
Very Loose	0 - 3	Very Soft	0 - 1	0 - 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium Dense	11 - 29	Medium Stiff	5 - 7	0.50 - 1.0
Dense	30 - 49	Stiff	8 - 14	1.0 - 2.0
Very Dense	50+	Very Stiff	15 - 29	2.0 - 4.0
		Hard	30+	Over 4.0

SOIL MOISTURE

DESCRIPTOR	DESCRIPTION
Dry	Dry of Standard Proctor Optimum
Damp	Sand Dry
Moist	Near Standard Proctor Optimum
Wet	Wet of Standard Proctor Optimum
Saturated	Free Water in Sample

PARTICLES SIZES

COMPONENTS		SIZE OR SIEVE NUMBER
Boulders		Over 12 Inches
Cobbles		3 to 12 inches
Gravels	-Coarse	3/4 to 3 Inches
	-Fine	Number 4 to 3/4 Inch
Sand	-Coarse	Number 10 to Number 4
	-Medium	Number 40 to Number 10
	-Fine	Number 200 to Number 40
Fines (Silt and Clay)		Below Number 200

Grab Bulk Sample

Standard Penetration Test

2.5 Inch Modified California

Shelby Tube

No Recovery

Initial Water Level Reading

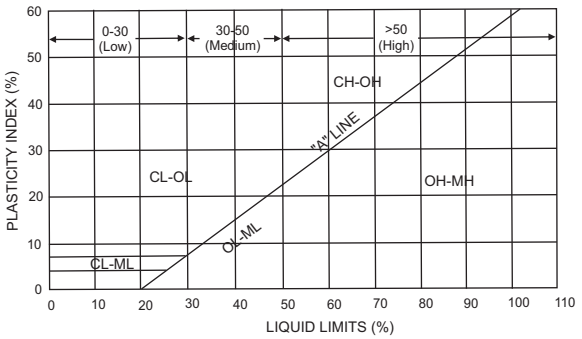
Final Water Level Reading

Blow Count
The number of blows of the sampling hammer required to drive the sampler through each of three 6-inch increments. Less than three increments may be reported if more than 50 blows are counted for any increment. The notation 50/5" indicates 50 blows recorded for 5 inches of penetration.

N-Value
Number of blows 140 LB hammer falling 30 inches to drive a 2 inch outside diameter (1-3/8 inch I.D) split barrel sampler the last 12 inches of an 18 inch drive (ASTM-1586 Standard Penetration Test)

CU -Consolidated Undrained triaxial test completed. Refer to laboratory results
DS - Results of Direct Shear test in terms of total cohesion (C, KSF) or effective cohesion and friction angles (C', KSF and degrees)
LL - Liquid Limit
PI - Plasticity Index
PP - Pocket Penetrometer test
TV - Torvane Shear Test results in terms of undrained shear strength (KSF)
UU - Unconsolidated-Undrained Triaxial test results in terms of undrained shear strength (KSF)
#200 - Percent passing number 200 sieve
Cu - Coefficient of Uniformity
Cc - Coefficient of Concavity

PLASTICITY CHART



General Notes

1. The boring locations were determined by pacing, sighting and/or measuring from site features. Locations are approximate. Elevations of borings (if included) were determined by interpolation between plan contours or from another source that will be identified in the report or on the project site plan. The location and elevation of borings should be considered accurate only to the degree implied by the method used.

2. The stratification lines represent the approximate boundary between soil types. The transition may be gradual.

3. Water level readings in the drill holes were recorded at time and under conditions stated on the boring logs. This data has been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tides, temperature and other factors at the time measurements were made.

4. The boring logs and attached data should only be used in accordance with the report.

ATLAS

KEY TO EXPLORATORY BORING LOGS

BORING NUMBER B-1

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 132 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0	**AC 3.5" :**										
	AB 7.5" :										
	(CL) **LEAN CLAY :** Stiff, dark brown, moist.	MC 1-1		4-5-6 (11)	1.5	112	21	32	12	20	
	Becomes very stiff.	MC 1-2		5-8-12 (20)	1.5						
	(CL) **SANDY CLAY :** Very stiff, orangish brown, moist.										
10		MC 1-3		8-12-14 (26)	4.0	101	19				
	(SC) **CLAYEY SAND :** Medium dense, brown, moist, with gravel.										
		SPT 1-4		10-13-12 (25)			16				39
	(SM) **SILTY SAND :** Medium dense, brown, moist.										
20		SPT 1-5		10-10-9 (19)							
	(CL) **SANDY CLAY :** Very stiff, brown, moist.										
	Becomes hard.	SPT 1-6		11-26-28 (54)							
30		SPT 1-7		8-8-13 (21)							
	Becomes very stiff.										

Bottom of borehole at 30.0 feet.

BORING NUMBER B-2

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 133 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**AC 3.5"** : **AB 6"** : (CL) **LEAN CLAY** : Very stiff, dark brown, moist.	MC 2-1		8-10-12 (22)		102	20				
		(CL) **SANDY CLAY** : Very stiff, brown, moist.	MC 2-2		8-10-12 (22)	2.0 3.0	107	20				
10			MC 2-3		8-12-13 (25)	2.0	100	21				58
		Becomes wet.	SPT 2-4		5-8-12 (20)							

Bottom of borehole at 15.0 feet.

BORING NUMBER B-3

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 135 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**TOPSOIL 3"**										
		(CL) **LEAN CLAY :** Very stiff, dark brown, moist.	MC 3-1		5-12-13 (25)		107	20				
		(CL) **SANDY CLAY :** Very stiff, brown, moist.	MC 3-2		7-10-13 (23)	2.5 / 2.5	97	20				57
10		DSCU @ 9.5': phi = 27.4 degrees, c = 700psf.	MC 3-3		5-6-13 (19)	3.0	99	22				
			SPT 3-4		8-12-12 (24)							
		(SM) **SILTY SAND :** Medium dense, brown, moist, fine grained.										
20			SPT 3-5		10-12-14 (26)							

Bottom of borehole at 20.0 feet.

BORING NUMBER B-4

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 133 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**TOPSOIL 3"**										
		(SM) **SILTY SAND** : Medium dense, brown, moist, fine grained.	MC 4-1		6-8-8 (16)		102	21				
			MC 4-2		6-8-12 (20)	1.0 2.0	97	21				
		Becomes medium grained, with trace gravel.										
10		No gravel.	MC 4-3		8-10-12 (22)	2.0	109	12				35
			SPT 4-4		8-10-10 (20)							

Bottom of borehole at 15.0 feet.

BORING NUMBER B-5

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 133 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0	**AC 3"** : **AB 4"** :										
	(CL) **LEAN CLAY WITH SAND** : Stiff, brown, moist.	MC 5-1		5-5-4 (9)	2.0	89	29	38	16	22	71
	Becomes very stiff.	MC 5-2		5-10-13 (23)	>4.5	101	17				
	(CL) **SANDY CLAY** : Very stiff, brown, moist.										
10		MC 5-3		7-10-13 (23)		108	15				51
	(SP-SM) **SAND WITH SILT** : Medium dense, brown, moist.	SPT 5-4		6-7-8 (15)							
	(SM) **SILTY SAND** : Medium dense, brown, moist.										
20		SPT 5-5		9-9-9 (18)							
		SPT 5-6		12-12-12 (24)							
	(SP) **SAND** : Medium dense, brown, moist.										
30	Becomes dense and light gray.	SPT 5-7		12-15-21 (36)							
		SPT 5-8		15-21-28 (49)							
	(SP-SM) **SAND WITH SILT** : Dense, brown, moist.										
40		SPT 5-9		20-20-23 (43)							
	(CL) **SANDY CLAY** : Hard, brown, moist.										
		SPT 5-10		10-17-17 (34)							

Bottom of borehole at 45.0 feet.

BORING NUMBER B-6

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 132 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**TOPSOIL 3"**										
		(CL) **SANDY CLAY :** Very stiff, brown, moist.	MC 6-1		5-8-7 (15)	1.5		21				
		Becomes stiff.	MC 6-2		5-6-7 (13)	2.0						
10		Becomes very stiff.	MC 6-3		7-8-10 (18)	>4.5	107	17				
		(SM) **SILTY SAND :** Medium dense, brown, moist.	SPT 6-4		5-5-6 (11)			11				15
20			SPT 6-5		6-11-13 (24)							
			SPT 6-6		8-8-14 (22)							
		(SP-SC) **SAND WITH CLAY :** Medium dense, brown, moist.										
30		Becomes dense.	SPT 6-7		16-18-21 (39)							
		(SC) **CLAYEY SAND :** Dense, brown, moist.										
			SPT 6-8		8-12-20 (32)							
40			SPT 6-9		6-13-20 (33)							
		(SM) **SILTY SAND :** Dense, brown, moist.										
		Becomes medium dense.	SPT 6-10		10-12-13 (25)							

Bottom of borehole at 45.0 feet.

BORING NUMBER B-7

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 133 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**AC 3.5" :**										
		AB 6" :										
		(SM) **SILTY SAND :** Medium dense, brown, moist, fine grained.	MC 7-1		5-7-10 (17)		97	24				
		Becomes dense.	MC 7-2		12-33	2.0	108	18				
		[Mod Cal 50 Blows for 6" at 4']				2.0						
10		With trace roots.	MC 7-3		7-14-16 (30)	2.5	97	21				
		Becomes medium dense.	SPT 7-4		5-8-9 (17)			14				35

Bottom of borehole at 15.0 feet.

BORING NUMBER B-8

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 137 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**AC 4"** : **AB 7"** : (CL) **SANDY CLAY** : Very stiff, dark brown, moist.	MC 8-1		8-13-14 (27)	3.0	100	21				
		(CL) **SANDY CLAY** : Very stiff, brown, moist, fine grained.	MC 8-2		7-8-8 (16)	1.5	96	22				54
10			MC 8-3		6-12-13 (25)	1.0	101	19				
		(SP-SC) **SAND WITH CLAY** : Medium dense, brown, moist, fine grained. Becomes dense.	SPT 8-4		12-12-19 (31)							
20		Becomes medium dense.	SPT 8-5		7-9-9 (18)							

Bottom of borehole at 20.0 feet.

BORING NUMBER B-9

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 137 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		**AC 4"** : **AB 7"** : (CL) **LEAN CLAY WITH SAND** : Very stiff, light brown, moist.	MC 9-1		8-12-12 (24)		98	21	38	13	25	70
			MC 9-2		6-7-12 (19)	1.5 >4.5	111	16				
		(SM) **SILTY SAND** : Medium dense, brown, moist, fine grained.										
10		Becomes very dense. [Mod Cal 50 Blows for 6" at 9']	MC 9-3		20-33	>4.5	112	10				
		Becomes medium dense.	SPT 9-4		15-13-12 (25)							
20		Becomes dense.	SPT 9-5		12-14-17 (31)							
		Becomes very dense.	SPT 9-6		15-25-30 (55)							
30		Becomes dense.	SPT 9-7		18-18-25 (43)							
			SPT 9-8		25-22-25 (47)							

Bottom of borehole at 35.0 feet.

BORING NUMBER B-10

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School Replacement Campus
PROJECT NUMBER 91-64513-PW
PROJECT LOCATION 333 Yosemite Dr Pittsburg, CA 94565
DATE STARTED 2/17/23 **COMPLETED** 2/17/23
GROUND ELEVATION 138 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR West Coast Exploration
GROUND WATER LEVELS:
DRILLING METHOD Solid Flight B-24
AT TIME OF DRILLING --- No Groundwater Encountered.
LOGGED BY NA **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations Based on Google Earth
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	Penetration Rate (sec./ft.)	SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		**TOPSOIL 3"**										
		(CL) **SANDY LEAN CLAY :** Brown, moist, fine grained.	GB 10-1					7	45	15	30	68
		Bottom of borehole at 4.5 feet.										

APPENDIX B

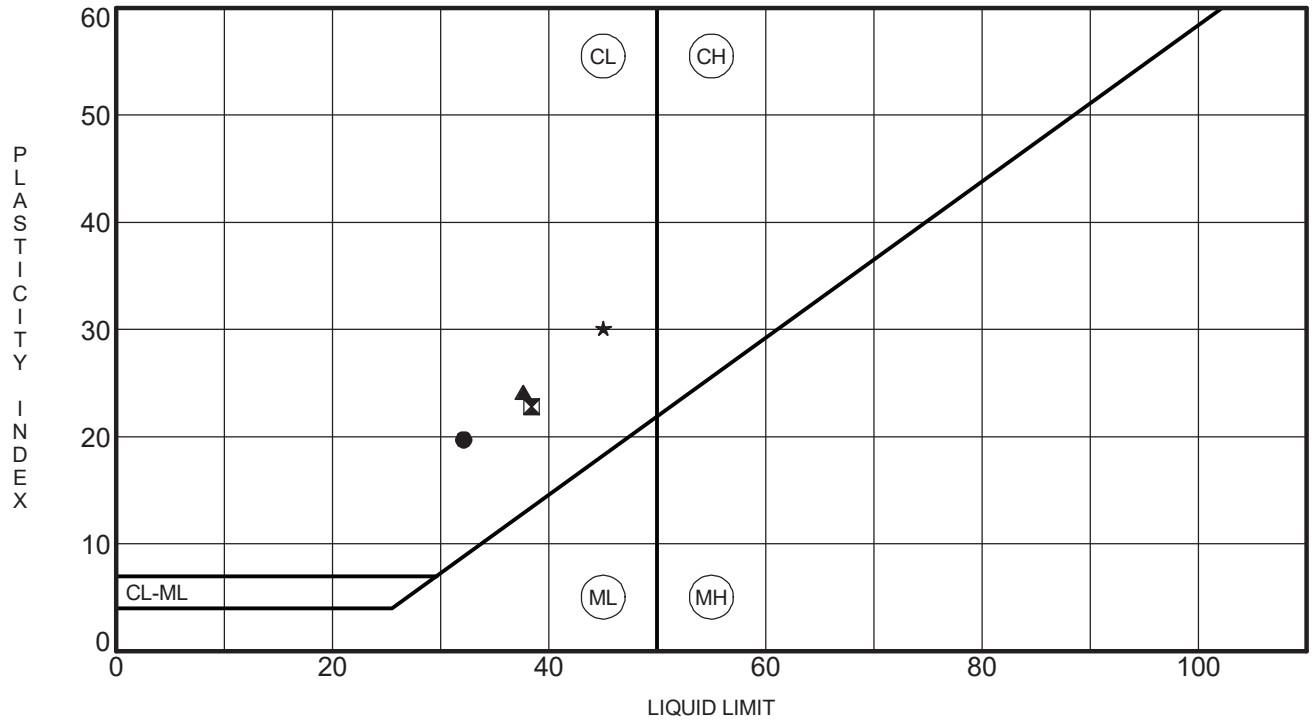
LABORATORY TEST RESULTS

Atterberg Limits Results
Grain Size Distribution (2)
Consolidated Undrained Direct Shear (ASTM D3080M)
R Value Test Report
Corrosivity Tests Summary

ATTERBERG LIMITS RESULTS

CLIENT Pittsburg Unified School District **PROJECT NAME** Hillview Junior High School Replacement Campus

PROJECT NUMBER 91-64513-PW **PROJECT LOCATION** 333 Yosemite Dr Pittsburg, CA 94565

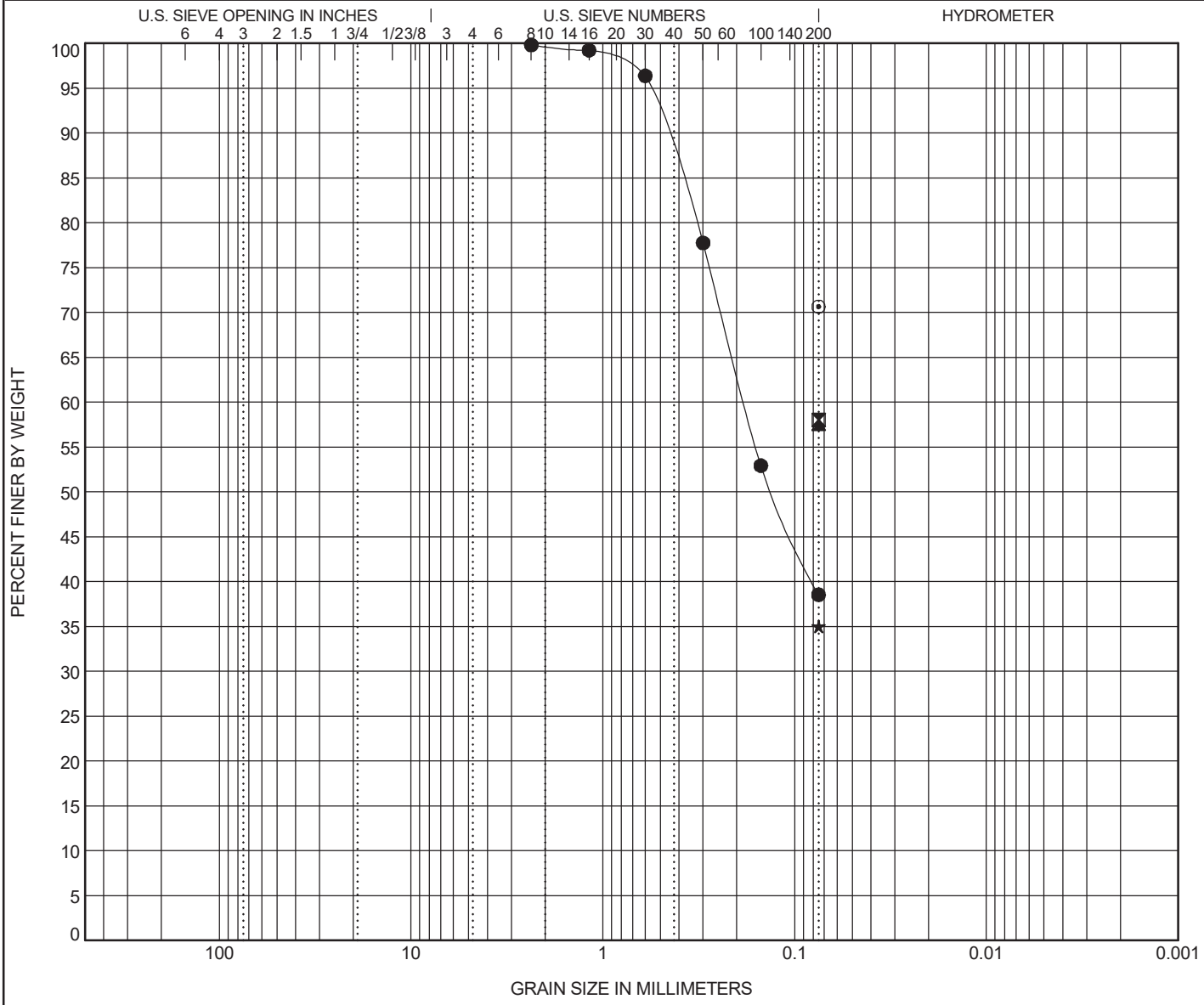


	Specimen Identification		LL	PL	PI	Fines	Classification
●	**B-01**	**2.5**	**32**	**12**	**20**		**LEAN CLAY (CL)**
⊠	**B-05**	**2.5**	**38**	**16**	**22**	**71**	**LEAN CLAY WITH SAND (CL)**
▲	**B-09**	**3.0**	**38**	**13**	**25**	**70**	**LEAN CLAY with SAND(CL)**
★	**B-10**	**3.0**	**45**	**15**	**30**	**68**	**SANDY LEAN CLAY(CL)**

GRAIN SIZE DISTRIBUTION

CLIENT Pittsburg Unified School District **PROJECT NAME** Hillview Junior High School Replacement Campus

PROJECT NUMBER 91-64513-PW **PROJECT LOCATION** 333 Yosemite Dr Pittsburg, CA 94565



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

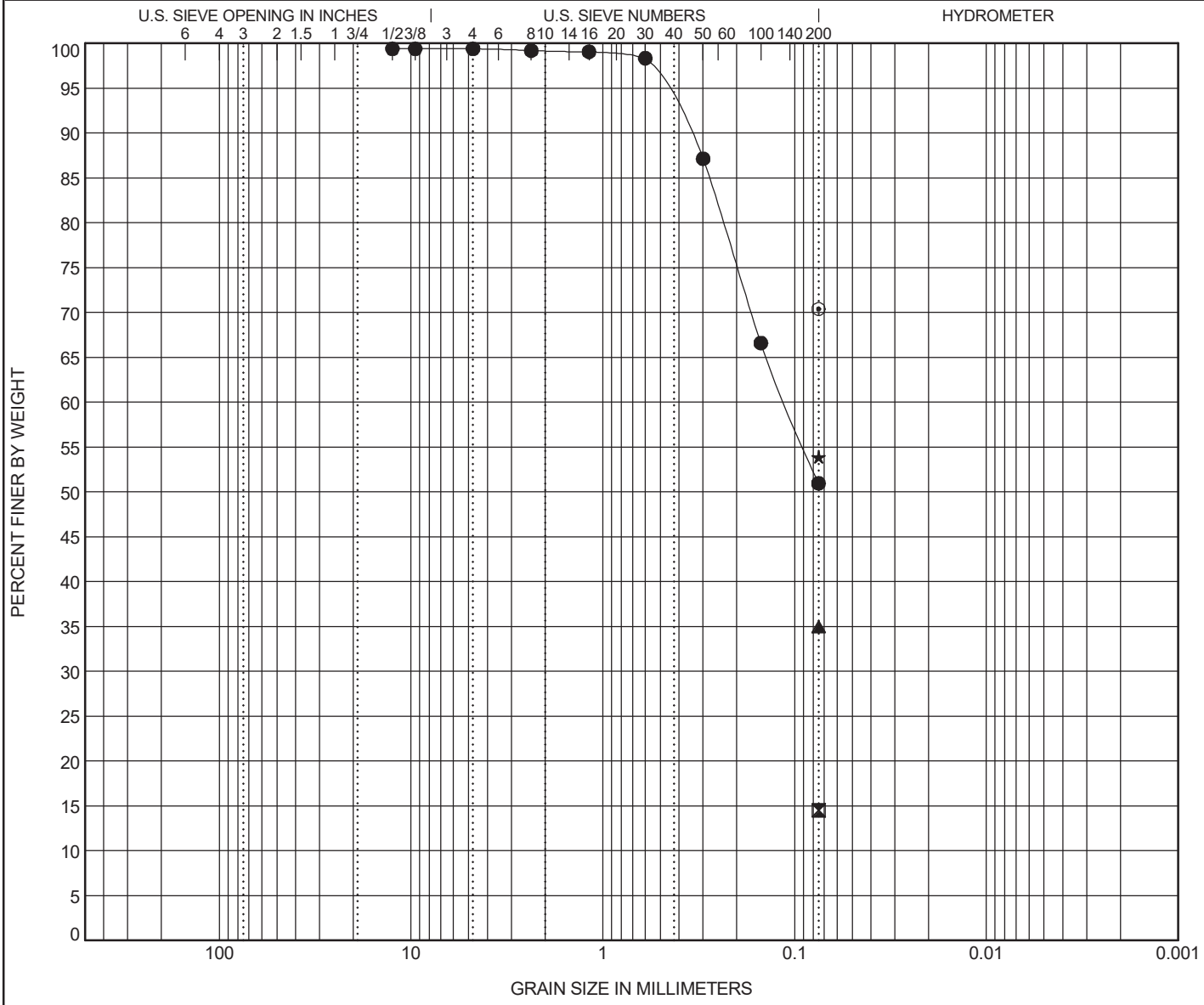
Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	B-01	14.5	CLAYEY SAND (SC)					
⊠	B-02	9.5	SANDY CLAY (CL)					
▲	B-03	4.5	SANDY CLAY (CL)					
★	B-04	9.5	SILTY SAND (SM)					
⊙	B-05	2.5	LEAN CLAY WITH SAND (CL)	38	16	22		

Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	14.5	2.36	0.183				61.3	38.5	
⊠	B-02	9.5	0.075						58.0	
▲	B-03	4.5	0.075						57.5	
★	B-04	9.5	0.075						35.0	
⊙	B-05	2.5	0.075						70.7	

GRAIN SIZE DISTRIBUTION

CLIENT Pittsburg Unified School District **PROJECT NAME** Hillview Junior High School Replacement Campus

PROJECT NUMBER 91-64513-PW **PROJECT LOCATION** 333 Yosemite Dr Pittsburg, CA 94565



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	LL	PL	PI	Cc	Cu
●	B-05	9.5	SANDY CLAY (CL)					
⊠	B-06	14.5	SILTY SAND (SM)					
▲	B-07	14.5	SILTY SAND (SM)					
★	B-08	4.5	SANDY CLAY (CL)					
⊙	B-09	3.0	LEAN CLAY with SAND(CL)	38	13	25		

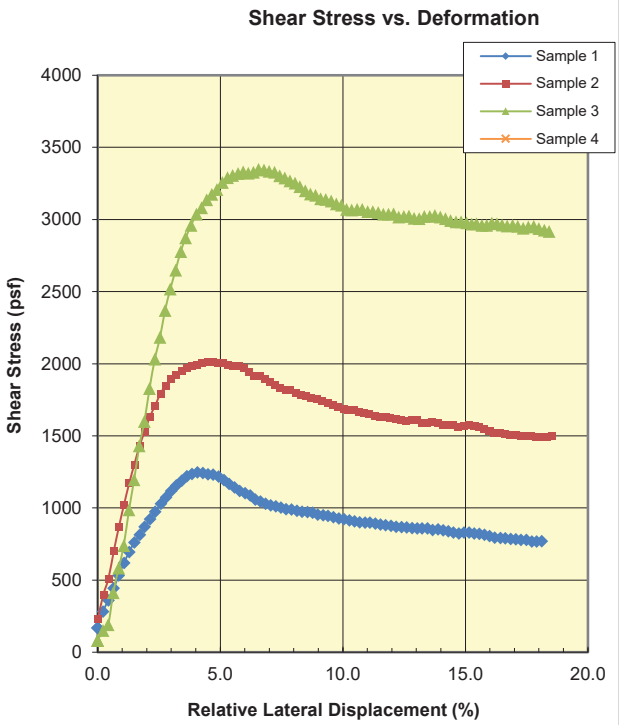
Specimen Identification			D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-05	9.5	12.5	0.112			0.0	48.4	51.0	
⊠	B-06	14.5	0.075						14.5	
▲	B-07	14.5	0.075						35.0	
★	B-08	4.5	0.075						53.9	
⊙	B-09	3.0	0.075						70.4	

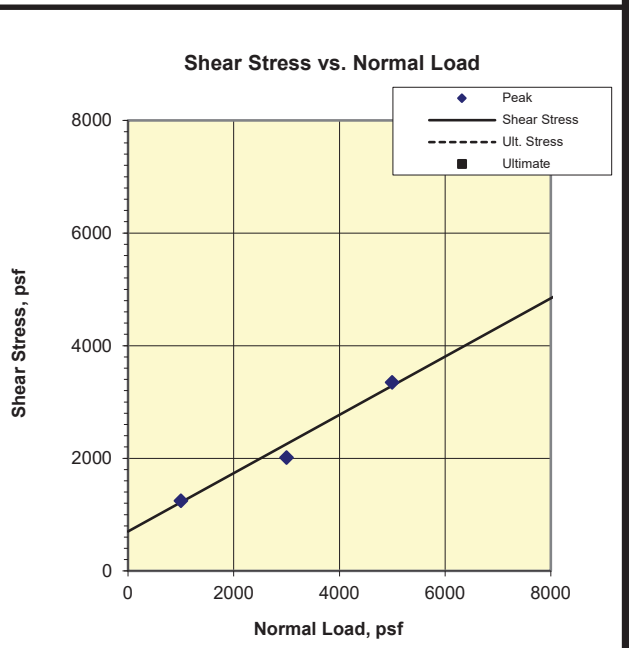
Consolidated Undrained Direct Shear (ASTM D3080M)

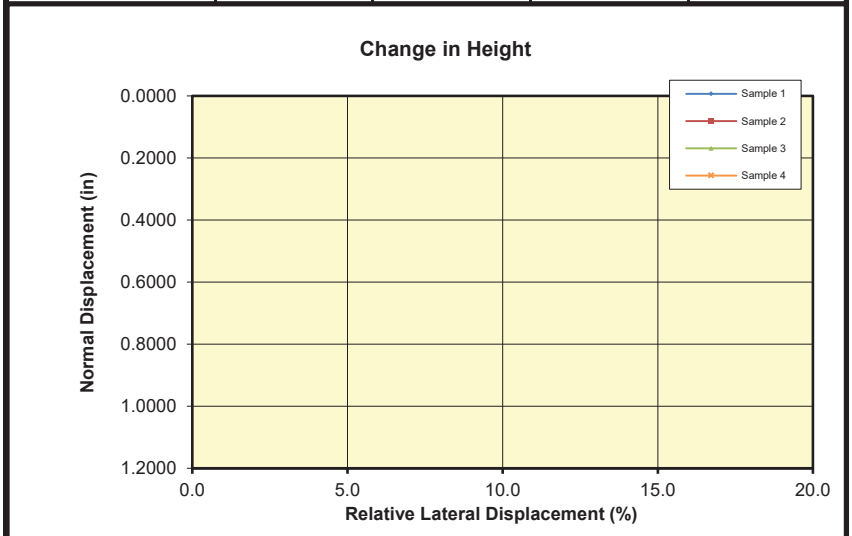
CTL Job #:	1108-078	Project #:	91-64513-PW	By:	MD
Client:	Atlas	Date:	2/28/2023	Checked:	PJ
Project Name:	PUSD Hillview JHS	Remolding Info:			

Specimen Data				
	1	2	3	4
Boring:	3	3	3	
Sample:	3-3	3-3	3-3	
Depth (ft):	9.5	9.5	9.5	
Visual Description:	Yellowish Brown Sandy CLAY	Yellowish Brown Sandy CLAY	Yellowish Brown Sandy CLAY	
Normal Load (psf)	1000	3000	5000	
Dry Mass of Specimen (g)	111.8	120.2	125.2	
Initial Height (in)	1.00	1.00	1.00	
Initial Diameter (in)	2.42	2.42	2.42	
Initial Void Ratio	0.816	0.689	0.619	
Initial Moisture (%)	25.7	20.7	18.3	
Initial Wet Density (pcf)	116.6	120.5	123.2	
Initial Dry Density (pcf)	92.8	99.8	104.1	
Initial Saturation (%)	84.9	81.2	79.9	
ΔHeight Consol (in)	0.0101	0.0295	0.0296	
At Test Void Ratio	0.798	0.639	0.571	
At Test Moisture (%)	27.5	22.4	18.8	
At Test Wet Density (pcf)	119.5	125.9	127.5	
At Test Dry Density (pcf)	93.7	102.8	107.3	
At Test Saturation (%)	93.0	94.6	88.9	
Strain Rate (%/min)	1.2	1.2	1.1	
Strengths Picked at	Peak	Peak	Peak	
Shear Stress (psf)	1246	2013	3347	
ΔHeight (in) at Peak				
Ultimate Stress (psf)				

Phi (deg)	27.4	Ult. Phi (deg)	
Cohesion (psf)	700	Ult. Cohesion (psf)	

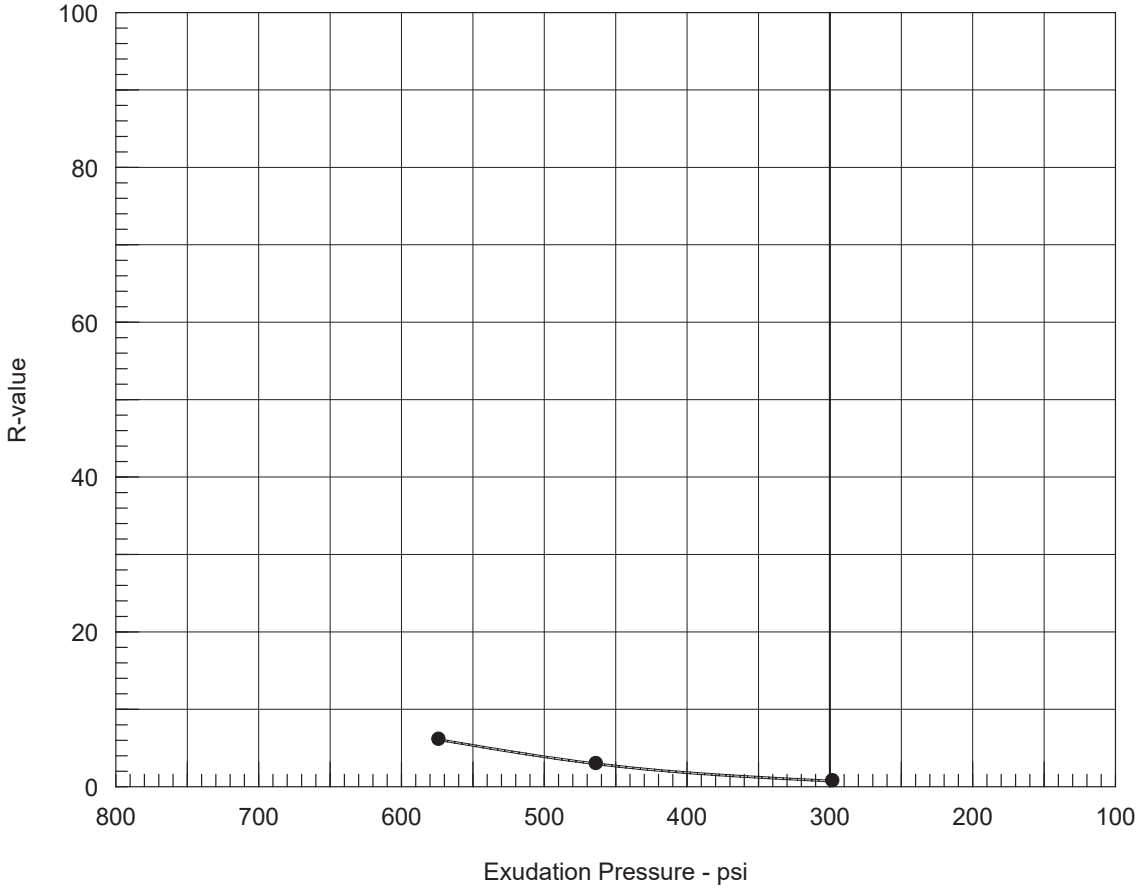






Remarks: *DS-CU* A fully undrained condition may not be attained in this test. ΔH is not measured during undrained direct shear tests.

R-VALUE TEST REPORT



Resistance R-Value and Expansion Pressure - Cal Test 301

No.	Compact. Pressure psi	Density pcf	Moist. %	Expansion Pressure psi	Horizontal Press. psi @ 160 psi	Sample Height in.	Exud. Pressure psi	R Value	R Value Corr.
1	60	102.7	19.4	0.58	146	2.53	573	6	6
2	60	102.5	20.3	0.27	153	2.60	463	3	3
3	60	102.1	21.9	0.00	158	2.65	298	1	1

Test Results	Material Description
R-value at 300 psi exudation pressure = 1	Brown Clay Sampled by N.Anastasio on 2/17/2023
Project No.: 9164513PW **Project:** PUSD - Hillview Junior High School Replacement Campus **Location:** B-10 0-4.5 ft / Native **Sample Number:** 10S230224-3 **Date:** 3/8/2023	**Tested by:** JS **Checked by:** YH **Remarks:**
R-VALUE TEST REPORT **CONSOLIDATED ENGINEERING LABORATORIES**	**Figure** 10S230224-3

Corrosivity Tests Summary

CTL # 1108-078 **Date:** 3/1/2023 **Tested By:** PJ **Checked:** PJ

Client: Atlas **Project:** PUSD Hillview JHS **Proj. No:** 91-64513-PW

Remarks:

Sample Location or ID			Resistivity @ 15.5 °C (Ohm-cm)			Chloride	Sulfate		pH	ORP (Redox)		Sulfide	Moisture	Soil Visual Description
			As Rec.	Min	Sat.	mg/kg	mg/kg	%		E_H (mv)	At Test	Qualitative by Lead	At Test %	
						Dry Wt.	Dry Wt.	Dry Wt.						
Boring	Sample, No.	Depth, ft.	ASTM G57	Cal 643	ASTM G57	ASTM D4327	ASTM D4327	ASTM D4327	ASTM G51	ASTM G200	Temp °C	Acetate Paper	ASTM D2216	
5	1	1-5	-	-	948	2	64	0.0064	7.6	488	16	Negative	18.9	Dark Yellowish Brown CLAY w/ Sand

APPENDIX C

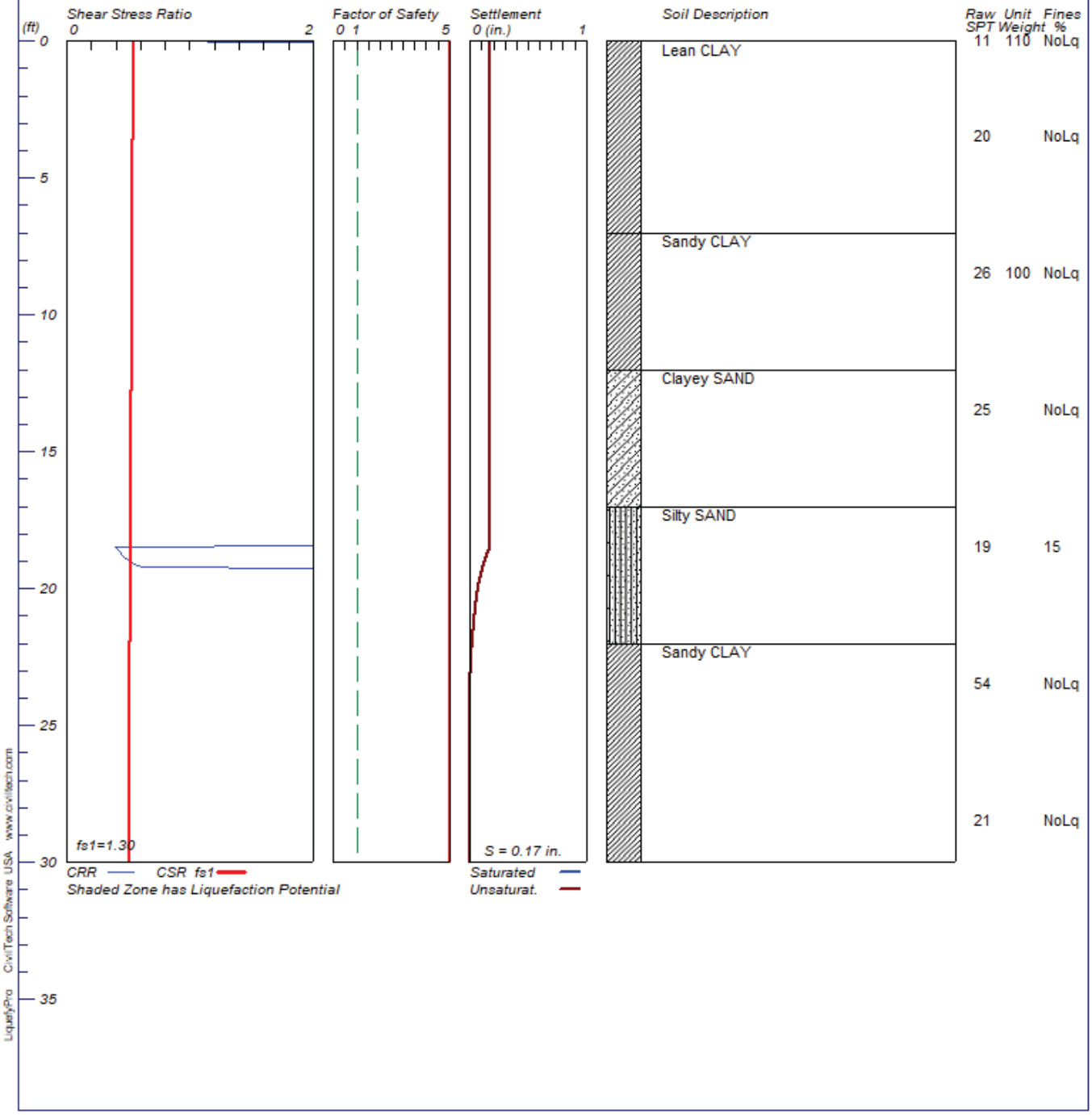
DYNAMIC SETTLEMENT ANALYSIS

LIQUEFACTION ANALYSIS

Hillview Jr. HS Replacement Campus

Hole No.=B-1 Water Depth=40 ft

Magnitude=6.5
Acceleration=0.835g



Civil Tech Corporation

Atlas No. 91-64513-PW

Plate A-1

****
LIQUEFACTION ANALYSIS CALCULATION SHEET
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****
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Input File Name: C:\Users\Manuel.Zea\Box\Geosphere-R Drive Folder\Geotech Projects by Number\64000\91-64513-PW PUSD Hillview Junior High School\4 - Liquefaction Analysis\B-1.liq
Title: Hillview Jr. HS Replacement Campus
Subtitle: Atlas No. 91-64513-PW

Surface Elev.=
Hole No.=B-1
Depth of Hole= 30.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration= 0.83 g
Earthquake Magnitude= 6.5

Input Data:
Surface Elev.=
Hole No.=B-1
Depth of Hole=30.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration=0.83 g
Earthquake Magnitude=6.5

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3

10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
ft		pcf	%
0.0	11.0	110.0	NoLiq
3.5	20.0	110.0	NoLiq

8.5	26.0	100.0	NoLiq
13.5	25.0	100.0	NoLiq
18.5	19.0	100.0	15.0
23.5	54.0	100.0	NoLiq
28.5	21.0	100.0	NoLiq

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.17 in.
Total Settlement of Saturated and Unsaturated Sands=0.17 in.
Differential Settlement=0.086 to 0.114 in.

Depth ft	CRRm	CSRsf	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.26	0.54	5.00	0.00	0.17	0.17
0.05	2.00	0.54	5.00	0.00	0.17	0.17
0.10	2.00	0.54	5.00	0.00	0.17	0.17
0.15	2.00	0.54	5.00	0.00	0.17	0.17
0.20	2.00	0.54	5.00	0.00	0.17	0.17
0.25	2.00	0.54	5.00	0.00	0.17	0.17
0.30	2.00	0.54	5.00	0.00	0.17	0.17
0.35	2.00	0.54	5.00	0.00	0.17	0.17
0.40	2.00	0.54	5.00	0.00	0.17	0.17
0.45	2.00	0.54	5.00	0.00	0.17	0.17
0.50	2.00	0.54	5.00	0.00	0.17	0.17
0.55	2.00	0.54	5.00	0.00	0.17	0.17
0.60	2.00	0.54	5.00	0.00	0.17	0.17
0.65	2.00	0.54	5.00	0.00	0.17	0.17
0.70	2.00	0.54	5.00	0.00	0.17	0.17
0.75	2.00	0.54	5.00	0.00	0.17	0.17
0.80	2.00	0.54	5.00	0.00	0.17	0.17
0.85	2.00	0.54	5.00	0.00	0.17	0.17
0.90	2.00	0.54	5.00	0.00	0.17	0.17
0.95	2.00	0.54	5.00	0.00	0.17	0.17
1.00	2.00	0.54	5.00	0.00	0.17	0.17
1.05	2.00	0.54	5.00	0.00	0.17	0.17
1.10	2.00	0.54	5.00	0.00	0.17	0.17
1.15	2.00	0.54	5.00	0.00	0.17	0.17
1.20	2.00	0.54	5.00	0.00	0.17	0.17
1.25	2.00	0.54	5.00	0.00	0.17	0.17
1.30	2.00	0.54	5.00	0.00	0.17	0.17
1.35	2.00	0.54	5.00	0.00	0.17	0.17
1.40	2.00	0.54	5.00	0.00	0.17	0.17
1.45	2.00	0.54	5.00	0.00	0.17	0.17
1.50	2.00	0.54	5.00	0.00	0.17	0.17
1.55	2.00	0.54	5.00	0.00	0.17	0.17
1.60	2.00	0.54	5.00	0.00	0.17	0.17
1.65	2.00	0.54	5.00	0.00	0.17	0.17
1.70	2.00	0.54	5.00	0.00	0.17	0.17
1.75	2.00	0.54	5.00	0.00	0.17	0.17
1.80	2.00	0.54	5.00	0.00	0.17	0.17
1.85	2.00	0.54	5.00	0.00	0.17	0.17

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9.95 2.00 0.53 5.00 0.00 0.17 0.17

10.00	2.00	0.53	5.00	0.00	0.17	0.17
10.05	2.00	0.53	5.00	0.00	0.17	0.17
10.10	2.00	0.53	5.00	0.00	0.17	0.17
10.15	2.00	0.53	5.00	0.00	0.17	0.17
10.20	2.00	0.53	5.00	0.00	0.17	0.17
10.25	2.00	0.53	5.00	0.00	0.17	0.17
10.30	2.00	0.53	5.00	0.00	0.17	0.17
10.35	2.00	0.53	5.00	0.00	0.17	0.17
10.40	2.00	0.53	5.00	0.00	0.17	0.17
10.45	2.00	0.53	5.00	0.00	0.17	0.17
10.50	2.00	0.53	5.00	0.00	0.17	0.17
10.55	2.00	0.53	5.00	0.00	0.17	0.17
10.60	2.00	0.53	5.00	0.00	0.17	0.17
10.65	2.00	0.53	5.00	0.00	0.17	0.17
10.70	2.00	0.53	5.00	0.00	0.17	0.17
10.75	2.00	0.53	5.00	0.00	0.17	0.17
10.80	2.00	0.53	5.00	0.00	0.17	0.17
10.85	2.00	0.53	5.00	0.00	0.17	0.17
10.90	2.00	0.53	5.00	0.00	0.17	0.17
10.95	2.00	0.53	5.00	0.00	0.17	0.17
11.00	2.00	0.53	5.00	0.00	0.17	0.17
11.05	2.00	0.53	5.00	0.00	0.17	0.17
11.10	2.00	0.53	5.00	0.00	0.17	0.17
11.15	2.00	0.53	5.00	0.00	0.17	0.17
11.20	2.00	0.53	5.00	0.00	0.17	0.17
11.25	2.00	0.53	5.00	0.00	0.17	0.17
11.30	2.00	0.53	5.00	0.00	0.17	0.17
11.35	2.00	0.53	5.00	0.00	0.17	0.17
11.40	2.00	0.53	5.00	0.00	0.17	0.17
11.45	2.00	0.53	5.00	0.00	0.17	0.17
11.50	2.00	0.53	5.00	0.00	0.17	0.17
11.55	2.00	0.53	5.00	0.00	0.17	0.17
11.60	2.00	0.53	5.00	0.00	0.17	0.17
11.65	2.00	0.53	5.00	0.00	0.17	0.17
11.70	2.00	0.53	5.00	0.00	0.17	0.17
11.75	2.00	0.53	5.00	0.00	0.17	0.17
11.80	2.00	0.53	5.00	0.00	0.17	0.17
11.85	2.00	0.53	5.00	0.00	0.17	0.17
11.90	2.00	0.53	5.00	0.00	0.17	0.17
11.95	2.00	0.53	5.00	0.00	0.17	0.17
12.00	2.00	0.53	5.00	0.00	0.17	0.17
12.05	2.00	0.53	5.00	0.00	0.17	0.17
12.10	2.00	0.53	5.00	0.00	0.17	0.17
12.15	2.00	0.53	5.00	0.00	0.17	0.17
12.20	2.00	0.53	5.00	0.00	0.17	0.17
12.25	2.00	0.53	5.00	0.00	0.17	0.17
12.30	2.00	0.53	5.00	0.00	0.17	0.17
12.35	2.00	0.53	5.00	0.00	0.17	0.17
12.40	2.00	0.53	5.00	0.00	0.17	0.17
12.45	2.00	0.53	5.00	0.00	0.17	0.17
12.50	2.00	0.53	5.00	0.00	0.17	0.17
12.55	2.00	0.53	5.00	0.00	0.17	0.17
12.60	2.00	0.53	5.00	0.00	0.17	0.17
12.65	2.00	0.53	5.00	0.00	0.17	0.17

12.70	2.00	0.53	5.00	0.00	0.17	0.17
12.75	2.00	0.53	5.00	0.00	0.17	0.17
12.80	2.00	0.53	5.00	0.00	0.17	0.17
12.85	2.00	0.53	5.00	0.00	0.17	0.17
12.90	2.00	0.53	5.00	0.00	0.17	0.17
12.95	2.00	0.53	5.00	0.00	0.17	0.17
13.00	2.00	0.53	5.00	0.00	0.17	0.17
13.05	2.00	0.53	5.00	0.00	0.17	0.17
13.10	2.00	0.53	5.00	0.00	0.17	0.17
13.15	2.00	0.53	5.00	0.00	0.17	0.17
13.20	2.00	0.53	5.00	0.00	0.17	0.17
13.25	2.00	0.53	5.00	0.00	0.17	0.17
13.30	2.00	0.53	5.00	0.00	0.17	0.17
13.35	2.00	0.53	5.00	0.00	0.17	0.17
13.40	2.00	0.53	5.00	0.00	0.17	0.17
13.45	2.00	0.53	5.00	0.00	0.17	0.17
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13.55	2.00	0.53	5.00	0.00	0.17	0.17
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13.65	2.00	0.53	5.00	0.00	0.17	0.17
13.70	2.00	0.53	5.00	0.00	0.17	0.17
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13.95	2.00	0.53	5.00	0.00	0.17	0.17
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14.15	2.00	0.52	5.00	0.00	0.17	0.17
14.20	2.00	0.52	5.00	0.00	0.17	0.17
14.25	2.00	0.52	5.00	0.00	0.17	0.17
14.30	2.00	0.52	5.00	0.00	0.17	0.17
14.35	2.00	0.52	5.00	0.00	0.17	0.17
14.40	2.00	0.52	5.00	0.00	0.17	0.17
14.45	2.00	0.52	5.00	0.00	0.17	0.17
14.50	2.00	0.52	5.00	0.00	0.17	0.17
14.55	2.00	0.52	5.00	0.00	0.17	0.17
14.60	2.00	0.52	5.00	0.00	0.17	0.17
14.65	2.00	0.52	5.00	0.00	0.17	0.17
14.70	2.00	0.52	5.00	0.00	0.17	0.17
14.75	2.00	0.52	5.00	0.00	0.17	0.17
14.80	2.00	0.52	5.00	0.00	0.17	0.17
14.85	2.00	0.52	5.00	0.00	0.17	0.17
14.90	2.00	0.52	5.00	0.00	0.17	0.17
14.95	2.00	0.52	5.00	0.00	0.17	0.17
15.00	2.00	0.52	5.00	0.00	0.17	0.17
15.05	2.00	0.52	5.00	0.00	0.17	0.17
15.10	2.00	0.52	5.00	0.00	0.17	0.17
15.15	2.00	0.52	5.00	0.00	0.17	0.17
15.20	2.00	0.52	5.00	0.00	0.17	0.17
15.25	2.00	0.52	5.00	0.00	0.17	0.17
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15.35	2.00	0.52	5.00	0.00	0.17	0.17

15.40	2.00	0.52	5.00	0.00	0.17	0.17
15.45	2.00	0.52	5.00	0.00	0.17	0.17
15.50	2.00	0.52	5.00	0.00	0.17	0.17
15.55	2.00	0.52	5.00	0.00	0.17	0.17
15.60	2.00	0.52	5.00	0.00	0.17	0.17
15.65	2.00	0.52	5.00	0.00	0.17	0.17
15.70	2.00	0.52	5.00	0.00	0.17	0.17
15.75	2.00	0.52	5.00	0.00	0.17	0.17
15.80	2.00	0.52	5.00	0.00	0.17	0.17
15.85	2.00	0.52	5.00	0.00	0.17	0.17
15.90	2.00	0.52	5.00	0.00	0.17	0.17
15.95	2.00	0.52	5.00	0.00	0.17	0.17
16.00	2.00	0.52	5.00	0.00	0.17	0.17
16.05	2.00	0.52	5.00	0.00	0.17	0.17
16.10	2.00	0.52	5.00	0.00	0.17	0.17
16.15	2.00	0.52	5.00	0.00	0.17	0.17
16.20	2.00	0.52	5.00	0.00	0.17	0.17
16.25	2.00	0.52	5.00	0.00	0.17	0.17
16.30	2.00	0.52	5.00	0.00	0.17	0.17
16.35	2.00	0.52	5.00	0.00	0.17	0.17
16.40	2.00	0.52	5.00	0.00	0.17	0.17
16.45	2.00	0.52	5.00	0.00	0.17	0.17
16.50	2.00	0.52	5.00	0.00	0.17	0.17
16.55	2.00	0.52	5.00	0.00	0.17	0.17
16.60	2.00	0.52	5.00	0.00	0.17	0.17
16.65	2.00	0.52	5.00	0.00	0.17	0.17
16.70	2.00	0.52	5.00	0.00	0.17	0.17
16.75	2.00	0.52	5.00	0.00	0.17	0.17
16.80	2.00	0.52	5.00	0.00	0.17	0.17
16.85	2.00	0.52	5.00	0.00	0.17	0.17
16.90	2.00	0.52	5.00	0.00	0.17	0.17
16.95	2.00	0.52	5.00	0.00	0.17	0.17
17.00	2.00	0.52	5.00	0.00	0.17	0.17
17.05	2.00	0.52	5.00	0.00	0.17	0.17
17.10	2.00	0.52	5.00	0.00	0.17	0.17
17.15	2.00	0.52	5.00	0.00	0.17	0.17
17.20	2.00	0.52	5.00	0.00	0.17	0.17
17.25	2.00	0.52	5.00	0.00	0.17	0.17
17.30	2.00	0.52	5.00	0.00	0.17	0.17
17.35	2.00	0.52	5.00	0.00	0.17	0.17
17.40	2.00	0.52	5.00	0.00	0.17	0.17
17.45	2.00	0.52	5.00	0.00	0.17	0.17
17.50	2.00	0.52	5.00	0.00	0.17	0.17
17.55	2.00	0.52	5.00	0.00	0.17	0.17
17.60	2.00	0.52	5.00	0.00	0.17	0.17
17.65	2.00	0.52	5.00	0.00	0.17	0.17
17.70	2.00	0.52	5.00	0.00	0.17	0.17
17.75	2.00	0.52	5.00	0.00	0.17	0.17
17.80	2.00	0.52	5.00	0.00	0.17	0.17
17.85	2.00	0.52	5.00	0.00	0.17	0.17
17.90	2.00	0.52	5.00	0.00	0.17	0.17
17.95	2.00	0.52	5.00	0.00	0.17	0.17
18.00	2.00	0.52	5.00	0.00	0.17	0.17
18.05	2.00	0.52	5.00	0.00	0.17	0.17

18.10	2.00	0.52	5.00	0.00	0.17	0.17
18.15	2.00	0.52	5.00	0.00	0.17	0.17
18.20	2.00	0.52	5.00	0.00	0.17	0.17
18.25	2.00	0.52	5.00	0.00	0.17	0.17
18.30	2.00	0.52	5.00	0.00	0.17	0.17
18.35	2.00	0.52	5.00	0.00	0.17	0.17
18.40	2.00	0.52	5.00	0.00	0.17	0.17
18.45	2.00	0.52	5.00	0.00	0.17	0.17
18.50	0.40	0.52	5.00	0.00	0.17	0.17
18.55	0.41	0.52	5.00	0.00	0.17	0.17
18.60	0.42	0.52	5.00	0.00	0.16	0.16
18.65	0.42	0.52	5.00	0.00	0.16	0.16
18.70	0.43	0.52	5.00	0.00	0.15	0.15
18.75	0.44	0.52	5.00	0.00	0.15	0.15
18.80	0.46	0.52	5.00	0.00	0.14	0.14
18.85	0.47	0.52	5.00	0.00	0.14	0.14
18.90	0.48	0.52	5.00	0.00	0.13	0.13
18.95	0.49	0.52	5.00	0.00	0.13	0.13
19.00	0.51	0.52	5.00	0.00	0.12	0.12
19.05	0.52	0.52	5.00	0.00	0.12	0.12
19.10	0.54	0.52	5.00	0.00	0.12	0.12
19.15	0.57	0.52	5.00	0.00	0.11	0.11
19.20	0.61	0.52	5.00	0.00	0.11	0.11
19.25	2.88	0.52	5.00	0.00	0.11	0.11
19.30	2.88	0.52	5.00	0.00	0.10	0.10
19.35	2.88	0.52	5.00	0.00	0.10	0.10
19.40	2.88	0.52	5.00	0.00	0.10	0.10
19.45	2.88	0.52	5.00	0.00	0.09	0.09
19.50	2.88	0.52	5.00	0.00	0.09	0.09
19.55	2.88	0.52	5.00	0.00	0.09	0.09
19.60	2.88	0.52	5.00	0.00	0.09	0.09
19.65	2.88	0.52	5.00	0.00	0.08	0.08
19.70	2.88	0.52	5.00	0.00	0.08	0.08
19.75	2.88	0.52	5.00	0.00	0.08	0.08
19.80	2.88	0.52	5.00	0.00	0.08	0.08
19.85	2.88	0.52	5.00	0.00	0.07	0.07
19.90	2.88	0.52	5.00	0.00	0.07	0.07
19.95	2.88	0.52	5.00	0.00	0.07	0.07
20.00	2.88	0.52	5.00	0.00	0.07	0.07
20.05	2.88	0.52	5.00	0.00	0.07	0.07
20.10	2.88	0.52	5.00	0.00	0.06	0.06
20.15	2.88	0.52	5.00	0.00	0.06	0.06
20.20	2.88	0.52	5.00	0.00	0.06	0.06
20.25	2.88	0.52	5.00	0.00	0.06	0.06
20.30	2.88	0.52	5.00	0.00	0.06	0.06
20.35	2.88	0.52	5.00	0.00	0.06	0.06
20.40	2.88	0.52	5.00	0.00	0.05	0.05
20.45	2.88	0.52	5.00	0.00	0.05	0.05
20.50	2.88	0.52	5.00	0.00	0.05	0.05
20.55	2.88	0.52	5.00	0.00	0.05	0.05
20.60	2.88	0.52	5.00	0.00	0.05	0.05
20.65	2.88	0.52	5.00	0.00	0.05	0.05
20.70	2.88	0.52	5.00	0.00	0.05	0.05
20.75	2.88	0.52	5.00	0.00	0.04	0.04

20.80	2.88	0.52	5.00	0.00	0.04	0.04
20.85	2.88	0.52	5.00	0.00	0.04	0.04
20.90	2.88	0.52	5.00	0.00	0.04	0.04
20.95	2.88	0.52	5.00	0.00	0.04	0.04
21.00	2.88	0.52	5.00	0.00	0.04	0.04
21.05	2.88	0.52	5.00	0.00	0.04	0.04
21.10	2.88	0.52	5.00	0.00	0.04	0.04
21.15	2.88	0.52	5.00	0.00	0.04	0.04
21.20	2.88	0.52	5.00	0.00	0.03	0.03
21.25	2.88	0.52	5.00	0.00	0.03	0.03
21.30	2.88	0.52	5.00	0.00	0.03	0.03
21.35	2.88	0.52	5.00	0.00	0.03	0.03
21.40	2.88	0.52	5.00	0.00	0.03	0.03
21.45	2.88	0.52	5.00	0.00	0.03	0.03
21.50	2.88	0.52	5.00	0.00	0.03	0.03
21.55	2.88	0.52	5.00	0.00	0.03	0.03
21.60	2.88	0.52	5.00	0.00	0.03	0.03
21.65	2.88	0.52	5.00	0.00	0.02	0.02
21.70	2.88	0.52	5.00	0.00	0.02	0.02
21.75	2.88	0.52	5.00	0.00	0.02	0.02
21.80	2.88	0.52	5.00	0.00	0.02	0.02
21.85	2.88	0.52	5.00	0.00	0.02	0.02
21.90	2.88	0.52	5.00	0.00	0.02	0.02
21.95	2.88	0.51	5.00	0.00	0.02	0.02
22.00	2.88	0.51	5.00	0.00	0.02	0.02
22.05	2.88	0.51	5.00	0.00	0.02	0.02
22.10	2.88	0.51	5.00	0.00	0.01	0.01
22.15	2.88	0.51	5.00	0.00	0.01	0.01
22.20	2.88	0.51	5.00	0.00	0.01	0.01
22.25	2.88	0.51	5.00	0.00	0.01	0.01
22.30	2.88	0.51	5.00	0.00	0.01	0.01
22.35	2.88	0.51	5.00	0.00	0.01	0.01
22.40	2.88	0.51	5.00	0.00	0.01	0.01
22.45	2.88	0.51	5.00	0.00	0.01	0.01
22.50	2.88	0.51	5.00	0.00	0.01	0.01
22.55	2.88	0.51	5.00	0.00	0.01	0.01
22.60	2.88	0.51	5.00	0.00	0.01	0.01
22.65	2.88	0.51	5.00	0.00	0.01	0.01
22.70	2.88	0.51	5.00	0.00	0.01	0.01
22.75	2.88	0.51	5.00	0.00	0.01	0.01
22.80	2.88	0.51	5.00	0.00	0.01	0.01
22.85	2.88	0.51	5.00	0.00	0.00	0.00
22.90	2.88	0.51	5.00	0.00	0.00	0.00
22.95	2.88	0.51	5.00	0.00	0.00	0.00
23.00	2.88	0.51	5.00	0.00	0.00	0.00
23.05	2.88	0.51	5.00	0.00	0.00	0.00
23.10	2.88	0.51	5.00	0.00	0.00	0.00
23.15	2.88	0.51	5.00	0.00	0.00	0.00
23.20	2.88	0.51	5.00	0.00	0.00	0.00
23.25	2.88	0.51	5.00	0.00	0.00	0.00
23.30	2.88	0.51	5.00	0.00	0.00	0.00
23.35	2.88	0.51	5.00	0.00	0.00	0.00
23.40	2.88	0.51	5.00	0.00	0.00	0.00
23.45	2.88	0.51	5.00	0.00	0.00	0.00

23.50 2.88 0.51 5.00 0.00 0.00 0.00
23.55 2.00 0.51 5.00 0.00 0.00 0.00
23.60 2.00 0.51 5.00 0.00 0.00 0.00
23.65 2.00 0.51 5.00 0.00 0.00 0.00
23.70 2.00 0.51 5.00 0.00 0.00 0.00
23.75 2.00 0.51 5.00 0.00 0.00 0.00
23.80 2.00 0.51 5.00 0.00 0.00 0.00
23.85 2.00 0.51 5.00 0.00 0.00 0.00
23.90 2.00 0.51 5.00 0.00 0.00 0.00
23.95 2.00 0.51 5.00 0.00 0.00 0.00
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24.10 2.00 0.51 5.00 0.00 0.00 0.00
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24.35 2.00 0.51 5.00 0.00 0.00 0.00
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24.50 2.00 0.51 5.00 0.00 0.00 0.00
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24.60 2.00 0.51 5.00 0.00 0.00 0.00
24.65 2.00 0.51 5.00 0.00 0.00 0.00
24.70 2.00 0.51 5.00 0.00 0.00 0.00
24.75 2.00 0.51 5.00 0.00 0.00 0.00
24.80 2.00 0.51 5.00 0.00 0.00 0.00
24.85 2.00 0.51 5.00 0.00 0.00 0.00
24.90 2.00 0.51 5.00 0.00 0.00 0.00
24.95 2.00 0.51 5.00 0.00 0.00 0.00
25.00 2.00 0.51 5.00 0.00 0.00 0.00
25.05 2.00 0.51 5.00 0.00 0.00 0.00
25.10 2.00 0.51 5.00 0.00 0.00 0.00
25.15 2.00 0.51 5.00 0.00 0.00 0.00
25.20 2.00 0.51 5.00 0.00 0.00 0.00
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25.65 2.00 0.51 5.00 0.00 0.00 0.00
25.70 2.00 0.51 5.00 0.00 0.00 0.00
25.75 2.00 0.51 5.00 0.00 0.00 0.00
25.80 2.00 0.51 5.00 0.00 0.00 0.00
25.85 2.00 0.51 5.00 0.00 0.00 0.00
25.90 2.00 0.51 5.00 0.00 0.00 0.00
25.95 2.00 0.51 5.00 0.00 0.00 0.00
26.00 2.00 0.51 5.00 0.00 0.00 0.00
26.05 2.00 0.51 5.00 0.00 0.00 0.00
26.10 2.00 0.51 5.00 0.00 0.00 0.00
26.15 2.00 0.51 5.00 0.00 0.00 0.00

26.20	2.00	0.51	5.00	0.00	0.00	0.00
26.25	2.00	0.51	5.00	0.00	0.00	0.00
26.30	2.00	0.51	5.00	0.00	0.00	0.00
26.35	2.00	0.51	5.00	0.00	0.00	0.00
26.40	2.00	0.51	5.00	0.00	0.00	0.00
26.45	2.00	0.51	5.00	0.00	0.00	0.00
26.50	2.00	0.51	5.00	0.00	0.00	0.00
26.55	2.00	0.51	5.00	0.00	0.00	0.00
26.60	2.00	0.51	5.00	0.00	0.00	0.00
26.65	2.00	0.51	5.00	0.00	0.00	0.00
26.70	2.00	0.51	5.00	0.00	0.00	0.00
26.75	2.00	0.51	5.00	0.00	0.00	0.00
26.80	2.00	0.51	5.00	0.00	0.00	0.00
26.85	2.00	0.51	5.00	0.00	0.00	0.00
26.90	2.00	0.51	5.00	0.00	0.00	0.00
26.95	2.00	0.51	5.00	0.00	0.00	0.00
27.00	2.00	0.51	5.00	0.00	0.00	0.00
27.05	2.00	0.51	5.00	0.00	0.00	0.00
27.10	2.00	0.51	5.00	0.00	0.00	0.00
27.15	2.00	0.51	5.00	0.00	0.00	0.00
27.20	2.00	0.51	5.00	0.00	0.00	0.00
27.25	2.00	0.51	5.00	0.00	0.00	0.00
27.30	2.00	0.51	5.00	0.00	0.00	0.00
27.35	2.00	0.51	5.00	0.00	0.00	0.00
27.40	2.00	0.51	5.00	0.00	0.00	0.00
27.45	2.00	0.51	5.00	0.00	0.00	0.00
27.50	2.00	0.51	5.00	0.00	0.00	0.00
27.55	2.00	0.51	5.00	0.00	0.00	0.00
27.60	2.00	0.51	5.00	0.00	0.00	0.00
27.65	2.00	0.51	5.00	0.00	0.00	0.00
27.70	2.00	0.51	5.00	0.00	0.00	0.00
27.75	2.00	0.51	5.00	0.00	0.00	0.00
27.80	2.00	0.51	5.00	0.00	0.00	0.00
27.85	2.00	0.51	5.00	0.00	0.00	0.00
27.90	2.00	0.51	5.00	0.00	0.00	0.00
27.95	2.00	0.51	5.00	0.00	0.00	0.00
28.00	2.00	0.51	5.00	0.00	0.00	0.00
28.05	2.00	0.51	5.00	0.00	0.00	0.00
28.10	2.00	0.51	5.00	0.00	0.00	0.00
28.15	2.00	0.51	5.00	0.00	0.00	0.00
28.20	2.00	0.51	5.00	0.00	0.00	0.00
28.25	2.00	0.51	5.00	0.00	0.00	0.00
28.30	2.00	0.51	5.00	0.00	0.00	0.00
28.35	2.00	0.51	5.00	0.00	0.00	0.00
28.40	2.00	0.51	5.00	0.00	0.00	0.00
28.45	2.00	0.51	5.00	0.00	0.00	0.00
28.50	2.00	0.51	5.00	0.00	0.00	0.00
28.55	2.00	0.51	5.00	0.00	0.00	0.00
28.60	2.00	0.51	5.00	0.00	0.00	0.00
28.65	2.00	0.51	5.00	0.00	0.00	0.00
28.70	2.00	0.51	5.00	0.00	0.00	0.00
28.75	2.00	0.51	5.00	0.00	0.00	0.00
28.80	2.00	0.51	5.00	0.00	0.00	0.00
28.85	2.00	0.51	5.00	0.00	0.00	0.00

28.90	2.00	0.51	5.00	0.00	0.00	0.00
28.95	2.00	0.51	5.00	0.00	0.00	0.00
29.00	2.00	0.51	5.00	0.00	0.00	0.00
29.05	2.00	0.51	5.00	0.00	0.00	0.00
29.10	2.00	0.51	5.00	0.00	0.00	0.00
29.15	2.00	0.51	5.00	0.00	0.00	0.00
29.20	2.00	0.51	5.00	0.00	0.00	0.00
29.25	2.00	0.51	5.00	0.00	0.00	0.00
29.30	2.00	0.51	5.00	0.00	0.00	0.00
29.35	2.00	0.51	5.00	0.00	0.00	0.00
29.40	2.00	0.51	5.00	0.00	0.00	0.00
29.45	2.00	0.51	5.00	0.00	0.00	0.00
29.50	2.00	0.51	5.00	0.00	0.00	0.00
29.55	2.00	0.51	5.00	0.00	0.00	0.00
29.60	2.00	0.51	5.00	0.00	0.00	0.00
29.65	2.00	0.51	5.00	0.00	0.00	0.00
29.70	2.00	0.51	5.00	0.00	0.00	0.00
29.75	2.00	0.51	5.00	0.00	0.00	0.00
29.80	2.00	0.51	5.00	0.00	0.00	0.00
29.85	2.00	0.50	5.00	0.00	0.00	0.00
29.90	2.00	0.50	5.00	0.00	0.00	0.00
29.95	2.00	0.50	5.00	0.00	0.00	0.00
30.00	2.00	0.50	5.00	0.00	0.00	0.00

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

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

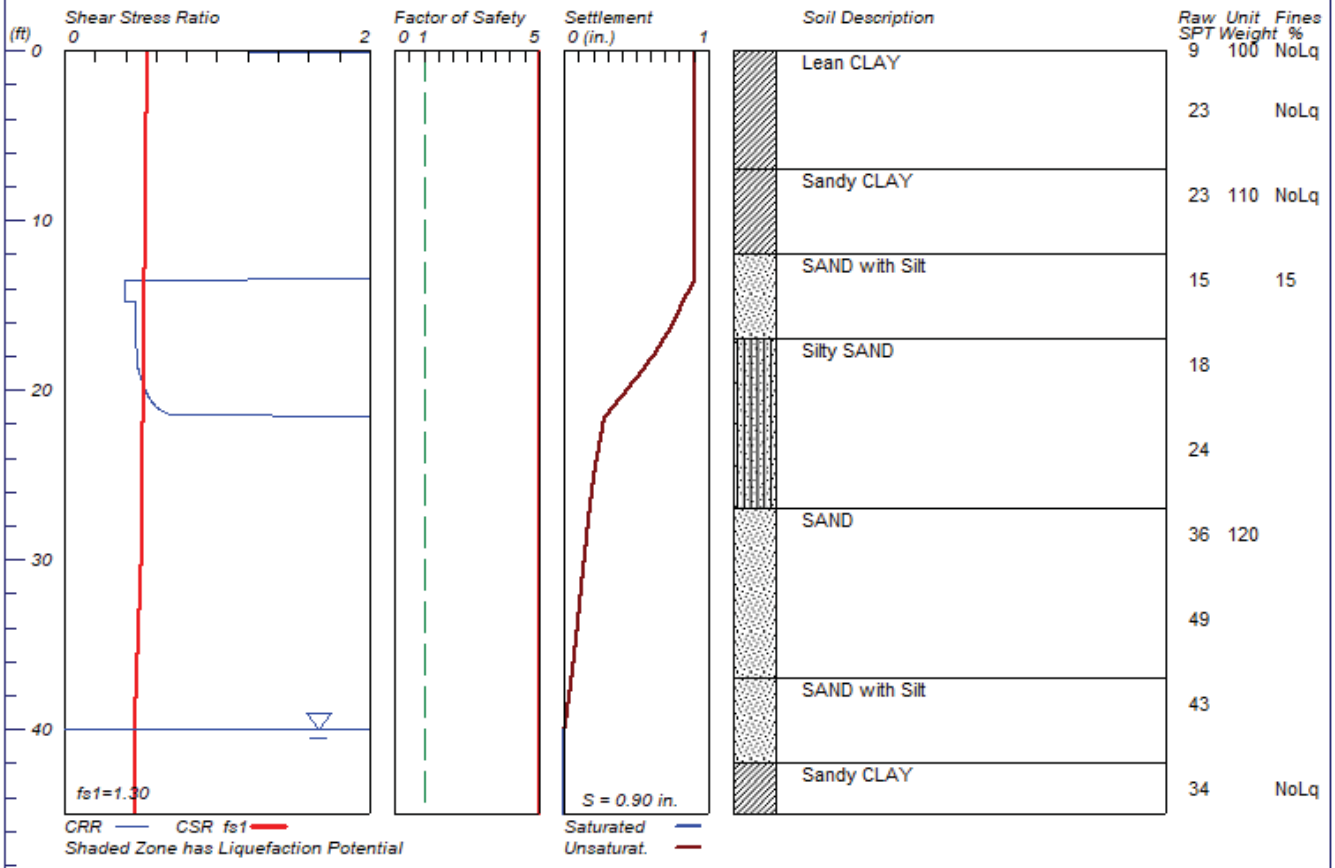
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated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

LIQUEFACTION ANALYSIS

Hillview Jr. HS Replacement Campus

Hole No.=B-5 Water Depth=40 ft

Magnitude=6.5
Acceleration=0.835g



****
LIQUEFACTION ANALYSIS CALCULATION SHEET

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****
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Input File Name: C:\Users\Manuel.Zea\Box\Geosphere-R Drive Folder\Geotech Projects by Number\64000\91-64513-PW PUSD Hillview Junior High School\4 - Liquefaction Analysis\B-5.liq
Title: Hillview Jr. HS Replacement Campus
Subtitle: Atlas No. 91-64513-PW

Surface Elev.=
Hole No.=B-5
Depth of Hole= 45.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration= 0.83 g
Earthquake Magnitude= 6.5

Input Data:
Surface Elev.=
Hole No.=B-5
Depth of Hole=45.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration=0.83 g
Earthquake Magnitude=6.5

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1.1
7. Borehole Diameter, Cb= 1.1
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3

10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines
ft		pcf	%
0.0	9.0	100.0	NoLiq
3.5	23.0	100.0	NoLiq

8.5	23.0	110.0	NoLiq
13.5	15.0	110.0	15.0
18.5	18.0	110.0	15.0
23.5	24.0	110.0	15.0
28.5	36.0	120.0	15.0
33.5	49.0	120.0	15.0
38.5	43.0	120.0	15.0
43.5	34.0	120.0	NoLiq

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.90 in.
Total Settlement of Saturated and Unsaturated Sands=0.90 in.
Differential Settlement=0.451 to 0.596 in.

Depth ft	CRRm	CSRsf	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.38	0.54	5.00	0.00	0.90	0.90
0.05	2.00	0.54	5.00	0.00	0.90	0.90
0.10	2.00	0.54	5.00	0.00	0.90	0.90
0.15	2.00	0.54	5.00	0.00	0.90	0.90
0.20	2.00	0.54	5.00	0.00	0.90	0.90
0.25	2.00	0.54	5.00	0.00	0.90	0.90
0.30	2.00	0.54	5.00	0.00	0.90	0.90
0.35	2.00	0.54	5.00	0.00	0.90	0.90
0.40	2.00	0.54	5.00	0.00	0.90	0.90
0.45	2.00	0.54	5.00	0.00	0.90	0.90
0.50	2.00	0.54	5.00	0.00	0.90	0.90
0.55	2.00	0.54	5.00	0.00	0.90	0.90
0.60	2.00	0.54	5.00	0.00	0.90	0.90
0.65	2.00	0.54	5.00	0.00	0.90	0.90
0.70	2.00	0.54	5.00	0.00	0.90	0.90
0.75	2.00	0.54	5.00	0.00	0.90	0.90
0.80	2.00	0.54	5.00	0.00	0.90	0.90
0.85	2.00	0.54	5.00	0.00	0.90	0.90
0.90	2.00	0.54	5.00	0.00	0.90	0.90
0.95	2.00	0.54	5.00	0.00	0.90	0.90
1.00	2.00	0.54	5.00	0.00	0.90	0.90
1.05	2.00	0.54	5.00	0.00	0.90	0.90
1.10	2.00	0.54	5.00	0.00	0.90	0.90
1.15	2.00	0.54	5.00	0.00	0.90	0.90
1.20	2.00	0.54	5.00	0.00	0.90	0.90
1.25	2.00	0.54	5.00	0.00	0.90	0.90
1.30	2.00	0.54	5.00	0.00	0.90	0.90
1.35	2.00	0.54	5.00	0.00	0.90	0.90
1.40	2.00	0.54	5.00	0.00	0.90	0.90
1.45	2.00	0.54	5.00	0.00	0.90	0.90
1.50	2.00	0.54	5.00	0.00	0.90	0.90
1.55	2.00	0.54	5.00	0.00	0.90	0.90
1.60	2.00	0.54	5.00	0.00	0.90	0.90
1.65	2.00	0.54	5.00	0.00	0.90	0.90
1.70	2.00	0.54	5.00	0.00	0.90	0.90

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12.55	2.00	0.53	5.00	0.00	0.90	0.90
12.60	2.00	0.53	5.00	0.00	0.90	0.90
12.65	2.00	0.53	5.00	0.00	0.90	0.90
12.70	2.00	0.53	5.00	0.00	0.90	0.90
12.75	2.00	0.53	5.00	0.00	0.90	0.90
12.80	2.00	0.53	5.00	0.00	0.90	0.90
12.85	2.00	0.53	5.00	0.00	0.90	0.90
12.90	2.00	0.53	5.00	0.00	0.90	0.90
12.95	2.00	0.53	5.00	0.00	0.90	0.90
13.00	2.00	0.53	5.00	0.00	0.90	0.90
13.05	2.00	0.53	5.00	0.00	0.90	0.90
13.10	2.00	0.53	5.00	0.00	0.90	0.90
13.15	2.00	0.53	5.00	0.00	0.90	0.90
13.20	2.00	0.53	5.00	0.00	0.90	0.90
13.25	2.00	0.53	5.00	0.00	0.90	0.90
13.30	2.00	0.53	5.00	0.00	0.90	0.90
13.35	2.00	0.53	5.00	0.00	0.90	0.90
13.40	2.00	0.53	5.00	0.00	0.90	0.90
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13.60	0.39	0.53	5.00	0.00	0.90	0.90
13.65	0.39	0.53	5.00	0.00	0.89	0.89
13.70	0.39	0.53	5.00	0.00	0.89	0.89
13.75	0.39	0.53	5.00	0.00	0.89	0.89
13.80	0.39	0.53	5.00	0.00	0.89	0.89
13.85	0.39	0.53	5.00	0.00	0.88	0.88
13.90	0.39	0.53	5.00	0.00	0.88	0.88
13.95	0.39	0.53	5.00	0.00	0.88	0.88
14.00	0.39	0.53	5.00	0.00	0.87	0.87
14.05	0.39	0.52	5.00	0.00	0.87	0.87
14.10	0.39	0.52	5.00	0.00	0.87	0.87
14.15	0.39	0.52	5.00	0.00	0.86	0.86
14.20	0.39	0.52	5.00	0.00	0.86	0.86
14.25	0.39	0.52	5.00	0.00	0.86	0.86
14.30	0.39	0.52	5.00	0.00	0.86	0.86
14.35	0.39	0.52	5.00	0.00	0.85	0.85
14.40	0.39	0.52	5.00	0.00	0.85	0.85
14.45	0.39	0.52	5.00	0.00	0.85	0.85
14.50	0.39	0.52	5.00	0.00	0.84	0.84
14.55	0.39	0.52	5.00	0.00	0.84	0.84
14.60	0.39	0.52	5.00	0.00	0.84	0.84
14.65	0.39	0.52	5.00	0.00	0.83	0.83
14.70	0.39	0.52	5.00	0.00	0.83	0.83
14.75	0.39	0.52	5.00	0.00	0.83	0.83
14.80	0.46	0.52	5.00	0.00	0.82	0.82
14.85	0.46	0.52	5.00	0.00	0.82	0.82
14.90	0.46	0.52	5.00	0.00	0.82	0.82
14.95	0.46	0.52	5.00	0.00	0.81	0.81
15.00	0.46	0.52	5.00	0.00	0.81	0.81
15.05	0.46	0.52	5.00	0.00	0.81	0.81
15.10	0.46	0.52	5.00	0.00	0.81	0.81
15.15	0.46	0.52	5.00	0.00	0.80	0.80
15.20	0.46	0.52	5.00	0.00	0.80	0.80

15.25	0.46	0.52	5.00	0.00	0.80	0.80
15.30	0.46	0.52	5.00	0.00	0.80	0.80
15.35	0.46	0.52	5.00	0.00	0.79	0.79
15.40	0.46	0.52	5.00	0.00	0.79	0.79
15.45	0.46	0.52	5.00	0.00	0.79	0.79
15.50	0.46	0.52	5.00	0.00	0.79	0.79
15.55	0.46	0.52	5.00	0.00	0.78	0.78
15.60	0.46	0.52	5.00	0.00	0.78	0.78
15.65	0.46	0.52	5.00	0.00	0.78	0.78
15.70	0.46	0.52	5.00	0.00	0.77	0.77
15.75	0.46	0.52	5.00	0.00	0.77	0.77
15.80	0.46	0.52	5.00	0.00	0.77	0.77
15.85	0.46	0.52	5.00	0.00	0.76	0.76
15.90	0.46	0.52	5.00	0.00	0.76	0.76
15.95	0.46	0.52	5.00	0.00	0.76	0.76
16.00	0.46	0.52	5.00	0.00	0.76	0.76
16.05	0.46	0.52	5.00	0.00	0.75	0.75
16.10	0.46	0.52	5.00	0.00	0.75	0.75
16.15	0.46	0.52	5.00	0.00	0.75	0.75
16.20	0.46	0.52	5.00	0.00	0.74	0.74
16.25	0.46	0.52	5.00	0.00	0.74	0.74
16.30	0.46	0.52	5.00	0.00	0.74	0.74
16.35	0.46	0.52	5.00	0.00	0.73	0.73
16.40	0.46	0.52	5.00	0.00	0.73	0.73
16.45	0.46	0.52	5.00	0.00	0.73	0.73
16.50	0.47	0.52	5.00	0.00	0.72	0.72
16.55	0.47	0.52	5.00	0.00	0.72	0.72
16.60	0.47	0.52	5.00	0.00	0.72	0.72
16.65	0.47	0.52	5.00	0.00	0.71	0.71
16.70	0.47	0.52	5.00	0.00	0.71	0.71
16.75	0.47	0.52	5.00	0.00	0.71	0.71
16.80	0.47	0.52	5.00	0.00	0.70	0.70
16.85	0.47	0.52	5.00	0.00	0.70	0.70
16.90	0.47	0.52	5.00	0.00	0.70	0.70
16.95	0.47	0.52	5.00	0.00	0.69	0.69
17.00	0.47	0.52	5.00	0.00	0.69	0.69
17.05	0.47	0.52	5.00	0.00	0.69	0.69
17.10	0.47	0.52	5.00	0.00	0.68	0.68
17.15	0.47	0.52	5.00	0.00	0.68	0.68
17.20	0.47	0.52	5.00	0.00	0.68	0.68
17.25	0.47	0.52	5.00	0.00	0.67	0.67
17.30	0.47	0.52	5.00	0.00	0.67	0.67
17.35	0.47	0.52	5.00	0.00	0.66	0.66
17.40	0.47	0.52	5.00	0.00	0.66	0.66
17.45	0.47	0.52	5.00	0.00	0.66	0.66
17.50	0.47	0.52	5.00	0.00	0.65	0.65
17.55	0.47	0.52	5.00	0.00	0.65	0.65
17.60	0.47	0.52	5.00	0.00	0.64	0.64
17.65	0.47	0.52	5.00	0.00	0.64	0.64
17.70	0.47	0.52	5.00	0.00	0.64	0.64
17.75	0.47	0.52	5.00	0.00	0.63	0.63
17.80	0.47	0.52	5.00	0.00	0.63	0.63
17.85	0.47	0.52	5.00	0.00	0.62	0.62
17.90	0.47	0.52	5.00	0.00	0.62	0.62

17.95	0.47	0.52	5.00	0.00	0.62	0.62
18.00	0.47	0.52	5.00	0.00	0.61	0.61
18.05	0.47	0.52	5.00	0.00	0.61	0.61
18.10	0.47	0.52	5.00	0.00	0.60	0.60
18.15	0.47	0.52	5.00	0.00	0.60	0.60
18.20	0.47	0.52	5.00	0.00	0.60	0.60
18.25	0.47	0.52	5.00	0.00	0.59	0.59
18.30	0.47	0.52	5.00	0.00	0.59	0.59
18.35	0.47	0.52	5.00	0.00	0.58	0.58
18.40	0.47	0.52	5.00	0.00	0.58	0.58
18.45	0.47	0.52	5.00	0.00	0.57	0.57
18.50	0.47	0.52	5.00	0.00	0.57	0.57
18.55	0.47	0.52	5.00	0.00	0.56	0.56
18.60	0.48	0.52	5.00	0.00	0.56	0.56
18.65	0.48	0.52	5.00	0.00	0.56	0.56
18.70	0.48	0.52	5.00	0.00	0.55	0.55
18.75	0.48	0.52	5.00	0.00	0.55	0.55
18.80	0.48	0.52	5.00	0.00	0.54	0.54
18.85	0.48	0.52	5.00	0.00	0.54	0.54
18.90	0.49	0.52	5.00	0.00	0.53	0.53
18.95	0.49	0.52	5.00	0.00	0.53	0.53
19.00	0.49	0.52	5.00	0.00	0.52	0.52
19.05	0.49	0.52	5.00	0.00	0.52	0.52
19.10	0.49	0.52	5.00	0.00	0.51	0.51
19.15	0.49	0.52	5.00	0.00	0.51	0.51
19.20	0.50	0.52	5.00	0.00	0.51	0.51
19.25	0.50	0.52	5.00	0.00	0.50	0.50
19.30	0.50	0.52	5.00	0.00	0.50	0.50
19.35	0.50	0.52	5.00	0.00	0.49	0.49
19.40	0.50	0.52	5.00	0.00	0.49	0.49
19.45	0.51	0.52	5.00	0.00	0.48	0.48
19.50	0.51	0.52	5.00	0.00	0.48	0.48
19.55	0.51	0.52	5.00	0.00	0.47	0.47
19.60	0.51	0.52	5.00	0.00	0.47	0.47
19.65	0.51	0.52	5.00	0.00	0.46	0.46
19.70	0.52	0.52	5.00	0.00	0.46	0.46
19.75	0.52	0.52	5.00	0.00	0.45	0.45
19.80	0.52	0.52	5.00	0.00	0.45	0.45
19.85	0.52	0.52	5.00	0.00	0.45	0.45
19.90	0.53	0.52	5.00	0.00	0.44	0.44
19.95	0.53	0.52	5.00	0.00	0.44	0.44
20.00	0.53	0.52	5.00	0.00	0.43	0.43
20.05	0.53	0.52	5.00	0.00	0.43	0.43
20.10	0.53	0.52	5.00	0.00	0.42	0.42
20.15	0.54	0.52	5.00	0.00	0.42	0.42
20.20	0.54	0.52	5.00	0.00	0.41	0.41
20.25	0.54	0.52	5.00	0.00	0.41	0.41
20.30	0.55	0.52	5.00	0.00	0.40	0.40
20.35	0.55	0.52	5.00	0.00	0.40	0.40
20.40	0.55	0.52	5.00	0.00	0.39	0.39
20.45	0.55	0.52	5.00	0.00	0.39	0.39
20.50	0.56	0.52	5.00	0.00	0.38	0.38
20.55	0.56	0.52	5.00	0.00	0.38	0.38
20.60	0.56	0.52	5.00	0.00	0.37	0.37

20.65	0.57	0.52	5.00	0.00	0.37	0.37
20.70	0.57	0.52	5.00	0.00	0.36	0.36
20.75	0.58	0.52	5.00	0.00	0.36	0.36
20.80	0.58	0.52	5.00	0.00	0.35	0.35
20.85	0.59	0.52	5.00	0.00	0.35	0.35
20.90	0.59	0.52	5.00	0.00	0.34	0.34
20.95	0.60	0.52	5.00	0.00	0.34	0.34
21.00	0.60	0.52	5.00	0.00	0.33	0.33
21.05	0.61	0.52	5.00	0.00	0.33	0.33
21.10	0.62	0.52	5.00	0.00	0.33	0.33
21.15	0.62	0.52	5.00	0.00	0.32	0.32
21.20	0.63	0.52	5.00	0.00	0.32	0.32
21.25	0.64	0.52	5.00	0.00	0.31	0.31
21.30	0.65	0.52	5.00	0.00	0.31	0.31
21.35	0.67	0.52	5.00	0.00	0.30	0.30
21.40	0.69	0.52	5.00	0.00	0.30	0.30
21.45	0.71	0.52	5.00	0.00	0.29	0.29
21.50	2.88	0.52	5.00	0.00	0.29	0.29
21.55	2.88	0.52	5.00	0.00	0.28	0.28
21.60	2.88	0.52	5.00	0.00	0.28	0.28
21.65	2.88	0.52	5.00	0.00	0.28	0.28
21.70	2.88	0.52	5.00	0.00	0.28	0.28
21.75	2.88	0.52	5.00	0.00	0.28	0.28
21.80	2.88	0.52	5.00	0.00	0.27	0.27
21.85	2.88	0.52	5.00	0.00	0.27	0.27
21.90	2.88	0.52	5.00	0.00	0.27	0.27
21.95	2.88	0.51	5.00	0.00	0.27	0.27
22.00	2.88	0.51	5.00	0.00	0.27	0.27
22.05	2.88	0.51	5.00	0.00	0.27	0.27
22.10	2.88	0.51	5.00	0.00	0.27	0.27
22.15	2.88	0.51	5.00	0.00	0.27	0.27
22.20	2.88	0.51	5.00	0.00	0.27	0.27
22.25	2.88	0.51	5.00	0.00	0.27	0.27
22.30	2.88	0.51	5.00	0.00	0.26	0.26
22.35	2.88	0.51	5.00	0.00	0.26	0.26
22.40	2.88	0.51	5.00	0.00	0.26	0.26
22.45	2.88	0.51	5.00	0.00	0.26	0.26
22.50	2.88	0.51	5.00	0.00	0.26	0.26
22.55	2.88	0.51	5.00	0.00	0.26	0.26
22.60	2.88	0.51	5.00	0.00	0.26	0.26
22.65	2.88	0.51	5.00	0.00	0.26	0.26
22.70	2.88	0.51	5.00	0.00	0.26	0.26
22.75	2.88	0.51	5.00	0.00	0.25	0.25
22.80	2.88	0.51	5.00	0.00	0.25	0.25
22.85	2.88	0.51	5.00	0.00	0.25	0.25
22.90	2.88	0.51	5.00	0.00	0.25	0.25
22.95	2.88	0.51	5.00	0.00	0.25	0.25
23.00	2.88	0.51	5.00	0.00	0.25	0.25
23.05	2.88	0.51	5.00	0.00	0.25	0.25
23.10	2.88	0.51	5.00	0.00	0.25	0.25
23.15	2.88	0.51	5.00	0.00	0.25	0.25
23.20	2.88	0.51	5.00	0.00	0.24	0.24
23.25	2.88	0.51	5.00	0.00	0.24	0.24
23.30	2.88	0.51	5.00	0.00	0.24	0.24

23.35	2.88	0.51	5.00	0.00	0.24	0.24
23.40	2.88	0.51	5.00	0.00	0.24	0.24
23.45	2.88	0.51	5.00	0.00	0.24	0.24
23.50	2.88	0.51	5.00	0.00	0.24	0.24
23.55	2.88	0.51	5.00	0.00	0.24	0.24
23.60	2.88	0.51	5.00	0.00	0.24	0.24
23.65	2.88	0.51	5.00	0.00	0.23	0.23
23.70	2.88	0.51	5.00	0.00	0.23	0.23
23.75	2.88	0.51	5.00	0.00	0.23	0.23
23.80	2.88	0.51	5.00	0.00	0.23	0.23
23.85	2.88	0.51	5.00	0.00	0.23	0.23
23.90	2.88	0.51	5.00	0.00	0.23	0.23
23.95	2.88	0.51	5.00	0.00	0.23	0.23
24.00	2.88	0.51	5.00	0.00	0.23	0.23
24.05	2.88	0.51	5.00	0.00	0.23	0.23
24.10	2.88	0.51	5.00	0.00	0.23	0.23
24.15	2.88	0.51	5.00	0.00	0.22	0.22
24.20	2.88	0.51	5.00	0.00	0.22	0.22
24.25	2.88	0.51	5.00	0.00	0.22	0.22
24.30	2.88	0.51	5.00	0.00	0.22	0.22
24.35	2.88	0.51	5.00	0.00	0.22	0.22
24.40	2.88	0.51	5.00	0.00	0.22	0.22
24.45	2.88	0.51	5.00	0.00	0.22	0.22
24.50	2.88	0.51	5.00	0.00	0.22	0.22
24.55	2.88	0.51	5.00	0.00	0.22	0.22
24.60	2.88	0.51	5.00	0.00	0.22	0.22
24.65	2.88	0.51	5.00	0.00	0.21	0.21
24.70	2.88	0.51	5.00	0.00	0.21	0.21
24.75	2.88	0.51	5.00	0.00	0.21	0.21
24.80	2.88	0.51	5.00	0.00	0.21	0.21
24.85	2.88	0.51	5.00	0.00	0.21	0.21
24.90	2.88	0.51	5.00	0.00	0.21	0.21
24.95	2.88	0.51	5.00	0.00	0.21	0.21
25.00	2.88	0.51	5.00	0.00	0.21	0.21
25.05	2.88	0.51	5.00	0.00	0.21	0.21
25.10	2.88	0.51	5.00	0.00	0.21	0.21
25.15	2.88	0.51	5.00	0.00	0.21	0.21
25.20	2.88	0.51	5.00	0.00	0.20	0.20
25.25	2.88	0.51	5.00	0.00	0.20	0.20
25.30	2.88	0.51	5.00	0.00	0.20	0.20
25.35	2.88	0.51	5.00	0.00	0.20	0.20
25.40	2.88	0.51	5.00	0.00	0.20	0.20
25.45	2.88	0.51	5.00	0.00	0.20	0.20
25.50	2.88	0.51	5.00	0.00	0.20	0.20
25.55	2.88	0.51	5.00	0.00	0.20	0.20
25.60	2.88	0.51	5.00	0.00	0.20	0.20
25.65	2.88	0.51	5.00	0.00	0.20	0.20
25.70	2.88	0.51	5.00	0.00	0.20	0.20
25.75	2.88	0.51	5.00	0.00	0.20	0.20
25.80	2.88	0.51	5.00	0.00	0.19	0.19
25.85	2.88	0.51	5.00	0.00	0.19	0.19
25.90	2.88	0.51	5.00	0.00	0.19	0.19
25.95	2.88	0.51	5.00	0.00	0.19	0.19
26.00	2.88	0.51	5.00	0.00	0.19	0.19

26.05	2.88	0.51	5.00	0.00	0.19	0.19
26.10	2.88	0.51	5.00	0.00	0.19	0.19
26.15	2.88	0.51	5.00	0.00	0.19	0.19
26.20	2.88	0.51	5.00	0.00	0.19	0.19
26.25	2.88	0.51	5.00	0.00	0.19	0.19
26.30	2.88	0.51	5.00	0.00	0.19	0.19
26.35	2.88	0.51	5.00	0.00	0.19	0.19
26.40	2.88	0.51	5.00	0.00	0.19	0.19
26.45	2.88	0.51	5.00	0.00	0.18	0.18
26.50	2.88	0.51	5.00	0.00	0.18	0.18
26.55	2.88	0.51	5.00	0.00	0.18	0.18
26.60	2.88	0.51	5.00	0.00	0.18	0.18
26.65	2.88	0.51	5.00	0.00	0.18	0.18
26.70	2.88	0.51	5.00	0.00	0.18	0.18
26.75	2.88	0.51	5.00	0.00	0.18	0.18
26.80	2.88	0.51	5.00	0.00	0.18	0.18
26.85	2.88	0.51	5.00	0.00	0.18	0.18
26.90	2.88	0.51	5.00	0.00	0.18	0.18
26.95	2.88	0.51	5.00	0.00	0.18	0.18
27.00	2.88	0.51	5.00	0.00	0.18	0.18
27.05	2.88	0.51	5.00	0.00	0.18	0.18
27.10	2.88	0.51	5.00	0.00	0.18	0.18
27.15	2.88	0.51	5.00	0.00	0.17	0.17
27.20	2.88	0.51	5.00	0.00	0.17	0.17
27.25	2.88	0.51	5.00	0.00	0.17	0.17
27.30	2.88	0.51	5.00	0.00	0.17	0.17
27.35	2.88	0.51	5.00	0.00	0.17	0.17
27.40	2.88	0.51	5.00	0.00	0.17	0.17
27.45	2.88	0.51	5.00	0.00	0.17	0.17
27.50	2.88	0.51	5.00	0.00	0.17	0.17
27.55	2.88	0.51	5.00	0.00	0.17	0.17
27.60	2.88	0.51	5.00	0.00	0.17	0.17
27.65	2.88	0.51	5.00	0.00	0.17	0.17
27.70	2.88	0.51	5.00	0.00	0.17	0.17
27.75	2.88	0.51	5.00	0.00	0.17	0.17
27.80	2.88	0.51	5.00	0.00	0.17	0.17
27.85	2.88	0.51	5.00	0.00	0.17	0.17
27.90	2.88	0.51	5.00	0.00	0.17	0.17
27.95	2.88	0.51	5.00	0.00	0.16	0.16
28.00	2.88	0.51	5.00	0.00	0.16	0.16
28.05	2.88	0.51	5.00	0.00	0.16	0.16
28.10	2.88	0.51	5.00	0.00	0.16	0.16
28.15	2.88	0.51	5.00	0.00	0.16	0.16
28.20	2.88	0.51	5.00	0.00	0.16	0.16
28.25	2.88	0.51	5.00	0.00	0.16	0.16
28.30	2.88	0.51	5.00	0.00	0.16	0.16
28.35	2.90	0.51	5.00	0.00	0.16	0.16
28.40	2.90	0.51	5.00	0.00	0.16	0.16
28.45	2.90	0.51	5.00	0.00	0.16	0.16
28.50	2.90	0.51	5.00	0.00	0.16	0.16
28.55	2.90	0.51	5.00	0.00	0.16	0.16
28.60	2.90	0.51	5.00	0.00	0.16	0.16
28.65	2.90	0.51	5.00	0.00	0.16	0.16
28.70	2.89	0.51	5.00	0.00	0.16	0.16

28.75	2.89	0.51	5.00	0.00	0.15	0.15
28.80	2.89	0.51	5.00	0.00	0.15	0.15
28.85	2.89	0.51	5.00	0.00	0.15	0.15
28.90	2.89	0.51	5.00	0.00	0.15	0.15
28.95	2.89	0.51	5.00	0.00	0.15	0.15
29.00	2.89	0.51	5.00	0.00	0.15	0.15
29.05	2.89	0.51	5.00	0.00	0.15	0.15
29.10	2.89	0.51	5.00	0.00	0.15	0.15
29.15	2.89	0.51	5.00	0.00	0.15	0.15
29.20	2.89	0.51	5.00	0.00	0.15	0.15
29.25	2.89	0.51	5.00	0.00	0.15	0.15
29.30	2.88	0.51	5.00	0.00	0.15	0.15
29.35	2.88	0.51	5.00	0.00	0.15	0.15
29.40	2.88	0.51	5.00	0.00	0.15	0.15
29.45	2.88	0.51	5.00	0.00	0.15	0.15
29.50	2.88	0.51	5.00	0.00	0.15	0.15
29.55	2.88	0.51	5.00	0.00	0.14	0.14
29.60	2.88	0.51	5.00	0.00	0.14	0.14
29.65	2.88	0.51	5.00	0.00	0.14	0.14
29.70	2.88	0.51	5.00	0.00	0.14	0.14
29.75	2.88	0.51	5.00	0.00	0.14	0.14
29.80	2.88	0.51	5.00	0.00	0.14	0.14
29.85	2.87	0.50	5.00	0.00	0.14	0.14
29.90	2.87	0.50	5.00	0.00	0.14	0.14
29.95	2.87	0.50	5.00	0.00	0.14	0.14
30.00	2.87	0.50	5.00	0.00	0.14	0.14
30.05	2.87	0.50	5.00	0.00	0.14	0.14
30.10	2.87	0.50	5.00	0.00	0.14	0.14
30.15	2.87	0.50	5.00	0.00	0.14	0.14
30.20	2.87	0.50	5.00	0.00	0.14	0.14
30.25	2.87	0.50	5.00	0.00	0.14	0.14
30.30	2.87	0.50	5.00	0.00	0.14	0.14
30.35	2.87	0.50	5.00	0.00	0.13	0.13
30.40	2.86	0.50	5.00	0.00	0.13	0.13
30.45	2.86	0.50	5.00	0.00	0.13	0.13
30.50	2.86	0.50	5.00	0.00	0.13	0.13
30.55	2.86	0.50	5.00	0.00	0.13	0.13
30.60	2.86	0.50	5.00	0.00	0.13	0.13
30.65	2.86	0.50	5.00	0.00	0.13	0.13
30.70	2.86	0.50	5.00	0.00	0.13	0.13
30.75	2.86	0.50	5.00	0.00	0.13	0.13
30.80	2.86	0.50	5.00	0.00	0.13	0.13
30.85	2.86	0.50	5.00	0.00	0.13	0.13
30.90	2.86	0.50	5.00	0.00	0.13	0.13
30.95	2.86	0.50	5.00	0.00	0.13	0.13
31.00	2.85	0.50	5.00	0.00	0.13	0.13
31.05	2.85	0.50	5.00	0.00	0.13	0.13
31.10	2.85	0.50	5.00	0.00	0.13	0.13
31.15	2.85	0.50	5.00	0.00	0.12	0.12
31.20	2.85	0.50	5.00	0.00	0.12	0.12
31.25	2.85	0.50	5.00	0.00	0.12	0.12
31.30	2.85	0.50	5.00	0.00	0.12	0.12
31.35	2.85	0.50	5.00	0.00	0.12	0.12
31.40	2.85	0.50	5.00	0.00	0.12	0.12

31.45	2.85	0.50	5.00	0.00	0.12	0.12
31.50	2.85	0.50	5.00	0.00	0.12	0.12
31.55	2.84	0.50	5.00	0.00	0.12	0.12
31.60	2.84	0.50	5.00	0.00	0.12	0.12
31.65	2.84	0.50	5.00	0.00	0.12	0.12
31.70	2.84	0.50	5.00	0.00	0.12	0.12
31.75	2.84	0.50	5.00	0.00	0.12	0.12
31.80	2.84	0.50	5.00	0.00	0.12	0.12
31.85	2.84	0.50	5.00	0.00	0.12	0.12
31.90	2.84	0.50	5.00	0.00	0.12	0.12
31.95	2.84	0.50	5.00	0.00	0.12	0.12
32.00	2.84	0.50	5.00	0.00	0.11	0.11
32.05	2.84	0.50	5.00	0.00	0.11	0.11
32.10	2.84	0.50	5.00	0.00	0.11	0.11
32.15	2.83	0.50	5.00	0.00	0.11	0.11
32.20	2.83	0.49	5.00	0.00	0.11	0.11
32.25	2.83	0.49	5.00	0.00	0.11	0.11
32.30	2.83	0.49	5.00	0.00	0.11	0.11
32.35	2.83	0.49	5.00	0.00	0.11	0.11
32.40	2.83	0.49	5.00	0.00	0.11	0.11
32.45	2.83	0.49	5.00	0.00	0.11	0.11
32.50	2.83	0.49	5.00	0.00	0.11	0.11
32.55	2.83	0.49	5.00	0.00	0.11	0.11
32.60	2.83	0.49	5.00	0.00	0.11	0.11
32.65	2.83	0.49	5.00	0.00	0.11	0.11
32.70	2.83	0.49	5.00	0.00	0.11	0.11
32.75	2.82	0.49	5.00	0.00	0.11	0.11
32.80	2.82	0.49	5.00	0.00	0.10	0.10
32.85	2.82	0.49	5.00	0.00	0.10	0.10
32.90	2.82	0.49	5.00	0.00	0.10	0.10
32.95	2.82	0.49	5.00	0.00	0.10	0.10
33.00	2.82	0.49	5.00	0.00	0.10	0.10
33.05	2.82	0.49	5.00	0.00	0.10	0.10
33.10	2.82	0.49	5.00	0.00	0.10	0.10
33.15	2.82	0.49	5.00	0.00	0.10	0.10
33.20	2.82	0.49	5.00	0.00	0.10	0.10
33.25	2.82	0.49	5.00	0.00	0.10	0.10
33.30	2.81	0.49	5.00	0.00	0.10	0.10
33.35	2.81	0.49	5.00	0.00	0.10	0.10
33.40	2.81	0.49	5.00	0.00	0.10	0.10
33.45	2.81	0.49	5.00	0.00	0.10	0.10
33.50	2.81	0.49	5.00	0.00	0.10	0.10
33.55	2.81	0.49	5.00	0.00	0.10	0.10
33.60	2.81	0.49	5.00	0.00	0.10	0.10
33.65	2.81	0.49	5.00	0.00	0.09	0.09
33.70	2.81	0.49	5.00	0.00	0.09	0.09
33.75	2.81	0.49	5.00	0.00	0.09	0.09
33.80	2.81	0.49	5.00	0.00	0.09	0.09
33.85	2.81	0.49	5.00	0.00	0.09	0.09
33.90	2.80	0.49	5.00	0.00	0.09	0.09
33.95	2.80	0.49	5.00	0.00	0.09	0.09
34.00	2.80	0.49	5.00	0.00	0.09	0.09
34.05	2.80	0.49	5.00	0.00	0.09	0.09
34.10	2.80	0.49	5.00	0.00	0.09	0.09

34.15	2.80	0.49	5.00	0.00	0.09	0.09
34.20	2.80	0.49	5.00	0.00	0.09	0.09
34.25	2.80	0.49	5.00	0.00	0.09	0.09
34.30	2.80	0.49	5.00	0.00	0.09	0.09
34.35	2.80	0.49	5.00	0.00	0.09	0.09
34.40	2.80	0.49	5.00	0.00	0.09	0.09
34.45	2.80	0.49	5.00	0.00	0.09	0.09
34.50	2.79	0.48	5.00	0.00	0.08	0.08
34.55	2.79	0.48	5.00	0.00	0.08	0.08
34.60	2.79	0.48	5.00	0.00	0.08	0.08
34.65	2.79	0.48	5.00	0.00	0.08	0.08
34.70	2.79	0.48	5.00	0.00	0.08	0.08
34.75	2.79	0.48	5.00	0.00	0.08	0.08
34.80	2.79	0.48	5.00	0.00	0.08	0.08
34.85	2.79	0.48	5.00	0.00	0.08	0.08
34.90	2.79	0.48	5.00	0.00	0.08	0.08
34.95	2.79	0.48	5.00	0.00	0.08	0.08
35.00	2.79	0.48	5.00	0.00	0.08	0.08
35.05	2.79	0.48	5.00	0.00	0.08	0.08
35.10	2.78	0.48	5.00	0.00	0.08	0.08
35.15	2.78	0.48	5.00	0.00	0.08	0.08
35.20	2.78	0.48	5.00	0.00	0.08	0.08
35.25	2.78	0.48	5.00	0.00	0.07	0.07
35.30	2.78	0.48	5.00	0.00	0.07	0.07
35.35	2.78	0.48	5.00	0.00	0.07	0.07
35.40	2.78	0.48	5.00	0.00	0.07	0.07
35.45	2.78	0.48	5.00	0.00	0.07	0.07
35.50	2.78	0.48	5.00	0.00	0.07	0.07
35.55	2.78	0.48	5.00	0.00	0.07	0.07
35.60	2.78	0.48	5.00	0.00	0.07	0.07
35.65	2.78	0.48	5.00	0.00	0.07	0.07
35.70	2.78	0.48	5.00	0.00	0.07	0.07
35.75	2.77	0.48	5.00	0.00	0.07	0.07
35.80	2.77	0.48	5.00	0.00	0.07	0.07
35.85	2.77	0.48	5.00	0.00	0.07	0.07
35.90	2.77	0.48	5.00	0.00	0.07	0.07
35.95	2.77	0.48	5.00	0.00	0.07	0.07
36.00	2.77	0.48	5.00	0.00	0.06	0.06
36.05	2.77	0.48	5.00	0.00	0.06	0.06
36.10	2.77	0.48	5.00	0.00	0.06	0.06
36.15	2.77	0.48	5.00	0.00	0.06	0.06
36.20	2.77	0.48	5.00	0.00	0.06	0.06
36.25	2.77	0.48	5.00	0.00	0.06	0.06
36.30	2.77	0.48	5.00	0.00	0.06	0.06
36.35	2.76	0.48	5.00	0.00	0.06	0.06
36.40	2.76	0.48	5.00	0.00	0.06	0.06
36.45	2.76	0.48	5.00	0.00	0.06	0.06
36.50	2.76	0.48	5.00	0.00	0.06	0.06
36.55	2.76	0.48	5.00	0.00	0.06	0.06
36.60	2.76	0.48	5.00	0.00	0.06	0.06
36.65	2.76	0.48	5.00	0.00	0.06	0.06
36.70	2.76	0.48	5.00	0.00	0.05	0.05
36.75	2.76	0.47	5.00	0.00	0.05	0.05
36.80	2.76	0.47	5.00	0.00	0.05	0.05

36.85	2.76	0.47	5.00	0.00	0.05	0.05
36.90	2.76	0.47	5.00	0.00	0.05	0.05
36.95	2.75	0.47	5.00	0.00	0.05	0.05
37.00	2.75	0.47	5.00	0.00	0.05	0.05
37.05	2.75	0.47	5.00	0.00	0.05	0.05
37.10	2.75	0.47	5.00	0.00	0.05	0.05
37.15	2.75	0.47	5.00	0.00	0.05	0.05
37.20	2.75	0.47	5.00	0.00	0.05	0.05
37.25	2.75	0.47	5.00	0.00	0.05	0.05
37.30	2.75	0.47	5.00	0.00	0.05	0.05
37.35	2.75	0.47	5.00	0.00	0.05	0.05
37.40	2.75	0.47	5.00	0.00	0.04	0.04
37.45	2.75	0.47	5.00	0.00	0.04	0.04
37.50	2.75	0.47	5.00	0.00	0.04	0.04
37.55	2.75	0.47	5.00	0.00	0.04	0.04
37.60	2.74	0.47	5.00	0.00	0.04	0.04
37.65	2.74	0.47	5.00	0.00	0.04	0.04
37.70	2.74	0.47	5.00	0.00	0.04	0.04
37.75	2.74	0.47	5.00	0.00	0.04	0.04
37.80	2.74	0.47	5.00	0.00	0.04	0.04
37.85	2.74	0.47	5.00	0.00	0.04	0.04
37.90	2.74	0.47	5.00	0.00	0.04	0.04
37.95	2.74	0.47	5.00	0.00	0.04	0.04
38.00	2.74	0.47	5.00	0.00	0.04	0.04
38.05	2.74	0.47	5.00	0.00	0.03	0.03
38.10	2.74	0.47	5.00	0.00	0.03	0.03
38.15	2.74	0.47	5.00	0.00	0.03	0.03
38.20	2.74	0.47	5.00	0.00	0.03	0.03
38.25	2.73	0.47	5.00	0.00	0.03	0.03
38.30	2.73	0.47	5.00	0.00	0.03	0.03
38.35	2.73	0.47	5.00	0.00	0.03	0.03
38.40	2.73	0.47	5.00	0.00	0.03	0.03
38.45	2.73	0.47	5.00	0.00	0.03	0.03
38.50	2.73	0.47	5.00	0.00	0.03	0.03
38.55	2.73	0.47	5.00	0.00	0.03	0.03
38.60	2.73	0.47	5.00	0.00	0.03	0.03
38.65	2.73	0.47	5.00	0.00	0.02	0.02
38.70	2.73	0.47	5.00	0.00	0.02	0.02
38.75	2.73	0.47	5.00	0.00	0.02	0.02
38.80	2.73	0.47	5.00	0.00	0.02	0.02
38.85	2.73	0.47	5.00	0.00	0.02	0.02
38.90	2.72	0.47	5.00	0.00	0.02	0.02
38.95	2.72	0.47	5.00	0.00	0.02	0.02
39.00	2.72	0.46	5.00	0.00	0.02	0.02
39.05	2.72	0.46	5.00	0.00	0.02	0.02
39.10	2.72	0.46	5.00	0.00	0.02	0.02
39.15	2.72	0.46	5.00	0.00	0.02	0.02
39.20	2.72	0.46	5.00	0.00	0.02	0.02
39.25	2.72	0.46	5.00	0.00	0.01	0.01
39.30	2.72	0.46	5.00	0.00	0.01	0.01
39.35	2.72	0.46	5.00	0.00	0.01	0.01
39.40	2.72	0.46	5.00	0.00	0.01	0.01
39.45	2.72	0.46	5.00	0.00	0.01	0.01
39.50	2.71	0.46	5.00	0.00	0.01	0.01

39.55	2.71	0.46	5.00	0.00	0.01	0.01
39.60	2.71	0.46	5.00	0.00	0.01	0.01
39.65	2.71	0.46	5.00	0.00	0.01	0.01
39.70	2.71	0.46	5.00	0.00	0.01	0.01
39.75	2.71	0.46	5.00	0.00	0.01	0.01
39.80	2.71	0.46	5.00	0.00	0.00	0.00
39.85	2.71	0.46	5.00	0.00	0.00	0.00
39.90	2.71	0.46	5.00	0.00	0.00	0.00
39.95	2.71	0.46	5.00	0.00	0.00	0.00
40.00	2.71	0.46	5.00	0.00	0.00	0.00
40.05	2.71	0.46	5.00	0.00	0.00	0.00
40.10	2.71	0.46	5.00	0.00	0.00	0.00
40.15	2.71	0.46	5.00	0.00	0.00	0.00
40.20	2.71	0.46	5.00	0.00	0.00	0.00
40.25	2.71	0.46	5.00	0.00	0.00	0.00
40.30	2.70	0.46	5.00	0.00	0.00	0.00
40.35	2.70	0.46	5.00	0.00	0.00	0.00
40.40	2.70	0.46	5.00	0.00	0.00	0.00
40.45	2.70	0.46	5.00	0.00	0.00	0.00
40.50	2.70	0.46	5.00	0.00	0.00	0.00
40.55	2.70	0.46	5.00	0.00	0.00	0.00
40.60	2.70	0.46	5.00	0.00	0.00	0.00
40.65	2.70	0.46	5.00	0.00	0.00	0.00
40.70	2.70	0.46	5.00	0.00	0.00	0.00
40.75	2.70	0.46	5.00	0.00	0.00	0.00
40.80	2.70	0.46	5.00	0.00	0.00	0.00
40.85	2.70	0.46	5.00	0.00	0.00	0.00
40.90	2.70	0.46	5.00	0.00	0.00	0.00
40.95	2.70	0.46	5.00	0.00	0.00	0.00
41.00	2.70	0.46	5.00	0.00	0.00	0.00
41.05	2.70	0.46	5.00	0.00	0.00	0.00
41.10	2.70	0.46	5.00	0.00	0.00	0.00
41.15	2.70	0.46	5.00	0.00	0.00	0.00
41.20	2.70	0.46	5.00	0.00	0.00	0.00
41.25	2.70	0.46	5.00	0.00	0.00	0.00
41.30	2.70	0.46	5.00	0.00	0.00	0.00
41.35	2.70	0.46	5.00	0.00	0.00	0.00
41.40	2.70	0.46	5.00	0.00	0.00	0.00
41.45	2.70	0.46	5.00	0.00	0.00	0.00
41.50	2.70	0.46	5.00	0.00	0.00	0.00
41.55	2.70	0.46	5.00	0.00	0.00	0.00
41.60	2.70	0.46	5.00	0.00	0.00	0.00
41.65	2.69	0.46	5.00	0.00	0.00	0.00
41.70	2.69	0.46	5.00	0.00	0.00	0.00
41.75	2.69	0.46	5.00	0.00	0.00	0.00
41.80	2.69	0.46	5.00	0.00	0.00	0.00
41.85	2.69	0.46	5.00	0.00	0.00	0.00
41.90	2.69	0.46	5.00	0.00	0.00	0.00
41.95	2.69	0.46	5.00	0.00	0.00	0.00
42.00	2.69	0.46	5.00	0.00	0.00	0.00
42.05	2.69	0.46	5.00	0.00	0.00	0.00
42.10	2.69	0.46	5.00	0.00	0.00	0.00
42.15	2.69	0.46	5.00	0.00	0.00	0.00
42.20	2.69	0.46	5.00	0.00	0.00	0.00

42.25	2.69	0.46	5.00	0.00	0.00	0.00
42.30	2.69	0.46	5.00	0.00	0.00	0.00
42.35	2.69	0.46	5.00	0.00	0.00	0.00
42.40	2.69	0.46	5.00	0.00	0.00	0.00
42.45	2.69	0.46	5.00	0.00	0.00	0.00
42.50	2.69	0.46	5.00	0.00	0.00	0.00
42.55	2.69	0.46	5.00	0.00	0.00	0.00
42.60	2.69	0.46	5.00	0.00	0.00	0.00
42.65	2.69	0.46	5.00	0.00	0.00	0.00
42.70	2.69	0.46	5.00	0.00	0.00	0.00
42.75	2.69	0.46	5.00	0.00	0.00	0.00
42.80	2.69	0.46	5.00	0.00	0.00	0.00
42.85	2.69	0.46	5.00	0.00	0.00	0.00
42.90	2.69	0.46	5.00	0.00	0.00	0.00
42.95	2.69	0.46	5.00	0.00	0.00	0.00
43.00	2.69	0.46	5.00	0.00	0.00	0.00
43.05	2.68	0.47	5.00	0.00	0.00	0.00
43.10	2.68	0.47	5.00	0.00	0.00	0.00
43.15	2.68	0.47	5.00	0.00	0.00	0.00
43.20	2.68	0.47	5.00	0.00	0.00	0.00
43.25	2.68	0.47	5.00	0.00	0.00	0.00
43.30	2.68	0.47	5.00	0.00	0.00	0.00
43.35	2.68	0.47	5.00	0.00	0.00	0.00
43.40	2.68	0.47	5.00	0.00	0.00	0.00
43.45	2.68	0.47	5.00	0.00	0.00	0.00
43.50	2.68	0.47	5.00	0.00	0.00	0.00
43.55	2.00	0.47	5.00	0.00	0.00	0.00
43.60	2.00	0.47	5.00	0.00	0.00	0.00
43.65	2.00	0.47	5.00	0.00	0.00	0.00
43.70	2.00	0.47	5.00	0.00	0.00	0.00
43.75	2.00	0.47	5.00	0.00	0.00	0.00
43.80	2.00	0.47	5.00	0.00	0.00	0.00
43.85	2.00	0.47	5.00	0.00	0.00	0.00
43.90	2.00	0.47	5.00	0.00	0.00	0.00
43.95	2.00	0.47	5.00	0.00	0.00	0.00
44.00	2.00	0.47	5.00	0.00	0.00	0.00
44.05	2.00	0.47	5.00	0.00	0.00	0.00
44.10	2.00	0.47	5.00	0.00	0.00	0.00
44.15	2.00	0.47	5.00	0.00	0.00	0.00
44.20	2.00	0.47	5.00	0.00	0.00	0.00
44.25	2.00	0.47	5.00	0.00	0.00	0.00
44.30	2.00	0.47	5.00	0.00	0.00	0.00
44.35	2.00	0.47	5.00	0.00	0.00	0.00
44.40	2.00	0.47	5.00	0.00	0.00	0.00
44.45	2.00	0.47	5.00	0.00	0.00	0.00
44.50	2.00	0.47	5.00	0.00	0.00	0.00
44.55	2.00	0.47	5.00	0.00	0.00	0.00
44.60	2.00	0.47	5.00	0.00	0.00	0.00
44.65	2.00	0.47	5.00	0.00	0.00	0.00
44.70	2.00	0.47	5.00	0.00	0.00	0.00
44.75	2.00	0.47	5.00	0.00	0.00	0.00
44.80	2.00	0.47	5.00	0.00	0.00	0.00
44.85	2.00	0.47	5.00	0.00	0.00	0.00
44.90	2.00	0.47	5.00	0.00	0.00	0.00

44.95 2.00 0.47 5.00 0.00 0.00 0.00
45.00 2.00 0.47 5.00 0.00 0.00 0.00

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

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

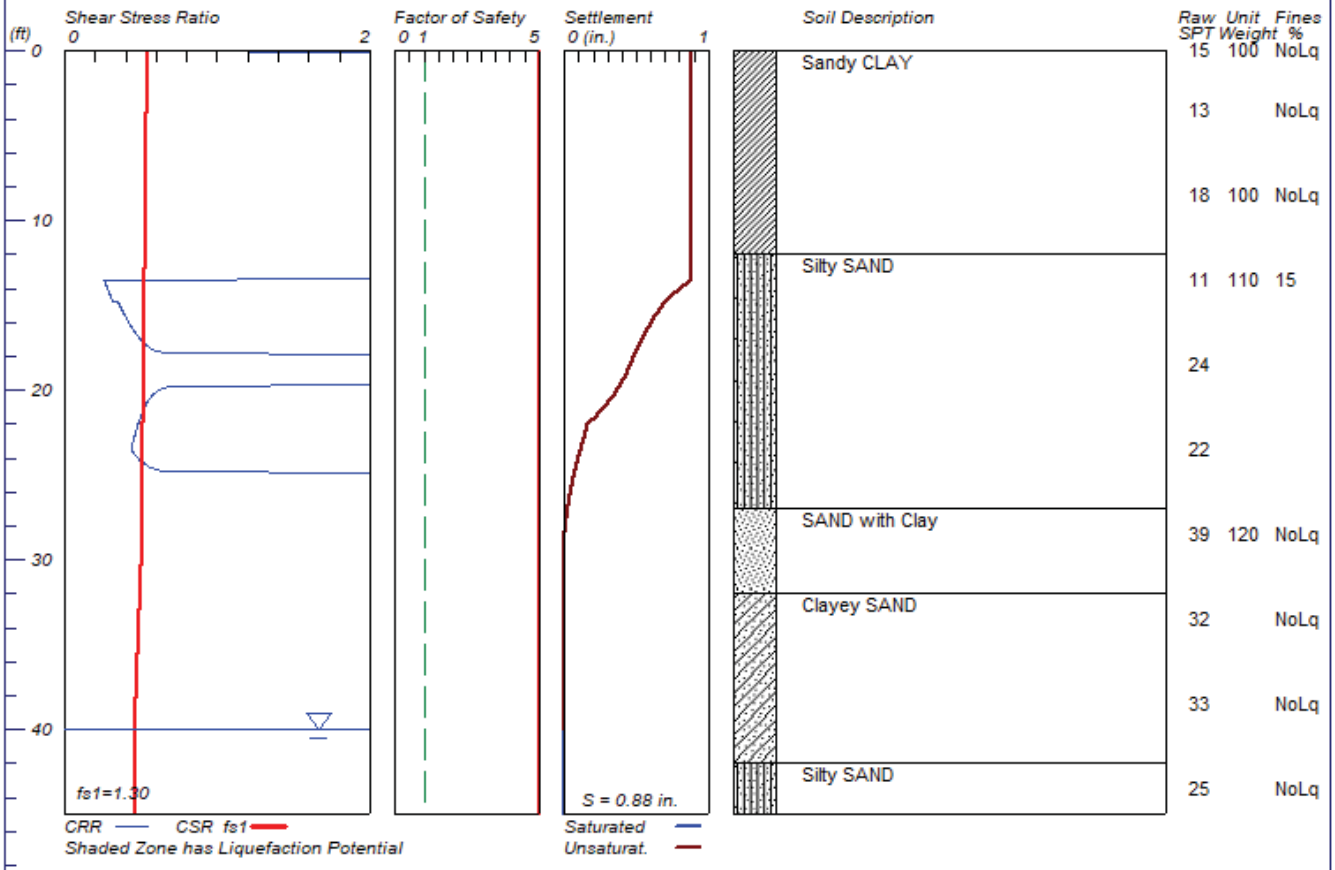
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated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

LIQUEFACTION ANALYSIS

Hillview Jr. HS Replacement Campus

Hole No.=B-6 Water Depth=40 ft

Magnitude=6.5
Acceleration=0.835g



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LIQUEFACTION ANALYSIS CALCULATION SHEET

www.civiltech.com
(425) 453-6488 Fax (425) 453-5848

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Input File Name: C:\Users\Manuel.Zea\Box\Geosphere-R Drive Folder\Geotech Projects by Number\64000\91-64513-PW PUSD Hillview Junior High School\4 - Liquefaction Analysis\B-6.liq
Title: Hillview Jr. HS Replacement Campus
Subtitle: Atlas No. 91-64513-PW

Surface Elev.=
Hole No.=B-6
Depth of Hole= 45.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration= 0.83 g
Earthquake Magnitude= 6.5

Input Data:
Surface Elev.=
Hole No.=B-6
Depth of Hole=45.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration=0.83 g
Earthquake Magnitude=6.5

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1.05
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3

10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth ft	SPT	gamma pcf	Fines %	
0.0	15.0	100.0		NoLiq
3.5	13.0	100.0		NoLiq

8.5	18.0	100.0	NoLiq
13.5	11.0	110.0	15.0
18.5	24.0	110.0	15.0
23.5	22.0	110.0	15.0
28.5	39.0	120.0	NoLiq
33.5	32.0	120.0	NoLiq
38.5	33.0	120.0	NoLiq
43.5	25.0	120.0	NoLiq

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.88 in.
Total Settlement of Saturated and Unsaturated Sands=0.88 in.
Differential Settlement=0.441 to 0.582 in.

Depth ft	CRRm	CSRsf	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	0.39	0.54	5.00	0.00	0.88	0.88
0.05	2.00	0.54	5.00	0.00	0.88	0.88
0.10	2.00	0.54	5.00	0.00	0.88	0.88
0.15	2.00	0.54	5.00	0.00	0.88	0.88
0.20	2.00	0.54	5.00	0.00	0.88	0.88
0.25	2.00	0.54	5.00	0.00	0.88	0.88
0.30	2.00	0.54	5.00	0.00	0.88	0.88
0.35	2.00	0.54	5.00	0.00	0.88	0.88
0.40	2.00	0.54	5.00	0.00	0.88	0.88
0.45	2.00	0.54	5.00	0.00	0.88	0.88
0.50	2.00	0.54	5.00	0.00	0.88	0.88
0.55	2.00	0.54	5.00	0.00	0.88	0.88
0.60	2.00	0.54	5.00	0.00	0.88	0.88
0.65	2.00	0.54	5.00	0.00	0.88	0.88
0.70	2.00	0.54	5.00	0.00	0.88	0.88
0.75	2.00	0.54	5.00	0.00	0.88	0.88
0.80	2.00	0.54	5.00	0.00	0.88	0.88
0.85	2.00	0.54	5.00	0.00	0.88	0.88
0.90	2.00	0.54	5.00	0.00	0.88	0.88
0.95	2.00	0.54	5.00	0.00	0.88	0.88
1.00	2.00	0.54	5.00	0.00	0.88	0.88
1.05	2.00	0.54	5.00	0.00	0.88	0.88
1.10	2.00	0.54	5.00	0.00	0.88	0.88
1.15	2.00	0.54	5.00	0.00	0.88	0.88
1.20	2.00	0.54	5.00	0.00	0.88	0.88
1.25	2.00	0.54	5.00	0.00	0.88	0.88
1.30	2.00	0.54	5.00	0.00	0.88	0.88
1.35	2.00	0.54	5.00	0.00	0.88	0.88
1.40	2.00	0.54	5.00	0.00	0.88	0.88
1.45	2.00	0.54	5.00	0.00	0.88	0.88
1.50	2.00	0.54	5.00	0.00	0.88	0.88
1.55	2.00	0.54	5.00	0.00	0.88	0.88
1.60	2.00	0.54	5.00	0.00	0.88	0.88
1.65	2.00	0.54	5.00	0.00	0.88	0.88
1.70	2.00	0.54	5.00	0.00	0.88	0.88

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11.75 2.00 0.53 5.00 0.00 0.88 0.88
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11.85 2.00 0.53 5.00 0.00 0.88 0.88
11.90 2.00 0.53 5.00 0.00 0.88 0.88
11.95 2.00 0.53 5.00 0.00 0.88 0.88
12.00 2.00 0.53 5.00 0.00 0.88 0.88
12.05 2.00 0.53 5.00 0.00 0.88 0.88
12.10 2.00 0.53 5.00 0.00 0.88 0.88
12.15 2.00 0.53 5.00 0.00 0.88 0.88
12.20 2.00 0.53 5.00 0.00 0.88 0.88
12.25 2.00 0.53 5.00 0.00 0.88 0.88
12.30 2.00 0.53 5.00 0.00 0.88 0.88
12.35 2.00 0.53 5.00 0.00 0.88 0.88
12.40 2.00 0.53 5.00 0.00 0.88 0.88
12.45 2.00 0.53 5.00 0.00 0.88 0.88
12.50 2.00 0.53 5.00 0.00 0.88 0.88

12.55	2.00	0.53	5.00	0.00	0.88	0.88
12.60	2.00	0.53	5.00	0.00	0.88	0.88
12.65	2.00	0.53	5.00	0.00	0.88	0.88
12.70	2.00	0.53	5.00	0.00	0.88	0.88
12.75	2.00	0.53	5.00	0.00	0.88	0.88
12.80	2.00	0.53	5.00	0.00	0.88	0.88
12.85	2.00	0.53	5.00	0.00	0.88	0.88
12.90	2.00	0.53	5.00	0.00	0.88	0.88
12.95	2.00	0.53	5.00	0.00	0.88	0.88
13.00	2.00	0.53	5.00	0.00	0.88	0.88
13.05	2.00	0.53	5.00	0.00	0.88	0.88
13.10	2.00	0.53	5.00	0.00	0.88	0.88
13.15	2.00	0.53	5.00	0.00	0.88	0.88
13.20	2.00	0.53	5.00	0.00	0.88	0.88
13.25	2.00	0.53	5.00	0.00	0.88	0.88
13.30	2.00	0.53	5.00	0.00	0.88	0.88
13.35	2.00	0.53	5.00	0.00	0.88	0.88
13.40	2.00	0.53	5.00	0.00	0.88	0.88
13.45	2.00	0.53	5.00	0.00	0.88	0.88
13.50	0.26	0.53	5.00	0.00	0.88	0.88
13.55	0.26	0.53	5.00	0.00	0.87	0.87
13.60	0.26	0.53	5.00	0.00	0.86	0.86
13.65	0.26	0.53	5.00	0.00	0.86	0.86
13.70	0.27	0.53	5.00	0.00	0.85	0.85
13.75	0.27	0.53	5.00	0.00	0.84	0.84
13.80	0.27	0.53	5.00	0.00	0.83	0.83
13.85	0.27	0.53	5.00	0.00	0.82	0.82
13.90	0.28	0.53	5.00	0.00	0.82	0.82
13.95	0.28	0.53	5.00	0.00	0.81	0.81
14.00	0.28	0.53	5.00	0.00	0.80	0.80
14.05	0.28	0.52	5.00	0.00	0.79	0.79
14.10	0.28	0.52	5.00	0.00	0.79	0.79
14.15	0.29	0.52	5.00	0.00	0.78	0.78
14.20	0.29	0.52	5.00	0.00	0.77	0.77
14.25	0.29	0.52	5.00	0.00	0.77	0.77
14.30	0.29	0.52	5.00	0.00	0.76	0.76
14.35	0.29	0.52	5.00	0.00	0.75	0.75
14.40	0.30	0.52	5.00	0.00	0.75	0.75
14.45	0.30	0.52	5.00	0.00	0.74	0.74
14.50	0.30	0.52	5.00	0.00	0.73	0.73
14.55	0.30	0.52	5.00	0.00	0.73	0.73
14.60	0.30	0.52	5.00	0.00	0.72	0.72
14.65	0.31	0.52	5.00	0.00	0.71	0.71
14.70	0.31	0.52	5.00	0.00	0.71	0.71
14.75	0.31	0.52	5.00	0.00	0.70	0.70
14.80	0.35	0.52	5.00	0.00	0.70	0.70
14.85	0.35	0.52	5.00	0.00	0.69	0.69
14.90	0.35	0.52	5.00	0.00	0.69	0.69
14.95	0.36	0.52	5.00	0.00	0.68	0.68
15.00	0.36	0.52	5.00	0.00	0.68	0.68
15.05	0.36	0.52	5.00	0.00	0.67	0.67
15.10	0.37	0.52	5.00	0.00	0.67	0.67
15.15	0.37	0.52	5.00	0.00	0.67	0.67
15.20	0.37	0.52	5.00	0.00	0.66	0.66

15.25	0.37	0.52	5.00	0.00	0.66	0.66
15.30	0.38	0.52	5.00	0.00	0.65	0.65
15.35	0.38	0.52	5.00	0.00	0.65	0.65
15.40	0.38	0.52	5.00	0.00	0.65	0.65
15.45	0.38	0.52	5.00	0.00	0.64	0.64
15.50	0.39	0.52	5.00	0.00	0.64	0.64
15.55	0.39	0.52	5.00	0.00	0.64	0.64
15.60	0.39	0.52	5.00	0.00	0.63	0.63
15.65	0.40	0.52	5.00	0.00	0.63	0.63
15.70	0.40	0.52	5.00	0.00	0.62	0.62
15.75	0.40	0.52	5.00	0.00	0.62	0.62
15.80	0.41	0.52	5.00	0.00	0.62	0.62
15.85	0.41	0.52	5.00	0.00	0.61	0.61
15.90	0.41	0.52	5.00	0.00	0.61	0.61
15.95	0.42	0.52	5.00	0.00	0.61	0.61
16.00	0.42	0.52	5.00	0.00	0.60	0.60
16.05	0.42	0.52	5.00	0.00	0.60	0.60
16.10	0.43	0.52	5.00	0.00	0.60	0.60
16.15	0.43	0.52	5.00	0.00	0.59	0.59
16.20	0.43	0.52	5.00	0.00	0.59	0.59
16.25	0.44	0.52	5.00	0.00	0.59	0.59
16.30	0.44	0.52	5.00	0.00	0.58	0.58
16.35	0.44	0.52	5.00	0.00	0.58	0.58
16.40	0.45	0.52	5.00	0.00	0.58	0.58
16.45	0.45	0.52	5.00	0.00	0.57	0.57
16.50	0.45	0.52	5.00	0.00	0.57	0.57
16.55	0.46	0.52	5.00	0.00	0.57	0.57
16.60	0.46	0.52	5.00	0.00	0.56	0.56
16.65	0.47	0.52	5.00	0.00	0.56	0.56
16.70	0.47	0.52	5.00	0.00	0.56	0.56
16.75	0.47	0.52	5.00	0.00	0.55	0.55
16.80	0.48	0.52	5.00	0.00	0.55	0.55
16.85	0.48	0.52	5.00	0.00	0.55	0.55
16.90	0.49	0.52	5.00	0.00	0.54	0.54
16.95	0.49	0.52	5.00	0.00	0.54	0.54
17.00	0.50	0.52	5.00	0.00	0.54	0.54
17.05	0.50	0.52	5.00	0.00	0.54	0.54
17.10	0.51	0.52	5.00	0.00	0.53	0.53
17.15	0.51	0.52	5.00	0.00	0.53	0.53
17.20	0.52	0.52	5.00	0.00	0.53	0.53
17.25	0.52	0.52	5.00	0.00	0.52	0.52
17.30	0.53	0.52	5.00	0.00	0.52	0.52
17.35	0.54	0.52	5.00	0.00	0.52	0.52
17.40	0.54	0.52	5.00	0.00	0.52	0.52
17.45	0.55	0.52	5.00	0.00	0.51	0.51
17.50	0.56	0.52	5.00	0.00	0.51	0.51
17.55	0.57	0.52	5.00	0.00	0.51	0.51
17.60	0.58	0.52	5.00	0.00	0.50	0.50
17.65	0.59	0.52	5.00	0.00	0.50	0.50
17.70	0.61	0.52	5.00	0.00	0.50	0.50
17.75	0.63	0.52	5.00	0.00	0.50	0.50
17.80	0.67	0.52	5.00	0.00	0.49	0.49
17.85	2.88	0.52	5.00	0.00	0.49	0.49
17.90	2.88	0.52	5.00	0.00	0.49	0.49

17.95	2.88	0.52	5.00	0.00	0.49	0.49
18.00	2.88	0.52	5.00	0.00	0.48	0.48
18.05	2.88	0.52	5.00	0.00	0.48	0.48
18.10	2.88	0.52	5.00	0.00	0.48	0.48
18.15	2.88	0.52	5.00	0.00	0.47	0.47
18.20	2.88	0.52	5.00	0.00	0.47	0.47
18.25	2.88	0.52	5.00	0.00	0.47	0.47
18.30	2.88	0.52	5.00	0.00	0.47	0.47
18.35	2.88	0.52	5.00	0.00	0.46	0.46
18.40	2.88	0.52	5.00	0.00	0.46	0.46
18.45	2.88	0.52	5.00	0.00	0.46	0.46
18.50	2.88	0.52	5.00	0.00	0.46	0.46
18.55	2.88	0.52	5.00	0.00	0.45	0.45
18.60	2.88	0.52	5.00	0.00	0.45	0.45
18.65	2.88	0.52	5.00	0.00	0.45	0.45
18.70	2.88	0.52	5.00	0.00	0.45	0.45
18.75	2.88	0.52	5.00	0.00	0.44	0.44
18.80	2.88	0.52	5.00	0.00	0.44	0.44
18.85	2.88	0.52	5.00	0.00	0.44	0.44
18.90	2.88	0.52	5.00	0.00	0.44	0.44
18.95	2.88	0.52	5.00	0.00	0.43	0.43
19.00	2.88	0.52	5.00	0.00	0.43	0.43
19.05	2.88	0.52	5.00	0.00	0.43	0.43
19.10	2.88	0.52	5.00	0.00	0.42	0.42
19.15	2.88	0.52	5.00	0.00	0.42	0.42
19.20	2.88	0.52	5.00	0.00	0.42	0.42
19.25	2.88	0.52	5.00	0.00	0.42	0.42
19.30	2.88	0.52	5.00	0.00	0.41	0.41
19.35	2.88	0.52	5.00	0.00	0.41	0.41
19.40	2.88	0.52	5.00	0.00	0.41	0.41
19.45	2.88	0.52	5.00	0.00	0.40	0.40
19.50	2.88	0.52	5.00	0.00	0.40	0.40
19.55	2.88	0.52	5.00	0.00	0.40	0.40
19.60	2.88	0.52	5.00	0.00	0.39	0.39
19.65	2.88	0.52	5.00	0.00	0.39	0.39
19.70	2.88	0.52	5.00	0.00	0.39	0.39
19.75	0.70	0.52	5.00	0.00	0.38	0.38
19.80	0.68	0.52	5.00	0.00	0.38	0.38
19.85	0.66	0.52	5.00	0.00	0.37	0.37
19.90	0.64	0.52	5.00	0.00	0.37	0.37
19.95	0.63	0.52	5.00	0.00	0.37	0.37
20.00	0.62	0.52	5.00	0.00	0.36	0.36
20.05	0.61	0.52	5.00	0.00	0.36	0.36
20.10	0.60	0.52	5.00	0.00	0.36	0.36
20.15	0.59	0.52	5.00	0.00	0.35	0.35
20.20	0.58	0.52	5.00	0.00	0.35	0.35
20.25	0.58	0.52	5.00	0.00	0.34	0.34
20.30	0.57	0.52	5.00	0.00	0.34	0.34
20.35	0.57	0.52	5.00	0.00	0.34	0.34
20.40	0.56	0.52	5.00	0.00	0.33	0.33
20.45	0.56	0.52	5.00	0.00	0.33	0.33
20.50	0.55	0.52	5.00	0.00	0.32	0.32
20.55	0.55	0.52	5.00	0.00	0.32	0.32
20.60	0.55	0.52	5.00	0.00	0.31	0.31

20.65	0.54	0.52	5.00	0.00	0.31	0.31
20.70	0.54	0.52	5.00	0.00	0.30	0.30
20.75	0.54	0.52	5.00	0.00	0.30	0.30
20.80	0.53	0.52	5.00	0.00	0.29	0.29
20.85	0.53	0.52	5.00	0.00	0.29	0.29
20.90	0.53	0.52	5.00	0.00	0.28	0.28
20.95	0.52	0.52	5.00	0.00	0.28	0.28
21.00	0.52	0.52	5.00	0.00	0.27	0.27
21.05	0.52	0.52	5.00	0.00	0.27	0.27
21.10	0.52	0.52	5.00	0.00	0.26	0.26
21.15	0.51	0.52	5.00	0.00	0.26	0.26
21.20	0.51	0.52	5.00	0.00	0.25	0.25
21.25	0.51	0.52	5.00	0.00	0.25	0.25
21.30	0.51	0.52	5.00	0.00	0.24	0.24
21.35	0.51	0.52	5.00	0.00	0.24	0.24
21.40	0.50	0.52	5.00	0.00	0.23	0.23
21.45	0.50	0.52	5.00	0.00	0.22	0.22
21.50	0.50	0.52	5.00	0.00	0.22	0.22
21.55	0.50	0.52	5.00	0.00	0.21	0.21
21.60	0.49	0.52	5.00	0.00	0.21	0.21
21.65	0.49	0.52	5.00	0.00	0.20	0.20
21.70	0.49	0.52	5.00	0.00	0.20	0.20
21.75	0.49	0.52	5.00	0.00	0.19	0.19
21.80	0.49	0.52	5.00	0.00	0.18	0.18
21.85	0.48	0.52	5.00	0.00	0.18	0.18
21.90	0.48	0.52	5.00	0.00	0.17	0.17
21.95	0.48	0.51	5.00	0.00	0.17	0.17
22.00	0.48	0.51	5.00	0.00	0.16	0.16
22.05	0.48	0.51	5.00	0.00	0.16	0.16
22.10	0.48	0.51	5.00	0.00	0.16	0.16
22.15	0.47	0.51	5.00	0.00	0.16	0.16
22.20	0.47	0.51	5.00	0.00	0.15	0.15
22.25	0.47	0.51	5.00	0.00	0.15	0.15
22.30	0.47	0.51	5.00	0.00	0.15	0.15
22.35	0.47	0.51	5.00	0.00	0.15	0.15
22.40	0.47	0.51	5.00	0.00	0.15	0.15
22.45	0.46	0.51	5.00	0.00	0.15	0.15
22.50	0.46	0.51	5.00	0.00	0.15	0.15
22.55	0.46	0.51	5.00	0.00	0.14	0.14
22.60	0.46	0.51	5.00	0.00	0.14	0.14
22.65	0.46	0.51	5.00	0.00	0.14	0.14
22.70	0.46	0.51	5.00	0.00	0.14	0.14
22.75	0.45	0.51	5.00	0.00	0.14	0.14
22.80	0.45	0.51	5.00	0.00	0.14	0.14
22.85	0.45	0.51	5.00	0.00	0.13	0.13
22.90	0.45	0.51	5.00	0.00	0.13	0.13
22.95	0.45	0.51	5.00	0.00	0.13	0.13
23.00	0.45	0.51	5.00	0.00	0.13	0.13
23.05	0.45	0.51	5.00	0.00	0.13	0.13
23.10	0.44	0.51	5.00	0.00	0.13	0.13
23.15	0.44	0.51	5.00	0.00	0.12	0.12
23.20	0.44	0.51	5.00	0.00	0.12	0.12
23.25	0.44	0.51	5.00	0.00	0.12	0.12
23.30	0.44	0.51	5.00	0.00	0.12	0.12

23.35	0.44	0.51	5.00	0.00	0.12	0.12
23.40	0.44	0.51	5.00	0.00	0.12	0.12
23.45	0.44	0.51	5.00	0.00	0.11	0.11
23.50	0.43	0.51	5.00	0.00	0.11	0.11
23.55	0.44	0.51	5.00	0.00	0.11	0.11
23.60	0.44	0.51	5.00	0.00	0.11	0.11
23.65	0.45	0.51	5.00	0.00	0.11	0.11
23.70	0.45	0.51	5.00	0.00	0.11	0.11
23.75	0.46	0.51	5.00	0.00	0.10	0.10
23.80	0.46	0.51	5.00	0.00	0.10	0.10
23.85	0.47	0.51	5.00	0.00	0.10	0.10
23.90	0.47	0.51	5.00	0.00	0.10	0.10
23.95	0.48	0.51	5.00	0.00	0.10	0.10
24.00	0.48	0.51	5.00	0.00	0.10	0.10
24.05	0.49	0.51	5.00	0.00	0.09	0.09
24.10	0.49	0.51	5.00	0.00	0.09	0.09
24.15	0.50	0.51	5.00	0.00	0.09	0.09
24.20	0.50	0.51	5.00	0.00	0.09	0.09
24.25	0.51	0.51	5.00	0.00	0.09	0.09
24.30	0.52	0.51	5.00	0.00	0.09	0.09
24.35	0.52	0.51	5.00	0.00	0.08	0.08
24.40	0.53	0.51	5.00	0.00	0.08	0.08
24.45	0.54	0.51	5.00	0.00	0.08	0.08
24.50	0.55	0.51	5.00	0.00	0.08	0.08
24.55	0.56	0.51	5.00	0.00	0.08	0.08
24.60	0.57	0.51	5.00	0.00	0.08	0.08
24.65	0.59	0.51	5.00	0.00	0.08	0.08
24.70	0.60	0.51	5.00	0.00	0.07	0.07
24.75	0.63	0.51	5.00	0.00	0.07	0.07
24.80	0.67	0.51	5.00	0.00	0.07	0.07
24.85	2.88	0.51	5.00	0.00	0.07	0.07
24.90	2.88	0.51	5.00	0.00	0.07	0.07
24.95	2.88	0.51	5.00	0.00	0.07	0.07
25.00	2.88	0.51	5.00	0.00	0.07	0.07
25.05	2.88	0.51	5.00	0.00	0.07	0.07
25.10	2.88	0.51	5.00	0.00	0.06	0.06
25.15	2.88	0.51	5.00	0.00	0.06	0.06
25.20	2.88	0.51	5.00	0.00	0.06	0.06
25.25	2.88	0.51	5.00	0.00	0.06	0.06
25.30	2.88	0.51	5.00	0.00	0.06	0.06
25.35	2.88	0.51	5.00	0.00	0.06	0.06
25.40	2.88	0.51	5.00	0.00	0.06	0.06
25.45	2.88	0.51	5.00	0.00	0.06	0.06
25.50	2.88	0.51	5.00	0.00	0.05	0.05
25.55	2.88	0.51	5.00	0.00	0.05	0.05
25.60	2.88	0.51	5.00	0.00	0.05	0.05
25.65	2.88	0.51	5.00	0.00	0.05	0.05
25.70	2.88	0.51	5.00	0.00	0.05	0.05
25.75	2.88	0.51	5.00	0.00	0.05	0.05
25.80	2.88	0.51	5.00	0.00	0.05	0.05
25.85	2.88	0.51	5.00	0.00	0.05	0.05
25.90	2.88	0.51	5.00	0.00	0.04	0.04
25.95	2.88	0.51	5.00	0.00	0.04	0.04
26.00	2.88	0.51	5.00	0.00	0.04	0.04

26.05	2.88	0.51	5.00	0.00	0.04	0.04
26.10	2.88	0.51	5.00	0.00	0.04	0.04
26.15	2.88	0.51	5.00	0.00	0.04	0.04
26.20	2.88	0.51	5.00	0.00	0.04	0.04
26.25	2.88	0.51	5.00	0.00	0.04	0.04
26.30	2.88	0.51	5.00	0.00	0.04	0.04
26.35	2.88	0.51	5.00	0.00	0.04	0.04
26.40	2.88	0.51	5.00	0.00	0.03	0.03
26.45	2.88	0.51	5.00	0.00	0.03	0.03
26.50	2.88	0.51	5.00	0.00	0.03	0.03
26.55	2.88	0.51	5.00	0.00	0.03	0.03
26.60	2.88	0.51	5.00	0.00	0.03	0.03
26.65	2.88	0.51	5.00	0.00	0.03	0.03
26.70	2.88	0.51	5.00	0.00	0.03	0.03
26.75	2.88	0.51	5.00	0.00	0.03	0.03
26.80	2.88	0.51	5.00	0.00	0.03	0.03
26.85	2.88	0.51	5.00	0.00	0.03	0.03
26.90	2.88	0.51	5.00	0.00	0.02	0.02
26.95	2.88	0.51	5.00	0.00	0.02	0.02
27.00	2.88	0.51	5.00	0.00	0.02	0.02
27.05	2.88	0.51	5.00	0.00	0.02	0.02
27.10	2.88	0.51	5.00	0.00	0.02	0.02
27.15	2.88	0.51	5.00	0.00	0.02	0.02
27.20	2.88	0.51	5.00	0.00	0.02	0.02
27.25	2.88	0.51	5.00	0.00	0.02	0.02
27.30	2.88	0.51	5.00	0.00	0.02	0.02
27.35	2.88	0.51	5.00	0.00	0.02	0.02
27.40	2.88	0.51	5.00	0.00	0.02	0.02
27.45	2.88	0.51	5.00	0.00	0.02	0.02
27.50	2.88	0.51	5.00	0.00	0.01	0.01
27.55	2.88	0.51	5.00	0.00	0.01	0.01
27.60	2.88	0.51	5.00	0.00	0.01	0.01
27.65	2.88	0.51	5.00	0.00	0.01	0.01
27.70	2.88	0.51	5.00	0.00	0.01	0.01
27.75	2.88	0.51	5.00	0.00	0.01	0.01
27.80	2.88	0.51	5.00	0.00	0.01	0.01
27.85	2.88	0.51	5.00	0.00	0.01	0.01
27.90	2.88	0.51	5.00	0.00	0.01	0.01
27.95	2.88	0.51	5.00	0.00	0.01	0.01
28.00	2.88	0.51	5.00	0.00	0.01	0.01
28.05	2.88	0.51	5.00	0.00	0.01	0.01
28.10	2.88	0.51	5.00	0.00	0.01	0.01
28.15	2.88	0.51	5.00	0.00	0.01	0.01
28.20	2.88	0.51	5.00	0.00	0.00	0.00
28.25	2.88	0.51	5.00	0.00	0.00	0.00
28.30	2.88	0.51	5.00	0.00	0.00	0.00
28.35	2.88	0.51	5.00	0.00	0.00	0.00
28.40	2.88	0.51	5.00	0.00	0.00	0.00
28.45	2.88	0.51	5.00	0.00	0.00	0.00
28.50	2.88	0.51	5.00	0.00	0.00	0.00
28.55	2.00	0.51	5.00	0.00	0.00	0.00
28.60	2.00	0.51	5.00	0.00	0.00	0.00
28.65	2.00	0.51	5.00	0.00	0.00	0.00
28.70	2.00	0.51	5.00	0.00	0.00	0.00

28.75 2.00 0.51 5.00 0.00 0.00 0.00
28.80 2.00 0.51 5.00 0.00 0.00 0.00
28.85 2.00 0.51 5.00 0.00 0.00 0.00
28.90 2.00 0.51 5.00 0.00 0.00 0.00
28.95 2.00 0.51 5.00 0.00 0.00 0.00
29.00 2.00 0.51 5.00 0.00 0.00 0.00
29.05 2.00 0.51 5.00 0.00 0.00 0.00
29.10 2.00 0.51 5.00 0.00 0.00 0.00
29.15 2.00 0.51 5.00 0.00 0.00 0.00
29.20 2.00 0.51 5.00 0.00 0.00 0.00
29.25 2.00 0.51 5.00 0.00 0.00 0.00
29.30 2.00 0.51 5.00 0.00 0.00 0.00
29.35 2.00 0.51 5.00 0.00 0.00 0.00
29.40 2.00 0.51 5.00 0.00 0.00 0.00
29.45 2.00 0.51 5.00 0.00 0.00 0.00
29.50 2.00 0.51 5.00 0.00 0.00 0.00
29.55 2.00 0.51 5.00 0.00 0.00 0.00
29.60 2.00 0.51 5.00 0.00 0.00 0.00
29.65 2.00 0.51 5.00 0.00 0.00 0.00
29.70 2.00 0.51 5.00 0.00 0.00 0.00
29.75 2.00 0.51 5.00 0.00 0.00 0.00
29.80 2.00 0.51 5.00 0.00 0.00 0.00
29.85 2.00 0.50 5.00 0.00 0.00 0.00
29.90 2.00 0.50 5.00 0.00 0.00 0.00
29.95 2.00 0.50 5.00 0.00 0.00 0.00
30.00 2.00 0.50 5.00 0.00 0.00 0.00
30.05 2.00 0.50 5.00 0.00 0.00 0.00
30.10 2.00 0.50 5.00 0.00 0.00 0.00
30.15 2.00 0.50 5.00 0.00 0.00 0.00
30.20 2.00 0.50 5.00 0.00 0.00 0.00
30.25 2.00 0.50 5.00 0.00 0.00 0.00
30.30 2.00 0.50 5.00 0.00 0.00 0.00
30.35 2.00 0.50 5.00 0.00 0.00 0.00
30.40 2.00 0.50 5.00 0.00 0.00 0.00
30.45 2.00 0.50 5.00 0.00 0.00 0.00
30.50 2.00 0.50 5.00 0.00 0.00 0.00
30.55 2.00 0.50 5.00 0.00 0.00 0.00
30.60 2.00 0.50 5.00 0.00 0.00 0.00
30.65 2.00 0.50 5.00 0.00 0.00 0.00
30.70 2.00 0.50 5.00 0.00 0.00 0.00
30.75 2.00 0.50 5.00 0.00 0.00 0.00
30.80 2.00 0.50 5.00 0.00 0.00 0.00
30.85 2.00 0.50 5.00 0.00 0.00 0.00
30.90 2.00 0.50 5.00 0.00 0.00 0.00
30.95 2.00 0.50 5.00 0.00 0.00 0.00
31.00 2.00 0.50 5.00 0.00 0.00 0.00
31.05 2.00 0.50 5.00 0.00 0.00 0.00
31.10 2.00 0.50 5.00 0.00 0.00 0.00
31.15 2.00 0.50 5.00 0.00 0.00 0.00
31.20 2.00 0.50 5.00 0.00 0.00 0.00
31.25 2.00 0.50 5.00 0.00 0.00 0.00
31.30 2.00 0.50 5.00 0.00 0.00 0.00
31.35 2.00 0.50 5.00 0.00 0.00 0.00
31.40 2.00 0.50 5.00 0.00 0.00 0.00

31.45	2.00	0.50	5.00	0.00	0.00	0.00
31.50	2.00	0.50	5.00	0.00	0.00	0.00
31.55	2.00	0.50	5.00	0.00	0.00	0.00
31.60	2.00	0.50	5.00	0.00	0.00	0.00
31.65	2.00	0.50	5.00	0.00	0.00	0.00
31.70	2.00	0.50	5.00	0.00	0.00	0.00
31.75	2.00	0.50	5.00	0.00	0.00	0.00
31.80	2.00	0.50	5.00	0.00	0.00	0.00
31.85	2.00	0.50	5.00	0.00	0.00	0.00
31.90	2.00	0.50	5.00	0.00	0.00	0.00
31.95	2.00	0.50	5.00	0.00	0.00	0.00
32.00	2.00	0.50	5.00	0.00	0.00	0.00
32.05	2.00	0.50	5.00	0.00	0.00	0.00
32.10	2.00	0.50	5.00	0.00	0.00	0.00
32.15	2.00	0.50	5.00	0.00	0.00	0.00
32.20	2.00	0.49	5.00	0.00	0.00	0.00
32.25	2.00	0.49	5.00	0.00	0.00	0.00
32.30	2.00	0.49	5.00	0.00	0.00	0.00
32.35	2.00	0.49	5.00	0.00	0.00	0.00
32.40	2.00	0.49	5.00	0.00	0.00	0.00
32.45	2.00	0.49	5.00	0.00	0.00	0.00
32.50	2.00	0.49	5.00	0.00	0.00	0.00
32.55	2.00	0.49	5.00	0.00	0.00	0.00
32.60	2.00	0.49	5.00	0.00	0.00	0.00
32.65	2.00	0.49	5.00	0.00	0.00	0.00
32.70	2.00	0.49	5.00	0.00	0.00	0.00
32.75	2.00	0.49	5.00	0.00	0.00	0.00
32.80	2.00	0.49	5.00	0.00	0.00	0.00
32.85	2.00	0.49	5.00	0.00	0.00	0.00
32.90	2.00	0.49	5.00	0.00	0.00	0.00
32.95	2.00	0.49	5.00	0.00	0.00	0.00
33.00	2.00	0.49	5.00	0.00	0.00	0.00
33.05	2.00	0.49	5.00	0.00	0.00	0.00
33.10	2.00	0.49	5.00	0.00	0.00	0.00
33.15	2.00	0.49	5.00	0.00	0.00	0.00
33.20	2.00	0.49	5.00	0.00	0.00	0.00
33.25	2.00	0.49	5.00	0.00	0.00	0.00
33.30	2.00	0.49	5.00	0.00	0.00	0.00
33.35	2.00	0.49	5.00	0.00	0.00	0.00
33.40	2.00	0.49	5.00	0.00	0.00	0.00
33.45	2.00	0.49	5.00	0.00	0.00	0.00
33.50	2.00	0.49	5.00	0.00	0.00	0.00
33.55	2.00	0.49	5.00	0.00	0.00	0.00
33.60	2.00	0.49	5.00	0.00	0.00	0.00
33.65	2.00	0.49	5.00	0.00	0.00	0.00
33.70	2.00	0.49	5.00	0.00	0.00	0.00
33.75	2.00	0.49	5.00	0.00	0.00	0.00
33.80	2.00	0.49	5.00	0.00	0.00	0.00
33.85	2.00	0.49	5.00	0.00	0.00	0.00
33.90	2.00	0.49	5.00	0.00	0.00	0.00
33.95	2.00	0.49	5.00	0.00	0.00	0.00
34.00	2.00	0.49	5.00	0.00	0.00	0.00
34.05	2.00	0.49	5.00	0.00	0.00	0.00
34.10	2.00	0.49	5.00	0.00	0.00	0.00

34.15	2.00	0.49	5.00	0.00	0.00	0.00
34.20	2.00	0.49	5.00	0.00	0.00	0.00
34.25	2.00	0.49	5.00	0.00	0.00	0.00
34.30	2.00	0.49	5.00	0.00	0.00	0.00
34.35	2.00	0.49	5.00	0.00	0.00	0.00
34.40	2.00	0.49	5.00	0.00	0.00	0.00
34.45	2.00	0.49	5.00	0.00	0.00	0.00
34.50	2.00	0.48	5.00	0.00	0.00	0.00
34.55	2.00	0.48	5.00	0.00	0.00	0.00
34.60	2.00	0.48	5.00	0.00	0.00	0.00
34.65	2.00	0.48	5.00	0.00	0.00	0.00
34.70	2.00	0.48	5.00	0.00	0.00	0.00
34.75	2.00	0.48	5.00	0.00	0.00	0.00
34.80	2.00	0.48	5.00	0.00	0.00	0.00
34.85	2.00	0.48	5.00	0.00	0.00	0.00
34.90	2.00	0.48	5.00	0.00	0.00	0.00
34.95	2.00	0.48	5.00	0.00	0.00	0.00
35.00	2.00	0.48	5.00	0.00	0.00	0.00
35.05	2.00	0.48	5.00	0.00	0.00	0.00
35.10	2.00	0.48	5.00	0.00	0.00	0.00
35.15	2.00	0.48	5.00	0.00	0.00	0.00
35.20	2.00	0.48	5.00	0.00	0.00	0.00
35.25	2.00	0.48	5.00	0.00	0.00	0.00
35.30	2.00	0.48	5.00	0.00	0.00	0.00
35.35	2.00	0.48	5.00	0.00	0.00	0.00
35.40	2.00	0.48	5.00	0.00	0.00	0.00
35.45	2.00	0.48	5.00	0.00	0.00	0.00
35.50	2.00	0.48	5.00	0.00	0.00	0.00
35.55	2.00	0.48	5.00	0.00	0.00	0.00
35.60	2.00	0.48	5.00	0.00	0.00	0.00
35.65	2.00	0.48	5.00	0.00	0.00	0.00
35.70	2.00	0.48	5.00	0.00	0.00	0.00
35.75	2.00	0.48	5.00	0.00	0.00	0.00
35.80	2.00	0.48	5.00	0.00	0.00	0.00
35.85	2.00	0.48	5.00	0.00	0.00	0.00
35.90	2.00	0.48	5.00	0.00	0.00	0.00
35.95	2.00	0.48	5.00	0.00	0.00	0.00
36.00	2.00	0.48	5.00	0.00	0.00	0.00
36.05	2.00	0.48	5.00	0.00	0.00	0.00
36.10	2.00	0.48	5.00	0.00	0.00	0.00
36.15	2.00	0.48	5.00	0.00	0.00	0.00
36.20	2.00	0.48	5.00	0.00	0.00	0.00
36.25	2.00	0.48	5.00	0.00	0.00	0.00
36.30	2.00	0.48	5.00	0.00	0.00	0.00
36.35	2.00	0.48	5.00	0.00	0.00	0.00
36.40	2.00	0.48	5.00	0.00	0.00	0.00
36.45	2.00	0.48	5.00	0.00	0.00	0.00
36.50	2.00	0.48	5.00	0.00	0.00	0.00
36.55	2.00	0.48	5.00	0.00	0.00	0.00
36.60	2.00	0.48	5.00	0.00	0.00	0.00
36.65	2.00	0.48	5.00	0.00	0.00	0.00
36.70	2.00	0.48	5.00	0.00	0.00	0.00
36.75	2.00	0.47	5.00	0.00	0.00	0.00
36.80	2.00	0.47	5.00	0.00	0.00	0.00

36.85	2.00	0.47	5.00	0.00	0.00	0.00
36.90	2.00	0.47	5.00	0.00	0.00	0.00
36.95	2.00	0.47	5.00	0.00	0.00	0.00
37.00	2.00	0.47	5.00	0.00	0.00	0.00
37.05	2.00	0.47	5.00	0.00	0.00	0.00
37.10	2.00	0.47	5.00	0.00	0.00	0.00
37.15	2.00	0.47	5.00	0.00	0.00	0.00
37.20	2.00	0.47	5.00	0.00	0.00	0.00
37.25	2.00	0.47	5.00	0.00	0.00	0.00
37.30	2.00	0.47	5.00	0.00	0.00	0.00
37.35	2.00	0.47	5.00	0.00	0.00	0.00
37.40	2.00	0.47	5.00	0.00	0.00	0.00
37.45	2.00	0.47	5.00	0.00	0.00	0.00
37.50	2.00	0.47	5.00	0.00	0.00	0.00
37.55	2.00	0.47	5.00	0.00	0.00	0.00
37.60	2.00	0.47	5.00	0.00	0.00	0.00
37.65	2.00	0.47	5.00	0.00	0.00	0.00
37.70	2.00	0.47	5.00	0.00	0.00	0.00
37.75	2.00	0.47	5.00	0.00	0.00	0.00
37.80	2.00	0.47	5.00	0.00	0.00	0.00
37.85	2.00	0.47	5.00	0.00	0.00	0.00
37.90	2.00	0.47	5.00	0.00	0.00	0.00
37.95	2.00	0.47	5.00	0.00	0.00	0.00
38.00	2.00	0.47	5.00	0.00	0.00	0.00
38.05	2.00	0.47	5.00	0.00	0.00	0.00
38.10	2.00	0.47	5.00	0.00	0.00	0.00
38.15	2.00	0.47	5.00	0.00	0.00	0.00
38.20	2.00	0.47	5.00	0.00	0.00	0.00
38.25	2.00	0.47	5.00	0.00	0.00	0.00
38.30	2.00	0.47	5.00	0.00	0.00	0.00
38.35	2.00	0.47	5.00	0.00	0.00	0.00
38.40	2.00	0.47	5.00	0.00	0.00	0.00
38.45	2.00	0.47	5.00	0.00	0.00	0.00
38.50	2.00	0.47	5.00	0.00	0.00	0.00
38.55	2.00	0.47	5.00	0.00	0.00	0.00
38.60	2.00	0.47	5.00	0.00	0.00	0.00
38.65	2.00	0.47	5.00	0.00	0.00	0.00
38.70	2.00	0.47	5.00	0.00	0.00	0.00
38.75	2.00	0.47	5.00	0.00	0.00	0.00
38.80	2.00	0.47	5.00	0.00	0.00	0.00
38.85	2.00	0.47	5.00	0.00	0.00	0.00
38.90	2.00	0.47	5.00	0.00	0.00	0.00
38.95	2.00	0.47	5.00	0.00	0.00	0.00
39.00	2.00	0.46	5.00	0.00	0.00	0.00
39.05	2.00	0.46	5.00	0.00	0.00	0.00
39.10	2.00	0.46	5.00	0.00	0.00	0.00
39.15	2.00	0.46	5.00	0.00	0.00	0.00
39.20	2.00	0.46	5.00	0.00	0.00	0.00
39.25	2.00	0.46	5.00	0.00	0.00	0.00
39.30	2.00	0.46	5.00	0.00	0.00	0.00
39.35	2.00	0.46	5.00	0.00	0.00	0.00
39.40	2.00	0.46	5.00	0.00	0.00	0.00
39.45	2.00	0.46	5.00	0.00	0.00	0.00
39.50	2.00	0.46	5.00	0.00	0.00	0.00

39.55	2.00	0.46	5.00	0.00	0.00	0.00
39.60	2.00	0.46	5.00	0.00	0.00	0.00
39.65	2.00	0.46	5.00	0.00	0.00	0.00
39.70	2.00	0.46	5.00	0.00	0.00	0.00
39.75	2.00	0.46	5.00	0.00	0.00	0.00
39.80	2.00	0.46	5.00	0.00	0.00	0.00
39.85	2.00	0.46	5.00	0.00	0.00	0.00
39.90	2.00	0.46	5.00	0.00	0.00	0.00
39.95	2.00	0.46	5.00	0.00	0.00	0.00
40.00	2.00	0.46	5.00	0.00	0.00	0.00
40.05	2.00	0.46	5.00	0.00	0.00	0.00
40.10	2.00	0.46	5.00	0.00	0.00	0.00
40.15	2.00	0.46	5.00	0.00	0.00	0.00
40.20	2.00	0.46	5.00	0.00	0.00	0.00
40.25	2.00	0.46	5.00	0.00	0.00	0.00
40.30	2.00	0.46	5.00	0.00	0.00	0.00
40.35	2.00	0.46	5.00	0.00	0.00	0.00
40.40	2.00	0.46	5.00	0.00	0.00	0.00
40.45	2.00	0.46	5.00	0.00	0.00	0.00
40.50	2.00	0.46	5.00	0.00	0.00	0.00
40.55	2.00	0.46	5.00	0.00	0.00	0.00
40.60	2.00	0.46	5.00	0.00	0.00	0.00
40.65	2.00	0.46	5.00	0.00	0.00	0.00
40.70	2.00	0.46	5.00	0.00	0.00	0.00
40.75	2.00	0.46	5.00	0.00	0.00	0.00
40.80	2.00	0.46	5.00	0.00	0.00	0.00
40.85	2.00	0.46	5.00	0.00	0.00	0.00
40.90	2.00	0.46	5.00	0.00	0.00	0.00
40.95	2.00	0.46	5.00	0.00	0.00	0.00
41.00	2.00	0.46	5.00	0.00	0.00	0.00
41.05	2.00	0.46	5.00	0.00	0.00	0.00
41.10	2.00	0.46	5.00	0.00	0.00	0.00
41.15	2.00	0.46	5.00	0.00	0.00	0.00
41.20	2.00	0.46	5.00	0.00	0.00	0.00
41.25	2.00	0.46	5.00	0.00	0.00	0.00
41.30	2.00	0.46	5.00	0.00	0.00	0.00
41.35	2.00	0.46	5.00	0.00	0.00	0.00
41.40	2.00	0.46	5.00	0.00	0.00	0.00
41.45	2.00	0.46	5.00	0.00	0.00	0.00
41.50	2.00	0.46	5.00	0.00	0.00	0.00
41.55	2.00	0.46	5.00	0.00	0.00	0.00
41.60	2.00	0.46	5.00	0.00	0.00	0.00
41.65	2.00	0.46	5.00	0.00	0.00	0.00
41.70	2.00	0.46	5.00	0.00	0.00	0.00
41.75	2.00	0.46	5.00	0.00	0.00	0.00
41.80	2.00	0.46	5.00	0.00	0.00	0.00
41.85	2.00	0.46	5.00	0.00	0.00	0.00
41.90	2.00	0.46	5.00	0.00	0.00	0.00
41.95	2.00	0.46	5.00	0.00	0.00	0.00
42.00	2.00	0.46	5.00	0.00	0.00	0.00
42.05	2.00	0.46	5.00	0.00	0.00	0.00
42.10	2.00	0.46	5.00	0.00	0.00	0.00
42.15	2.00	0.46	5.00	0.00	0.00	0.00
42.20	2.00	0.46	5.00	0.00	0.00	0.00

42.25	2.00	0.46	5.00	0.00	0.00	0.00
42.30	2.00	0.46	5.00	0.00	0.00	0.00
42.35	2.00	0.46	5.00	0.00	0.00	0.00
42.40	2.00	0.46	5.00	0.00	0.00	0.00
42.45	2.00	0.46	5.00	0.00	0.00	0.00
42.50	2.00	0.46	5.00	0.00	0.00	0.00
42.55	2.00	0.46	5.00	0.00	0.00	0.00
42.60	2.00	0.46	5.00	0.00	0.00	0.00
42.65	2.00	0.46	5.00	0.00	0.00	0.00
42.70	2.00	0.46	5.00	0.00	0.00	0.00
42.75	2.00	0.46	5.00	0.00	0.00	0.00
42.80	2.00	0.46	5.00	0.00	0.00	0.00
42.85	2.00	0.46	5.00	0.00	0.00	0.00
42.90	2.00	0.47	5.00	0.00	0.00	0.00
42.95	2.00	0.47	5.00	0.00	0.00	0.00
43.00	2.00	0.47	5.00	0.00	0.00	0.00
43.05	2.00	0.47	5.00	0.00	0.00	0.00
43.10	2.00	0.47	5.00	0.00	0.00	0.00
43.15	2.00	0.47	5.00	0.00	0.00	0.00
43.20	2.00	0.47	5.00	0.00	0.00	0.00
43.25	2.00	0.47	5.00	0.00	0.00	0.00
43.30	2.00	0.47	5.00	0.00	0.00	0.00
43.35	2.00	0.47	5.00	0.00	0.00	0.00
43.40	2.00	0.47	5.00	0.00	0.00	0.00
43.45	2.00	0.47	5.00	0.00	0.00	0.00
43.50	2.00	0.47	5.00	0.00	0.00	0.00
43.55	2.00	0.47	5.00	0.00	0.00	0.00
43.60	2.00	0.47	5.00	0.00	0.00	0.00
43.65	2.00	0.47	5.00	0.00	0.00	0.00
43.70	2.00	0.47	5.00	0.00	0.00	0.00
43.75	2.00	0.47	5.00	0.00	0.00	0.00
43.80	2.00	0.47	5.00	0.00	0.00	0.00
43.85	2.00	0.47	5.00	0.00	0.00	0.00
43.90	2.00	0.47	5.00	0.00	0.00	0.00
43.95	2.00	0.47	5.00	0.00	0.00	0.00
44.00	2.00	0.47	5.00	0.00	0.00	0.00
44.05	2.00	0.47	5.00	0.00	0.00	0.00
44.10	2.00	0.47	5.00	0.00	0.00	0.00
44.15	2.00	0.47	5.00	0.00	0.00	0.00
44.20	2.00	0.47	5.00	0.00	0.00	0.00
44.25	2.00	0.47	5.00	0.00	0.00	0.00
44.30	2.00	0.47	5.00	0.00	0.00	0.00
44.35	2.00	0.47	5.00	0.00	0.00	0.00
44.40	2.00	0.47	5.00	0.00	0.00	0.00
44.45	2.00	0.47	5.00	0.00	0.00	0.00
44.50	2.00	0.47	5.00	0.00	0.00	0.00
44.55	2.00	0.47	5.00	0.00	0.00	0.00
44.60	2.00	0.47	5.00	0.00	0.00	0.00
44.65	2.00	0.47	5.00	0.00	0.00	0.00
44.70	2.00	0.47	5.00	0.00	0.00	0.00
44.75	2.00	0.47	5.00	0.00	0.00	0.00
44.80	2.00	0.47	5.00	0.00	0.00	0.00
44.85	2.00	0.47	5.00	0.00	0.00	0.00
44.90	2.00	0.47	5.00	0.00	0.00	0.00

44.95 2.00 0.47 5.00 0.00 0.00 0.00
45.00 2.00 0.47 5.00 0.00 0.00 0.00

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

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

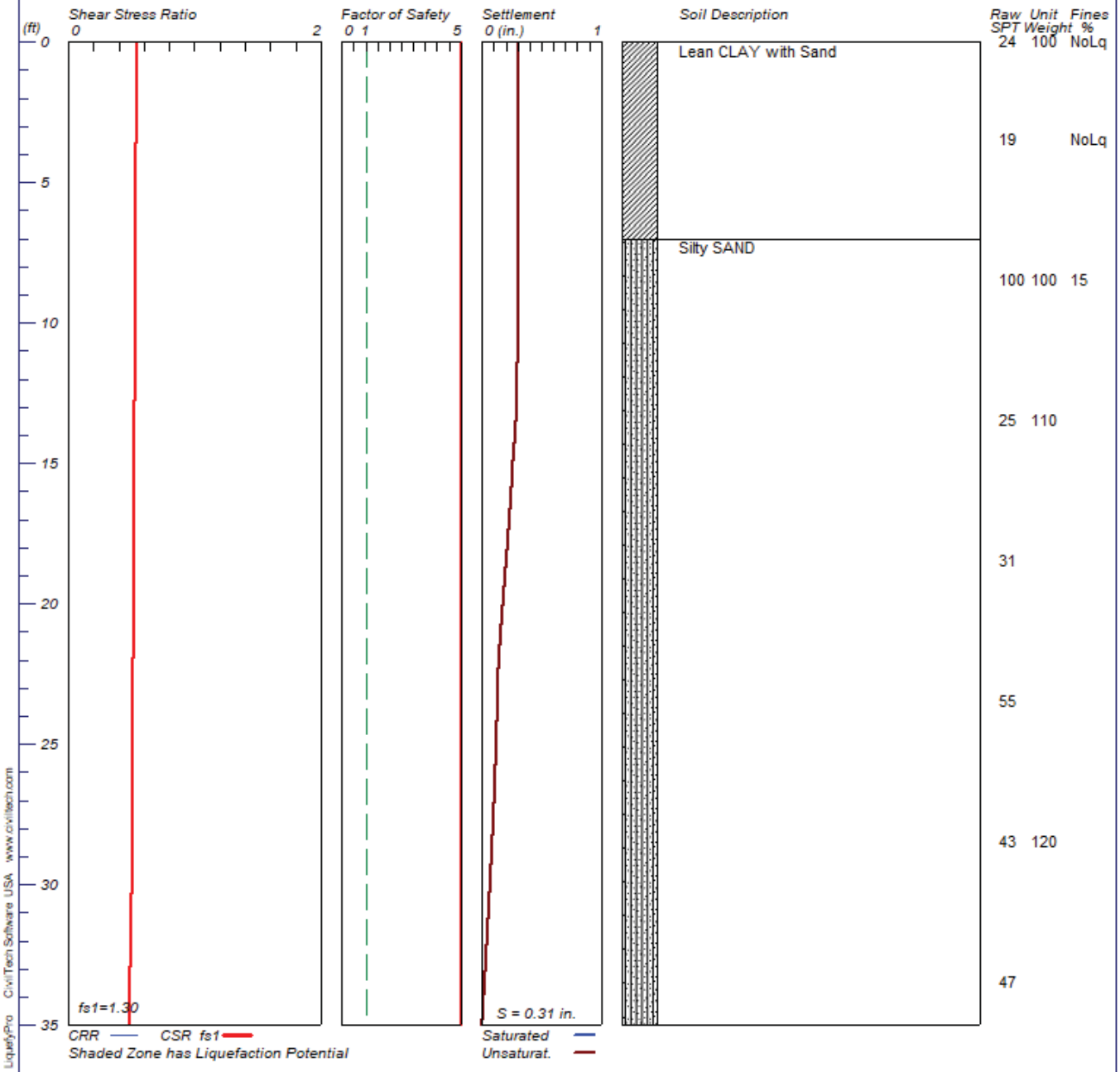
CRRm	Cyclic resistance ratio from soils
CSRsf	Cyclic stress ratio induced by a given earthquake (with user request factor of safety)
F.S.	Factor of Safety against liquefaction, F.S.=CRRm/CSRsf
S_sat	Settlement from saturated sands
S_dry	Settlement from Unsaturated Sands
S_all	Total Settlement from Saturated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

LIQUEFACTION ANALYSIS

Hillview Jr. HS Replacement Campus

Hole No.=B-9 Water Depth=40 ft

Magnitude=6.5
Acceleration=0.835g



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LIQUEFACTION ANALYSIS CALCULATION SHEET

www.civiltech.com
(425) 453-6488 Fax (425) 453-5848

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Input File Name: C:\Users\Manuel.Zea\Box\Geosphere-R Drive Folder\Geotech Projects by Number\64000\91-64513-PW PUSD Hillview Junior High School\4 - Liquefaction Analysis\B-9.liq
Title: Hillview Jr. HS Replacement Campus
Subtitle: Atlas No. 91-64513-PW

Surface Elev.=
Hole No.=B-9
Depth of Hole= 35.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration= 0.83 g
Earthquake Magnitude= 6.5

Input Data:
Surface Elev.=
Hole No.=B-9
Depth of Hole=35.0 ft
Water Table during Earthquake= 40.0 ft
Water Table during In-Situ Testing= 40.0 ft
Max. Acceleration=0.83 g
Earthquake Magnitude=6.5

1. SPT or BPT Calculation.
2. Settlement Analysis Method: Ishihara / Yoshimine*
3. Fines Correction for Liquefaction: Stark/Olson et al.*
4. Fine Correction for Settlement: During Liquefaction*
5. Settlement Calculation in: All zones*
6. Hammer Energy Ratio, Ce = 1
7. Borehole Diameter, Cb= 1.05
8. Sampling Method, Cs= 1.2
9. User request factor of safety (apply to CSR) , User= 1.3

10. Use Curve Smoothing: Yes*
* Recommended Options

In-Situ Test Data:

Depth	SPT	gamma	Fines	
ft		pcf	%	
0.0	24.0	100.0		NoLiq
3.5	19.0	100.0		NoLiq

8.5	100.0	100.0	15.0
13.5	25.0	110.0	15.0
18.5	31.0	110.0	15.0
23.5	55.0	110.0	15.0
28.5	43.0	120.0	15.0
33.5	47.0	120.0	15.0

Output Results:

Settlement of Saturated Sands=0.00 in.
Settlement of Unsaturated Sands=0.31 in.
Total Settlement of Saturated and Unsaturated Sands=0.31 in.
Differential Settlement=0.153 to 0.202 in.

Depth ft	CRRm	CSRsf	F.S.	S_sat. in.	S_dry in.	S_all in.
0.00	2.88	0.54	5.00	0.00	0.31	0.31
0.05	2.00	0.54	5.00	0.00	0.31	0.31
0.10	2.00	0.54	5.00	0.00	0.31	0.31
0.15	2.00	0.54	5.00	0.00	0.31	0.31
0.20	2.00	0.54	5.00	0.00	0.31	0.31
0.25	2.00	0.54	5.00	0.00	0.31	0.31
0.30	2.00	0.54	5.00	0.00	0.31	0.31
0.35	2.00	0.54	5.00	0.00	0.31	0.31
0.40	2.00	0.54	5.00	0.00	0.31	0.31
0.45	2.00	0.54	5.00	0.00	0.31	0.31
0.50	2.00	0.54	5.00	0.00	0.31	0.31
0.55	2.00	0.54	5.00	0.00	0.31	0.31
0.60	2.00	0.54	5.00	0.00	0.31	0.31
0.65	2.00	0.54	5.00	0.00	0.31	0.31
0.70	2.00	0.54	5.00	0.00	0.31	0.31
0.75	2.00	0.54	5.00	0.00	0.31	0.31
0.80	2.00	0.54	5.00	0.00	0.31	0.31
0.85	2.00	0.54	5.00	0.00	0.31	0.31
0.90	2.00	0.54	5.00	0.00	0.31	0.31
0.95	2.00	0.54	5.00	0.00	0.31	0.31
1.00	2.00	0.54	5.00	0.00	0.31	0.31
1.05	2.00	0.54	5.00	0.00	0.31	0.31
1.10	2.00	0.54	5.00	0.00	0.31	0.31
1.15	2.00	0.54	5.00	0.00	0.31	0.31
1.20	2.00	0.54	5.00	0.00	0.31	0.31
1.25	2.00	0.54	5.00	0.00	0.31	0.31
1.30	2.00	0.54	5.00	0.00	0.31	0.31
1.35	2.00	0.54	5.00	0.00	0.31	0.31
1.40	2.00	0.54	5.00	0.00	0.31	0.31
1.45	2.00	0.54	5.00	0.00	0.31	0.31
1.50	2.00	0.54	5.00	0.00	0.31	0.31
1.55	2.00	0.54	5.00	0.00	0.31	0.31
1.60	2.00	0.54	5.00	0.00	0.31	0.31
1.65	2.00	0.54	5.00	0.00	0.31	0.31
1.70	2.00	0.54	5.00	0.00	0.31	0.31
1.75	2.00	0.54	5.00	0.00	0.31	0.31
1.80	2.00	0.54	5.00	0.00	0.31	0.31

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9.15 2.88 0.53 5.00 0.00 0.30 0.30
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9.60 2.88 0.53 5.00 0.00 0.30 0.30
9.65 2.88 0.53 5.00 0.00 0.30 0.30
9.70 2.88 0.53 5.00 0.00 0.30 0.30
9.75 2.88 0.53 5.00 0.00 0.30 0.30
9.80 2.88 0.53 5.00 0.00 0.30 0.30
9.85 2.88 0.53 5.00 0.00 0.30 0.30
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9.95 2.88 0.53 5.00 0.00 0.30 0.30
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10.65 2.88 0.53 5.00 0.00 0.30 0.30
10.70 2.88 0.53 5.00 0.00 0.30 0.30
10.75 2.88 0.53 5.00 0.00 0.30 0.30
10.80 2.88 0.53 5.00 0.00 0.30 0.30
10.85 2.88 0.53 5.00 0.00 0.30 0.30
10.90 2.88 0.53 5.00 0.00 0.30 0.30
10.95 2.88 0.53 5.00 0.00 0.30 0.30
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11.05 2.88 0.53 5.00 0.00 0.30 0.30
11.10 2.88 0.53 5.00 0.00 0.30 0.30
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11.45 2.88 0.53 5.00 0.00 0.30 0.30
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11.65 2.88 0.53 5.00 0.00 0.30 0.30
11.70 2.88 0.53 5.00 0.00 0.30 0.30
11.75 2.88 0.53 5.00 0.00 0.30 0.30
11.80 2.88 0.53 5.00 0.00 0.30 0.30
11.85 2.88 0.53 5.00 0.00 0.30 0.30
11.90 2.88 0.53 5.00 0.00 0.30 0.30
11.95 2.88 0.53 5.00 0.00 0.30 0.30
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12.10 2.88 0.53 5.00 0.00 0.30 0.30
12.15 2.88 0.53 5.00 0.00 0.29 0.29
12.20 2.88 0.53 5.00 0.00 0.29 0.29
12.25 2.88 0.53 5.00 0.00 0.29 0.29
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12.35 2.88 0.53 5.00 0.00 0.29 0.29
12.40 2.88 0.53 5.00 0.00 0.29 0.29
12.45 2.88 0.53 5.00 0.00 0.29 0.29
12.50 2.88 0.53 5.00 0.00 0.29 0.29
12.55 2.88 0.53 5.00 0.00 0.29 0.29
12.60 2.88 0.53 5.00 0.00 0.29 0.29

12.65	2.88	0.53	5.00	0.00	0.29	0.29
12.70	2.88	0.53	5.00	0.00	0.29	0.29
12.75	2.88	0.53	5.00	0.00	0.29	0.29
12.80	2.88	0.53	5.00	0.00	0.29	0.29
12.85	2.88	0.53	5.00	0.00	0.29	0.29
12.90	2.88	0.53	5.00	0.00	0.29	0.29
12.95	2.88	0.53	5.00	0.00	0.29	0.29
13.00	2.88	0.53	5.00	0.00	0.29	0.29
13.05	2.88	0.53	5.00	0.00	0.29	0.29
13.10	2.88	0.53	5.00	0.00	0.29	0.29
13.15	2.88	0.53	5.00	0.00	0.29	0.29
13.20	2.88	0.53	5.00	0.00	0.29	0.29
13.25	2.88	0.53	5.00	0.00	0.29	0.29
13.30	2.88	0.53	5.00	0.00	0.29	0.29
13.35	2.88	0.53	5.00	0.00	0.29	0.29
13.40	2.88	0.53	5.00	0.00	0.29	0.29
13.45	2.88	0.53	5.00	0.00	0.29	0.29
13.50	2.88	0.53	5.00	0.00	0.29	0.29
13.55	2.88	0.53	5.00	0.00	0.28	0.28
13.60	2.88	0.53	5.00	0.00	0.28	0.28
13.65	2.88	0.53	5.00	0.00	0.28	0.28
13.70	2.88	0.53	5.00	0.00	0.28	0.28
13.75	2.88	0.53	5.00	0.00	0.28	0.28
13.80	2.88	0.53	5.00	0.00	0.28	0.28
13.85	2.88	0.53	5.00	0.00	0.28	0.28
13.90	2.88	0.53	5.00	0.00	0.28	0.28
13.95	2.88	0.53	5.00	0.00	0.28	0.28
14.00	2.88	0.53	5.00	0.00	0.28	0.28
14.05	2.88	0.52	5.00	0.00	0.28	0.28
14.10	2.88	0.52	5.00	0.00	0.28	0.28
14.15	2.88	0.52	5.00	0.00	0.27	0.27
14.20	2.88	0.52	5.00	0.00	0.27	0.27
14.25	2.88	0.52	5.00	0.00	0.27	0.27
14.30	2.88	0.52	5.00	0.00	0.27	0.27
14.35	2.88	0.52	5.00	0.00	0.27	0.27
14.40	2.88	0.52	5.00	0.00	0.27	0.27
14.45	2.88	0.52	5.00	0.00	0.27	0.27
14.50	2.88	0.52	5.00	0.00	0.27	0.27
14.55	2.88	0.52	5.00	0.00	0.27	0.27
14.60	2.88	0.52	5.00	0.00	0.27	0.27
14.65	2.88	0.52	5.00	0.00	0.27	0.27
14.70	2.88	0.52	5.00	0.00	0.26	0.26
14.75	2.88	0.52	5.00	0.00	0.26	0.26
14.80	2.88	0.52	5.00	0.00	0.26	0.26
14.85	2.88	0.52	5.00	0.00	0.26	0.26
14.90	2.88	0.52	5.00	0.00	0.26	0.26
14.95	2.88	0.52	5.00	0.00	0.26	0.26
15.00	2.88	0.52	5.00	0.00	0.26	0.26
15.05	2.88	0.52	5.00	0.00	0.26	0.26
15.10	2.88	0.52	5.00	0.00	0.26	0.26
15.15	2.88	0.52	5.00	0.00	0.26	0.26
15.20	2.88	0.52	5.00	0.00	0.26	0.26
15.25	2.88	0.52	5.00	0.00	0.26	0.26
15.30	2.88	0.52	5.00	0.00	0.26	0.26

15.35	2.88	0.52	5.00	0.00	0.25	0.25
15.40	2.88	0.52	5.00	0.00	0.25	0.25
15.45	2.88	0.52	5.00	0.00	0.25	0.25
15.50	2.88	0.52	5.00	0.00	0.25	0.25
15.55	2.88	0.52	5.00	0.00	0.25	0.25
15.60	2.88	0.52	5.00	0.00	0.25	0.25
15.65	2.88	0.52	5.00	0.00	0.25	0.25
15.70	2.88	0.52	5.00	0.00	0.25	0.25
15.75	2.88	0.52	5.00	0.00	0.25	0.25
15.80	2.88	0.52	5.00	0.00	0.25	0.25
15.85	2.88	0.52	5.00	0.00	0.25	0.25
15.90	2.88	0.52	5.00	0.00	0.25	0.25
15.95	2.88	0.52	5.00	0.00	0.25	0.25
16.00	2.88	0.52	5.00	0.00	0.25	0.25
16.05	2.88	0.52	5.00	0.00	0.24	0.24
16.10	2.88	0.52	5.00	0.00	0.24	0.24
16.15	2.88	0.52	5.00	0.00	0.24	0.24
16.20	2.88	0.52	5.00	0.00	0.24	0.24
16.25	2.88	0.52	5.00	0.00	0.24	0.24
16.30	2.88	0.52	5.00	0.00	0.24	0.24
16.35	2.88	0.52	5.00	0.00	0.24	0.24
16.40	2.88	0.52	5.00	0.00	0.24	0.24
16.45	2.88	0.52	5.00	0.00	0.24	0.24
16.50	2.88	0.52	5.00	0.00	0.24	0.24
16.55	2.88	0.52	5.00	0.00	0.24	0.24
16.60	2.88	0.52	5.00	0.00	0.24	0.24
16.65	2.88	0.52	5.00	0.00	0.24	0.24
16.70	2.88	0.52	5.00	0.00	0.23	0.23
16.75	2.88	0.52	5.00	0.00	0.23	0.23
16.80	2.88	0.52	5.00	0.00	0.23	0.23
16.85	2.88	0.52	5.00	0.00	0.23	0.23
16.90	2.88	0.52	5.00	0.00	0.23	0.23
16.95	2.88	0.52	5.00	0.00	0.23	0.23
17.00	2.88	0.52	5.00	0.00	0.23	0.23
17.05	2.88	0.52	5.00	0.00	0.23	0.23
17.10	2.88	0.52	5.00	0.00	0.23	0.23
17.15	2.88	0.52	5.00	0.00	0.23	0.23
17.20	2.88	0.52	5.00	0.00	0.23	0.23
17.25	2.88	0.52	5.00	0.00	0.23	0.23
17.30	2.88	0.52	5.00	0.00	0.22	0.22
17.35	2.88	0.52	5.00	0.00	0.22	0.22
17.40	2.88	0.52	5.00	0.00	0.22	0.22
17.45	2.88	0.52	5.00	0.00	0.22	0.22
17.50	2.88	0.52	5.00	0.00	0.22	0.22
17.55	2.88	0.52	5.00	0.00	0.22	0.22
17.60	2.88	0.52	5.00	0.00	0.22	0.22
17.65	2.88	0.52	5.00	0.00	0.22	0.22
17.70	2.88	0.52	5.00	0.00	0.22	0.22
17.75	2.88	0.52	5.00	0.00	0.22	0.22
17.80	2.88	0.52	5.00	0.00	0.22	0.22
17.85	2.88	0.52	5.00	0.00	0.22	0.22
17.90	2.88	0.52	5.00	0.00	0.21	0.21
17.95	2.88	0.52	5.00	0.00	0.21	0.21
18.00	2.88	0.52	5.00	0.00	0.21	0.21

18.05	2.88	0.52	5.00	0.00	0.21	0.21
18.10	2.88	0.52	5.00	0.00	0.21	0.21
18.15	2.88	0.52	5.00	0.00	0.21	0.21
18.20	2.88	0.52	5.00	0.00	0.21	0.21
18.25	2.88	0.52	5.00	0.00	0.21	0.21
18.30	2.88	0.52	5.00	0.00	0.21	0.21
18.35	2.88	0.52	5.00	0.00	0.21	0.21
18.40	2.88	0.52	5.00	0.00	0.21	0.21
18.45	2.88	0.52	5.00	0.00	0.20	0.20
18.50	2.88	0.52	5.00	0.00	0.20	0.20
18.55	2.88	0.52	5.00	0.00	0.20	0.20
18.60	2.88	0.52	5.00	0.00	0.20	0.20
18.65	2.88	0.52	5.00	0.00	0.20	0.20
18.70	2.88	0.52	5.00	0.00	0.20	0.20
18.75	2.88	0.52	5.00	0.00	0.20	0.20
18.80	2.88	0.52	5.00	0.00	0.20	0.20
18.85	2.88	0.52	5.00	0.00	0.20	0.20
18.90	2.88	0.52	5.00	0.00	0.20	0.20
18.95	2.88	0.52	5.00	0.00	0.19	0.19
19.00	2.88	0.52	5.00	0.00	0.19	0.19
19.05	2.88	0.52	5.00	0.00	0.19	0.19
19.10	2.88	0.52	5.00	0.00	0.19	0.19
19.15	2.88	0.52	5.00	0.00	0.19	0.19
19.20	2.88	0.52	5.00	0.00	0.19	0.19
19.25	2.88	0.52	5.00	0.00	0.19	0.19
19.30	2.88	0.52	5.00	0.00	0.19	0.19
19.35	2.88	0.52	5.00	0.00	0.19	0.19
19.40	2.88	0.52	5.00	0.00	0.19	0.19
19.45	2.88	0.52	5.00	0.00	0.19	0.19
19.50	2.88	0.52	5.00	0.00	0.18	0.18
19.55	2.88	0.52	5.00	0.00	0.18	0.18
19.60	2.88	0.52	5.00	0.00	0.18	0.18
19.65	2.88	0.52	5.00	0.00	0.18	0.18
19.70	2.88	0.52	5.00	0.00	0.18	0.18
19.75	2.88	0.52	5.00	0.00	0.18	0.18
19.80	2.88	0.52	5.00	0.00	0.18	0.18
19.85	2.88	0.52	5.00	0.00	0.18	0.18
19.90	2.88	0.52	5.00	0.00	0.18	0.18
19.95	2.88	0.52	5.00	0.00	0.18	0.18
20.00	2.88	0.52	5.00	0.00	0.18	0.18
20.05	2.88	0.52	5.00	0.00	0.17	0.17
20.10	2.88	0.52	5.00	0.00	0.17	0.17
20.15	2.88	0.52	5.00	0.00	0.17	0.17
20.20	2.88	0.52	5.00	0.00	0.17	0.17
20.25	2.88	0.52	5.00	0.00	0.17	0.17
20.30	2.88	0.52	5.00	0.00	0.17	0.17
20.35	2.88	0.52	5.00	0.00	0.17	0.17
20.40	2.88	0.52	5.00	0.00	0.17	0.17
20.45	2.88	0.52	5.00	0.00	0.17	0.17
20.50	2.88	0.52	5.00	0.00	0.17	0.17
20.55	2.88	0.52	5.00	0.00	0.17	0.17
20.60	2.88	0.52	5.00	0.00	0.16	0.16
20.65	2.88	0.52	5.00	0.00	0.16	0.16
20.70	2.88	0.52	5.00	0.00	0.16	0.16

20.75	2.88	0.52	5.00	0.00	0.16	0.16
20.80	2.88	0.52	5.00	0.00	0.16	0.16
20.85	2.88	0.52	5.00	0.00	0.16	0.16
20.90	2.88	0.52	5.00	0.00	0.16	0.16
20.95	2.88	0.52	5.00	0.00	0.16	0.16
21.00	2.88	0.52	5.00	0.00	0.16	0.16
21.05	2.88	0.52	5.00	0.00	0.16	0.16
21.10	2.88	0.52	5.00	0.00	0.16	0.16
21.15	2.88	0.52	5.00	0.00	0.16	0.16
21.20	2.88	0.52	5.00	0.00	0.15	0.15
21.25	2.88	0.52	5.00	0.00	0.15	0.15
21.30	2.88	0.52	5.00	0.00	0.15	0.15
21.35	2.88	0.52	5.00	0.00	0.15	0.15
21.40	2.88	0.52	5.00	0.00	0.15	0.15
21.45	2.88	0.52	5.00	0.00	0.15	0.15
21.50	2.88	0.52	5.00	0.00	0.15	0.15
21.55	2.88	0.52	5.00	0.00	0.15	0.15
21.60	2.88	0.52	5.00	0.00	0.15	0.15
21.65	2.88	0.52	5.00	0.00	0.15	0.15
21.70	2.88	0.52	5.00	0.00	0.15	0.15
21.75	2.88	0.52	5.00	0.00	0.14	0.14
21.80	2.88	0.52	5.00	0.00	0.14	0.14
21.85	2.88	0.52	5.00	0.00	0.14	0.14
21.90	2.88	0.52	5.00	0.00	0.14	0.14
21.95	2.88	0.51	5.00	0.00	0.14	0.14
22.00	2.88	0.51	5.00	0.00	0.14	0.14
22.05	2.88	0.51	5.00	0.00	0.14	0.14
22.10	2.88	0.51	5.00	0.00	0.14	0.14
22.15	2.88	0.51	5.00	0.00	0.14	0.14
22.20	2.88	0.51	5.00	0.00	0.14	0.14
22.25	2.88	0.51	5.00	0.00	0.14	0.14
22.30	2.88	0.51	5.00	0.00	0.14	0.14
22.35	2.88	0.51	5.00	0.00	0.14	0.14
22.40	2.88	0.51	5.00	0.00	0.14	0.14
22.45	2.88	0.51	5.00	0.00	0.14	0.14
22.50	2.88	0.51	5.00	0.00	0.14	0.14
22.55	2.88	0.51	5.00	0.00	0.14	0.14
22.60	2.88	0.51	5.00	0.00	0.14	0.14
22.65	2.88	0.51	5.00	0.00	0.14	0.14
22.70	2.88	0.51	5.00	0.00	0.14	0.14
22.75	2.88	0.51	5.00	0.00	0.14	0.14
22.80	2.88	0.51	5.00	0.00	0.14	0.14
22.85	2.88	0.51	5.00	0.00	0.13	0.13
22.90	2.88	0.51	5.00	0.00	0.13	0.13
22.95	2.88	0.51	5.00	0.00	0.13	0.13
23.00	2.88	0.51	5.00	0.00	0.13	0.13
23.05	2.88	0.51	5.00	0.00	0.13	0.13
23.10	2.88	0.51	5.00	0.00	0.13	0.13
23.15	2.88	0.51	5.00	0.00	0.13	0.13
23.20	2.88	0.51	5.00	0.00	0.13	0.13
23.25	2.88	0.51	5.00	0.00	0.13	0.13
23.30	2.88	0.51	5.00	0.00	0.13	0.13
23.35	2.88	0.51	5.00	0.00	0.13	0.13
23.40	2.88	0.51	5.00	0.00	0.13	0.13

23.45	2.88	0.51	5.00	0.00	0.13	0.13
23.50	2.88	0.51	5.00	0.00	0.13	0.13
23.55	2.88	0.51	5.00	0.00	0.13	0.13
23.60	2.88	0.51	5.00	0.00	0.13	0.13
23.65	2.88	0.51	5.00	0.00	0.13	0.13
23.70	2.88	0.51	5.00	0.00	0.13	0.13
23.75	2.88	0.51	5.00	0.00	0.13	0.13
23.80	2.88	0.51	5.00	0.00	0.13	0.13
23.85	2.88	0.51	5.00	0.00	0.13	0.13
23.90	2.88	0.51	5.00	0.00	0.13	0.13
23.95	2.88	0.51	5.00	0.00	0.13	0.13
24.00	2.88	0.51	5.00	0.00	0.13	0.13
24.05	2.88	0.51	5.00	0.00	0.13	0.13
24.10	2.88	0.51	5.00	0.00	0.13	0.13
24.15	2.88	0.51	5.00	0.00	0.13	0.13
24.20	2.88	0.51	5.00	0.00	0.13	0.13
24.25	2.88	0.51	5.00	0.00	0.13	0.13
24.30	2.88	0.51	5.00	0.00	0.12	0.12
24.35	2.88	0.51	5.00	0.00	0.12	0.12
24.40	2.88	0.51	5.00	0.00	0.12	0.12
24.45	2.88	0.51	5.00	0.00	0.12	0.12
24.50	2.88	0.51	5.00	0.00	0.12	0.12
24.55	2.88	0.51	5.00	0.00	0.12	0.12
24.60	2.88	0.51	5.00	0.00	0.12	0.12
24.65	2.88	0.51	5.00	0.00	0.12	0.12
24.70	2.88	0.51	5.00	0.00	0.12	0.12
24.75	2.88	0.51	5.00	0.00	0.12	0.12
24.80	2.88	0.51	5.00	0.00	0.12	0.12
24.85	2.88	0.51	5.00	0.00	0.12	0.12
24.90	2.88	0.51	5.00	0.00	0.12	0.12
24.95	2.88	0.51	5.00	0.00	0.12	0.12
25.00	2.88	0.51	5.00	0.00	0.12	0.12
25.05	2.88	0.51	5.00	0.00	0.12	0.12
25.10	2.88	0.51	5.00	0.00	0.12	0.12
25.15	2.88	0.51	5.00	0.00	0.12	0.12
25.20	2.88	0.51	5.00	0.00	0.12	0.12
25.25	2.88	0.51	5.00	0.00	0.12	0.12
25.30	2.88	0.51	5.00	0.00	0.12	0.12
25.35	2.88	0.51	5.00	0.00	0.12	0.12
25.40	2.88	0.51	5.00	0.00	0.12	0.12
25.45	2.88	0.51	5.00	0.00	0.12	0.12
25.50	2.88	0.51	5.00	0.00	0.12	0.12
25.55	2.88	0.51	5.00	0.00	0.12	0.12
25.60	2.88	0.51	5.00	0.00	0.11	0.11
25.65	2.88	0.51	5.00	0.00	0.11	0.11
25.70	2.88	0.51	5.00	0.00	0.11	0.11
25.75	2.88	0.51	5.00	0.00	0.11	0.11
25.80	2.88	0.51	5.00	0.00	0.11	0.11
25.85	2.88	0.51	5.00	0.00	0.11	0.11
25.90	2.88	0.51	5.00	0.00	0.11	0.11
25.95	2.88	0.51	5.00	0.00	0.11	0.11
26.00	2.88	0.51	5.00	0.00	0.11	0.11
26.05	2.88	0.51	5.00	0.00	0.11	0.11
26.10	2.88	0.51	5.00	0.00	0.11	0.11

26.15	2.88	0.51	5.00	0.00	0.11	0.11
26.20	2.88	0.51	5.00	0.00	0.11	0.11
26.25	2.88	0.51	5.00	0.00	0.11	0.11
26.30	2.88	0.51	5.00	0.00	0.11	0.11
26.35	2.88	0.51	5.00	0.00	0.11	0.11
26.40	2.88	0.51	5.00	0.00	0.11	0.11
26.45	2.88	0.51	5.00	0.00	0.11	0.11
26.50	2.88	0.51	5.00	0.00	0.11	0.11
26.55	2.88	0.51	5.00	0.00	0.11	0.11
26.60	2.88	0.51	5.00	0.00	0.11	0.11
26.65	2.88	0.51	5.00	0.00	0.11	0.11
26.70	2.88	0.51	5.00	0.00	0.10	0.10
26.75	2.88	0.51	5.00	0.00	0.10	0.10
26.80	2.88	0.51	5.00	0.00	0.10	0.10
26.85	2.88	0.51	5.00	0.00	0.10	0.10
26.90	2.88	0.51	5.00	0.00	0.10	0.10
26.95	2.88	0.51	5.00	0.00	0.10	0.10
27.00	2.88	0.51	5.00	0.00	0.10	0.10
27.05	2.88	0.51	5.00	0.00	0.10	0.10
27.10	2.88	0.51	5.00	0.00	0.10	0.10
27.15	2.88	0.51	5.00	0.00	0.10	0.10
27.20	2.88	0.51	5.00	0.00	0.10	0.10
27.25	2.88	0.51	5.00	0.00	0.10	0.10
27.30	2.88	0.51	5.00	0.00	0.10	0.10
27.35	2.88	0.51	5.00	0.00	0.10	0.10
27.40	2.88	0.51	5.00	0.00	0.10	0.10
27.45	2.88	0.51	5.00	0.00	0.10	0.10
27.50	2.88	0.51	5.00	0.00	0.10	0.10
27.55	2.88	0.51	5.00	0.00	0.10	0.10
27.60	2.88	0.51	5.00	0.00	0.10	0.10
27.65	2.88	0.51	5.00	0.00	0.10	0.10
27.70	2.88	0.51	5.00	0.00	0.09	0.09
27.75	2.88	0.51	5.00	0.00	0.09	0.09
27.80	2.88	0.51	5.00	0.00	0.09	0.09
27.85	2.88	0.51	5.00	0.00	0.09	0.09
27.90	2.88	0.51	5.00	0.00	0.09	0.09
27.95	2.88	0.51	5.00	0.00	0.09	0.09
28.00	2.88	0.51	5.00	0.00	0.09	0.09
28.05	2.88	0.51	5.00	0.00	0.09	0.09
28.10	2.88	0.51	5.00	0.00	0.09	0.09
28.15	2.88	0.51	5.00	0.00	0.09	0.09
28.20	2.88	0.51	5.00	0.00	0.09	0.09
28.25	2.88	0.51	5.00	0.00	0.09	0.09
28.30	2.88	0.51	5.00	0.00	0.09	0.09
28.35	2.88	0.51	5.00	0.00	0.09	0.09
28.40	2.88	0.51	5.00	0.00	0.09	0.09
28.45	2.88	0.51	5.00	0.00	0.09	0.09
28.50	2.88	0.51	5.00	0.00	0.09	0.09
28.55	2.88	0.51	5.00	0.00	0.09	0.09
28.60	2.88	0.51	5.00	0.00	0.08	0.08
28.65	2.88	0.51	5.00	0.00	0.08	0.08
28.70	2.88	0.51	5.00	0.00	0.08	0.08
28.75	2.90	0.51	5.00	0.00	0.08	0.08
28.80	2.90	0.51	5.00	0.00	0.08	0.08

28.85	2.90	0.51	5.00	0.00	0.08	0.08
28.90	2.90	0.51	5.00	0.00	0.08	0.08
28.95	2.90	0.51	5.00	0.00	0.08	0.08
29.00	2.90	0.51	5.00	0.00	0.08	0.08
29.05	2.90	0.51	5.00	0.00	0.08	0.08
29.10	2.90	0.51	5.00	0.00	0.08	0.08
29.15	2.89	0.51	5.00	0.00	0.08	0.08
29.20	2.89	0.51	5.00	0.00	0.08	0.08
29.25	2.89	0.51	5.00	0.00	0.08	0.08
29.30	2.89	0.51	5.00	0.00	0.08	0.08
29.35	2.89	0.51	5.00	0.00	0.08	0.08
29.40	2.89	0.51	5.00	0.00	0.08	0.08
29.45	2.89	0.51	5.00	0.00	0.07	0.07
29.50	2.89	0.51	5.00	0.00	0.07	0.07
29.55	2.89	0.51	5.00	0.00	0.07	0.07
29.60	2.89	0.51	5.00	0.00	0.07	0.07
29.65	2.89	0.51	5.00	0.00	0.07	0.07
29.70	2.88	0.51	5.00	0.00	0.07	0.07
29.75	2.88	0.51	5.00	0.00	0.07	0.07
29.80	2.88	0.51	5.00	0.00	0.07	0.07
29.85	2.88	0.50	5.00	0.00	0.07	0.07
29.90	2.88	0.50	5.00	0.00	0.07	0.07
29.95	2.88	0.50	5.00	0.00	0.07	0.07
30.00	2.88	0.50	5.00	0.00	0.07	0.07
30.05	2.88	0.50	5.00	0.00	0.07	0.07
30.10	2.88	0.50	5.00	0.00	0.07	0.07
30.15	2.88	0.50	5.00	0.00	0.07	0.07
30.20	2.88	0.50	5.00	0.00	0.07	0.07
30.25	2.87	0.50	5.00	0.00	0.06	0.06
30.30	2.87	0.50	5.00	0.00	0.06	0.06
30.35	2.87	0.50	5.00	0.00	0.06	0.06
30.40	2.87	0.50	5.00	0.00	0.06	0.06
30.45	2.87	0.50	5.00	0.00	0.06	0.06
30.50	2.87	0.50	5.00	0.00	0.06	0.06
30.55	2.87	0.50	5.00	0.00	0.06	0.06
30.60	2.87	0.50	5.00	0.00	0.06	0.06
30.65	2.87	0.50	5.00	0.00	0.06	0.06
30.70	2.87	0.50	5.00	0.00	0.06	0.06
30.75	2.87	0.50	5.00	0.00	0.06	0.06
30.80	2.86	0.50	5.00	0.00	0.06	0.06
30.85	2.86	0.50	5.00	0.00	0.06	0.06
30.90	2.86	0.50	5.00	0.00	0.06	0.06
30.95	2.86	0.50	5.00	0.00	0.06	0.06
31.00	2.86	0.50	5.00	0.00	0.06	0.06
31.05	2.86	0.50	5.00	0.00	0.05	0.05
31.10	2.86	0.50	5.00	0.00	0.05	0.05
31.15	2.86	0.50	5.00	0.00	0.05	0.05
31.20	2.86	0.50	5.00	0.00	0.05	0.05
31.25	2.86	0.50	5.00	0.00	0.05	0.05
31.30	2.86	0.50	5.00	0.00	0.05	0.05
31.35	2.86	0.50	5.00	0.00	0.05	0.05
31.40	2.85	0.50	5.00	0.00	0.05	0.05
31.45	2.85	0.50	5.00	0.00	0.05	0.05
31.50	2.85	0.50	5.00	0.00	0.05	0.05

31.55	2.85	0.50	5.00	0.00	0.05	0.05
31.60	2.85	0.50	5.00	0.00	0.05	0.05
31.65	2.85	0.50	5.00	0.00	0.05	0.05
31.70	2.85	0.50	5.00	0.00	0.05	0.05
31.75	2.85	0.50	5.00	0.00	0.05	0.05
31.80	2.85	0.50	5.00	0.00	0.04	0.04
31.85	2.85	0.50	5.00	0.00	0.04	0.04
31.90	2.85	0.50	5.00	0.00	0.04	0.04
31.95	2.84	0.50	5.00	0.00	0.04	0.04
32.00	2.84	0.50	5.00	0.00	0.04	0.04
32.05	2.84	0.50	5.00	0.00	0.04	0.04
32.10	2.84	0.50	5.00	0.00	0.04	0.04
32.15	2.84	0.50	5.00	0.00	0.04	0.04
32.20	2.84	0.49	5.00	0.00	0.04	0.04
32.25	2.84	0.49	5.00	0.00	0.04	0.04
32.30	2.84	0.49	5.00	0.00	0.04	0.04
32.35	2.84	0.49	5.00	0.00	0.04	0.04
32.40	2.84	0.49	5.00	0.00	0.04	0.04
32.45	2.84	0.49	5.00	0.00	0.04	0.04
32.50	2.84	0.49	5.00	0.00	0.04	0.04
32.55	2.83	0.49	5.00	0.00	0.03	0.03
32.60	2.83	0.49	5.00	0.00	0.03	0.03
32.65	2.83	0.49	5.00	0.00	0.03	0.03
32.70	2.83	0.49	5.00	0.00	0.03	0.03
32.75	2.83	0.49	5.00	0.00	0.03	0.03
32.80	2.83	0.49	5.00	0.00	0.03	0.03
32.85	2.83	0.49	5.00	0.00	0.03	0.03
32.90	2.83	0.49	5.00	0.00	0.03	0.03
32.95	2.83	0.49	5.00	0.00	0.03	0.03
33.00	2.83	0.49	5.00	0.00	0.03	0.03
33.05	2.83	0.49	5.00	0.00	0.03	0.03
33.10	2.83	0.49	5.00	0.00	0.03	0.03
33.15	2.82	0.49	5.00	0.00	0.03	0.03
33.20	2.82	0.49	5.00	0.00	0.03	0.03
33.25	2.82	0.49	5.00	0.00	0.03	0.03
33.30	2.82	0.49	5.00	0.00	0.02	0.02
33.35	2.82	0.49	5.00	0.00	0.02	0.02
33.40	2.82	0.49	5.00	0.00	0.02	0.02
33.45	2.82	0.49	5.00	0.00	0.02	0.02
33.50	2.82	0.49	5.00	0.00	0.02	0.02
33.55	2.82	0.49	5.00	0.00	0.02	0.02
33.60	2.82	0.49	5.00	0.00	0.02	0.02
33.65	2.82	0.49	5.00	0.00	0.02	0.02
33.70	2.82	0.49	5.00	0.00	0.02	0.02
33.75	2.81	0.49	5.00	0.00	0.02	0.02
33.80	2.81	0.49	5.00	0.00	0.02	0.02
33.85	2.81	0.49	5.00	0.00	0.02	0.02
33.90	2.81	0.49	5.00	0.00	0.02	0.02
33.95	2.81	0.49	5.00	0.00	0.02	0.02
34.00	2.81	0.49	5.00	0.00	0.01	0.01
34.05	2.81	0.49	5.00	0.00	0.01	0.01
34.10	2.81	0.49	5.00	0.00	0.01	0.01
34.15	2.81	0.49	5.00	0.00	0.01	0.01
34.20	2.81	0.49	5.00	0.00	0.01	0.01

34.25	2.81	0.49	5.00	0.00	0.01	0.01
34.30	2.81	0.49	5.00	0.00	0.01	0.01
34.35	2.80	0.49	5.00	0.00	0.01	0.01
34.40	2.80	0.49	5.00	0.00	0.01	0.01
34.45	2.80	0.49	5.00	0.00	0.01	0.01
34.50	2.80	0.48	5.00	0.00	0.01	0.01
34.55	2.80	0.48	5.00	0.00	0.01	0.01
34.60	2.80	0.48	5.00	0.00	0.01	0.01
34.65	2.80	0.48	5.00	0.00	0.01	0.01
34.70	2.80	0.48	5.00	0.00	0.00	0.00
34.75	2.80	0.48	5.00	0.00	0.00	0.00
34.80	2.80	0.48	5.00	0.00	0.00	0.00
34.85	2.80	0.48	5.00	0.00	0.00	0.00
34.90	2.80	0.48	5.00	0.00	0.00	0.00
34.95	2.79	0.48	5.00	0.00	0.00	0.00
35.00	2.79	0.48	5.00	0.00	0.00	0.00

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

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

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

Geosphere Consultants, Inc.
AN ATLAS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

GEOTECHNICAL SITE CHARACTERIZATION STUDY

Proposed Development –
Modernization & Addition Project, or a Replacement Campus Project
Hillview Junior High School
333 Yosemite Drive
Pittsburg, California 94025

Prepared for:

Pittsburg Unified School District
Facilities Planning & Management
3200 Loveridge Road
Pittsburg, California 94565-5122

Prepared by:

GEOSPHERE CONSULTANTS, INC.
2001 Crow Canyon Road, Suite 210
San Ramon, California 94583
Geosphere Project No. 91-04580-PW

Geosphere Consultants, Inc.
AN ATLAS COMPANY
Geotechnical Engineering • Engineering Geology
Environmental Management • Water Resources

June 17, 2019

Pittsburg Unified School District
Facilities Planning & Management
3200 Loveridge Road
Pittsburg, California 94565-5122

Attention: Mr. E. Keith Holtslander, Project Manager

Subject: **Geotechnical Site Characterization Study**
Proposed Development – Modernization & Addition Project, or a Replacement Campus
Hillview Junior High School
333 Yosemite Drive, Pittsburg, California 94025
Geosphere Project No. 91-04580-PW

Dear Mr. Holtslander:

Geosphere Consultants, Inc. has completed a Geotechnical Site Characterization Study for a potential modernization & addition project, or a replacement campus at Hillview Junior High School in Pittsburg, California. This report has been prepared based on our discussion with your office staff, and review of select conceptual project plans. Transmitted herewith are the results of our findings, conclusions, and preliminary recommendations regarding geologic hazards, foundation types, site grading, cut and fill slopes, shoring, and pavement design. In general, the proposed improvements at the site are considered to be geotechnically feasible provided the geotechnical considerations described in this report are addressed in the design and construction of the project.

Should you or members of the design team have questions or need additional information, please contact the undersigned at (925) 314-7180, or Mr. Dare by e-mail at cdare@geosphereinc.net. We greatly appreciate the opportunity to be of service to the Pittsburg Unified School District and to be involved in this project.

Sincerely,
GEOSPHERE CONSULTANTS, INC.

Manuel Zea, P.E.
Senior Project Engineer

Corey T. Dare, PE, GE
Principal Geotechnical Engineer

Distribution: PDF to Addressee; kholtslander@pittsburg.k12.ca.us

AK/MZ/CTD:pmf

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GEOTECHNICAL SITE CHARACTERIZATION STUDY

Project: **Proposed Development – Modernization & Addition Project, or a Replacement Campus**
Hillview Junior High School

Client: **Pittsburg Unified School District**
Facilities Planning & Management
3200 Loveridge Road
Pittsburg, California 94565-5122

1.0 INTRODUCTION

1.1 Purpose and Scope

The purpose of this characterization study was to evaluate the subsurface conditions at the site and develop conclusions and preliminary recommendations regarding the feasibility of development at the project site from a geotechnical and geological standpoint. This study provides our findings, conclusions, and preliminary recommendations regarding geologic hazards, geotechnical design and construction considerations, feasible foundation types, site grading, excavation cut slopes, and shoring. This study was performed in accordance with the scope of work outlined in our proposal to the Pittsburg Unified School District dated February 6, 2019.

The scope of this study included the review of available geotechnical and geologic literature for the site, review of a Geotechnical Engineering Report prepared by Kleinfelder West, Inc., dated March 29, 2010, for an area adjacent to the proposed development located at the synthetic turf playfield, the drilling of six subsurface borings within the project site, laboratory testing of selected samples retrieved from the borings, engineering analysis of the accumulated data, and preparation of this report. The conclusions and preliminary recommendations presented in this report are based on the data acquired and analyzed during this study, and on prudent engineering judgment and experience. This study did not include an assessment of potentially toxic or hazardous materials that may be present on or beneath the site.

1.2 Site Description

Hillview Junior High School is located northeast of Yosemite Drive between San Juan Drive and Harbor Street at the general location indicated on Plate 1, *Site Vicinity Map*. This map also shows the Kirker Creek channel, situated approximately 50 feet southeast of the site, which locally travels in a southwest to northeast direction toward New York Slough. The proposed project site is generally surrounded by the aforementioned Kirker Creek and residential single-family houses on the east, by the existing campus to the west, by the Contra Costa Canal to the

north, and by Yosemite Drive to the south, as shown on Plate 2, *Site Plan and Site Geology Map*. The project site currently consists of a lower jogging track with an internal soccer field to the north and large field areas to the south. The site vicinity generally descends gently northeast towards New York Slough with elevations ranging from +119 to +134 feet based on Google Earth Pro elevations. The average geographic coordinates of the proposed building sites used for engineering analysis are 38.0033 degrees north latitude and 121.8866 degrees west longitude.

1.3 Proposed Development

It is our understanding that the subject properties are being evaluated for potential future use for new campus development and that no design work has been performed. The evaluated area of potential development is shown on Plate 2. Foundation types and loads for new structures were not determined as of the time of this study, but could potentially consist of shallow spread footing foundations or structural mat foundations, with potential ground improvement if needed for support of shallow foundations.

1.4 Validity and Use of Report

This report is a feasibility level study intended to provide guidance to the District in helping to identify the significant geotechnical aspects of the site that may affect the feasibility and potential costs of developing the site with respect to their potential alternative development schemes. This level of study provides guidance on issues which may affect the amount of grading required, the potential geologic hazards which will or may affect the development, and preliminary recommendations on alternative foundation design types which would be appropriate for potential site structures. Once a siting plan is finalized for the project, project design will require a future study and engineering in order to fully develop design level recommendations based on future planning and engineering. This characterization report should be considered to be valid for five years after publication. If the actual development differs considerably from that described above, conclusions and recommendations regarding the geotechnical feasibility of development could differ and may need to be re-evaluated by Geosphere.

2.0 PROCEDURES AND RESULTS

2.1 Literature Review

Pertinent geologic and geotechnical literature pertaining to the site area was reviewed. These included various publications and maps issued by the United States Geological Survey (USGS), California Geological Survey (CGS), Santa Clara County and other government agencies, as listed in the References section.

2.2 Field Exploration

In order to characterize the subsurface conditions across the property, a field exploration program was conducted, which consisted of the drilling of six test borings at the site on April 25, 2019 under the supervision of a Geosphere staff engineer.

The borings were drilled at the locations indicated on Plate 2 to total depths from 16.5 to 45 feet using a CME-75 drill rig equipped with four-inch diameter, solid-stem augers. The Geosphere engineer visually classified the materials encountered in the borings based on the Unified Soil Classification System as the borings were advanced. Relatively undisturbed soil samples were recovered at selected intervals using a three-inch outside diameter Modified California split spoon sampler containing six-inch long brass liners, and disturbed samples recovered using a two-inch outside diameter Standard Penetration Test (SPT) sampler. The samplers were driven by means of a 140-pound wireline hammer with an approximate 30-inch fall. Resistance to penetration was recorded as the number of hammer blows required to drive the sampler the final foot of an 18-inch drive. For reporting purposes, all of the blow counts recorded using Modified California (MC) split spoon samplers in the field were subsequently converted to equivalent SPT blow counts using appropriate modification factors suggested by Burmister (1948); i.e., multiplied by a factor of 0.65 assuming a liner sample with an inner diameter of 2.5 inches. Therefore, the boring logs provided in this report all show *equivalent SPT blow counts* for the MC sampler in lieu of blow counts recorded in the field. Following the completion of drilling, the boreholes were backfilled with drill cuttings and sealed at the surface using a cement grout.

The boring logs with descriptions of the various materials encountered in each boring, a key to the boring symbols, and select laboratory test results are included in Appendix A. Ground surface elevations indicated on the soil boring logs were estimated to the nearest foot using Google Earth Pro.

2.3 Laboratory Testing

Laboratory tests were performed on selected samples to determine some of the physical and engineering properties of the subsurface soils. The results of the laboratory testing are either presented on the boring logs, and/or are included in Appendix B. The following soil tests were performed for this study:

Dry Density and Moisture Content (ASTM D2216 and ASTM 2937) – In-situ dry density and/or moisture tests were conducted on several samples to measure the in-place dry density and/or moisture content of the subsurface materials. These properties provide information for evaluating the physical characteristics of the subsurface soils. Test results are shown on the boring logs.

Atterberg Limits (ASTM D4318 and CT204) - Atterberg Limits tests were performed on select samples of cohesive soils encountered at the site. Liquid Limit, Plastic Limit, and Plasticity Index are useful in the classification and characterization of the engineering properties of soil, and help to evaluate the expansive characteristics of the soil and determine the USCS soil classification. Test results are presented in Appendix B, and on the boring logs.

Particle Size Analysis & Percent Passing USCS No. 200 Sieve (Wet and Dry Sieve, ASTM D422, D1140, and CT202) - Sieve analysis testing was conducted on a few samples to measure the soil particle size distribution and/or the total percentage of fines (i.e., percent passing the USCS No. 200 sieve). This information is useful for characterizing the soil type according to USCS, and to assist in the evaluation of liquefaction susceptibility of granular soils or soils of relatively low cohesion. Test results are presented in Appendix B and/or the boring logs.

3.0 GEOLOGIC AND SEISMIC OVERVIEW

3.1 Regional and Local Geologic Setting

The site is located in the central portion of the northern Coast Ranges geomorphic province of California. The Coast Ranges extend from the Transverse Ranges in southern California to the Oregon border and are comprised of a northwest-trending series of mountain ranges and intervening valleys that reflect the overall structural grain of the province. The ranges consist of a variably thick veneer of Cenozoic volcanic and sedimentary deposits overlying a Mesozoic basement of sedimentary, metamorphic, and basic igneous Franciscan Formation and primarily marine sedimentary rocks of the Great Valley Sequence. East-dipping sedimentary rocks of the Coast Ranges are flanked on the east by sedimentary rocks of the Great Valley geomorphic province (Page, 1966).

More specifically, the site is located east of San Francisco Bay, near the northern flanks of Mt. Diablo. The site is mapped as being underlain by Pleistocene-aged alluvial gravel and sand (Qoa). The mapped geologic units in the site vicinity per USGS, *Geologic Map of Honker Bay Quadrangle* are shown on Plate 3, *Regional Geologic Map*.

3.2 Geologic Evolution of the Northern Coast Ranges

The subject site is located within the tectonically active and geologically complex northern Coast Ranges, which have been shaped by continuous deformation resulting from tectonic plate convergence (subduction) beginning in the Jurassic period (about 145 million years ago). Eastward thrusting of the oceanic plate beneath the continental plate resulted in the accretion of materials onto the continental plate. These accreted materials now largely comprise the Coast Ranges. The dominant tectonic structures formed during this time include generally east-dipping thrust and reverse faults.

Beginning in the Cenozoic time period (about 25 to 30 million years ago), the tectonics along the California coast changed to a transpressional regime and right-lateral strike-slip displacements as well as thrusting were superimposed on the earlier structures resulting in the formation of northwest-trending, near-vertical faults comprising the San Andreas Fault System. The northern Coast Ranges were segmented into a series of tectonic blocks separated by major faults including the San Andreas, Hayward, Concord, and Calaveras. Active faults with Holocene movement (last 11,000 years) do not lie within the limits of the site. The site is not mapped within an Alquist-Priolo Earthquake Fault Zone.

3.3 Regional Faulting and Tectonics

Regional transpression has caused uplift and folding of the bedrock units within the Coast Ranges. This structural deformation occurred during periods of tectonic activity that began in the Pliocene and continues today. The site is located in a seismically active region that has experienced periodic, large magnitude earthquakes during historic times. This seismic activity appears to be largely controlled by displacement between the Pacific and North American crustal plates, separated by the San Andreas Fault zone, and located approximately 40 miles (64.4 km) southwest of the site. This plate displacement produced regional strain that is concentrated along major faults of the San Andreas Fault System including the San Andreas, Hayward, Concord, and Calaveras faults in this area. The site location relative to active and potentially active faults in the San Francisco Bay Area is shown on Plate 4, *Regional Fault Map*.

The Working Group on California Earthquake Probabilities (WGCEP, 2015), in conjunction with the United States Geological Survey (USGS), has evaluated the probabilities of significant earthquakes occurring in the Bay Area over the next 30 years. The WGCEP report indicates that there is a 72 percent probability that at least one magnitude (M) 6.7 or greater earthquake will occur in the San Francisco Bay region before 2045. This probability is an aggregate value that considers seven principal Bay Area fault systems and unknown faults (background values).

4.0 SUBSURFACE CONDITIONS

4.1 Subsurface Soil Conditions

During our subsurface exploration program, we investigated the subsurface soils and evaluated soil conditions to a maximum depth of about 45 feet as performed for this study. From our field exploration and collected data, we conclude that where explored, the site below the topsoil in our borings is underlain by alluvial soils generally consisting of medium stiff to hard, lean and sandy clay to the maximum depth explored, with a 5 to 8-foot thick layer of loose to medium dense, poorly graded sand with a variable amount of clay generally encountered in between 12 and 22 feet, with the layer encountered in Boring B-2 between depths of 25 and 32 feet.

The test results of near-surface soil samples within the upper five feet of the soil profile, collected from Borings B-1 and B-2 indicated measured Liquid Limits of 45 and 33 and corresponding Plasticity Indices of 29 and 18 respectively. Based on these results, the near-surface soils are considered to have a medium to high plasticity and a low to moderate expansion (shrink/swell) potential.

Older borings advanced by Kleinfelder West in 2010 at the synthetic turf field northwest of the study area encountered alluvial soils of different composition, consisting of a 5-foot thick surficial layer of fat clay, underlain by medium dense silty sand to stiff sandy silt to the maximum depth explored of 16.5 feet.

Our general interpretation of the subsurface soil conditions across the study site based on the borings is presented in Plate 5, *Schematic Geologic Cross Section A-A'*. Additional details of materials encountered in the exploratory borings, including laboratory test results, are included in the boring logs in Appendix A, and laboratory test summaries are presented in Appendix B.

4.2 Groundwater Conditions

Groundwater was encountered in our Boring B-2 at a measured depth of 42 feet after drilling, corresponding to approximate Elevation +77 feet. No groundwater was encountered in any of our other borings, which were drilled to a maximum depths of 16 to 30 feet. Borings drilled on the school site by Kleinfelder in 2010 were less than about 16 feet in depth and did not encounter groundwater. The historical high (i.e., shallowest) groundwater depth is estimated to be on the order of 30 feet at the project site based on a groundwater contour map presented in the *Seismic Hazard Zone Report for the Honker Bay 7.5-minute Quadrangle* (CGS, 2019).

We note that the borings may not have been left open for a sufficient period of time to establish equilibrium groundwater conditions. Groundwater levels can vary in response to time of year, variations in seasonal rainfall, well pumping, irrigation, and alterations to site drainage. A detailed investigation of local groundwater conditions was not performed and is beyond the scope of this study.

5.0 GEOLOGIC HAZARDS

5.1 Seismic Induced Hazards

Seismic hazards resulting from the effects of an earthquake generally include ground shaking, liquefaction, lateral spreading, dynamic settlement (densification), fault ground rupture and fault creep, seismic slope failure, and less commonly, tsunamis and seiches. The site is not necessarily impacted by all of these potential seismic hazards. Applicable potential seismic hazards are discussed and evaluated in the following sections in relation to the planned construction.

5.1.1 Ground Shaking

The site will likely experience moderate to strong ground shaking from a major earthquake originating from a number of significant faults in the greater San Francisco Bay Area, including the San Andreas, Hayward-Rodgers Creek, Calaveras, and Concord-Green Valley faults. Earthquake intensities vary throughout the greater Bay Area depending upon the magnitude of the earthquake, the distance of the site from the causative fault, the type of materials underlying the site and other factors.

In addition to shaking of the structures, strong ground shaking can induce other related phenomena that may have an effect on structures, such as liquefaction and dynamic densification settlement.

5.1.2 Liquefaction Induced Phenomena

The site has been mapped by the USGS and William Lettis & Associates in corporation with the CGS as being located primarily within a zone of low liquefaction potential (see attached Plate 6, *Seismic Hazards Map*). The eastern most edge of the site that borders Kirker Creek is mapped within a liquefaction area.

Research and historical data indicate that soil liquefaction generally occurs in saturated, loose granular soil (primarily fine to medium-grained, clean sand deposits) during or after strong seismic ground shaking and is typified by a loss of shear strength in the affected soil layer, thereby causing the soil to flow as a liquid. However, because of the higher inter-granular pressure of the soil at greater depths, the potential for liquefaction is generally limited to the upper 40 to 50 feet of the soil. Potential hazards associated with soil liquefaction below or near a structure include loss of foundation support, lateral spreading, sand boils, and areal and differential settlement.

Lateral spreading is lateral ground movement, with some vertical component, as a result of liquefaction. The soil

literally rides on top of the liquefied layer. Lateral spreading can occur on relatively flat sites with slopes less than 2% under certain circumstances. Lateral spreading can cause ground cracking and settlement.

The soils encountered in our subsurface investigation indicated the presence of loose to medium dense, granular sands with some fines between depths of 25 and 32 feet in Boring B-2. Additionally, layers of potentially liquefiable granular materials between 5 and 6.5 feet thick were encountered in Borings B-1 and B-3 through B-6. To further quantify the potential hazard, a liquefaction analysis of these soils was conducted.

The initiation of liquefaction settlement occurs as a result of seismic shaking, the magnitude of settlement increasing with increasing site ground accelerations. The 2016 CBC specifies that that Peak Ground Acceleration (PGA_M) as defined in the CBC be used for liquefaction and other seismic analyses. This resulted in a PGA used in our analysis of 0.55 g. We also used a Modal Magnitude of 6.7 applicable to the San Andreas Fault. A historic groundwater depth of 30 feet was assumed for analysis. A Factor-of-Safety (FS) of 1.3 was assumed to initiate dynamic settlement.

We utilized the software LiquefyPro, Version 5 (CivilTech Software, 2011) to perform our liquefaction analysis for our borings. LiquefyPro calculates seismic settlement due to liquefaction of saturated granular soils, as well as dynamic settlement of unsaturated clean sands, as discussed in Section 5.1.2 of this report. The following Table 1 presents a summary of our analysis results. Calculation graphic printouts of our analyses are presented in Appendix C of this report.

Our analysis results indicate that using a historic high groundwater depth of 30 feet, a liquefaction settlement of about 1¼ inches was calculated to occur in one of the six borings (B-2), occurring between a depth of between 30 and 32 feet.

Table 1: Summary of Liquefaction Settlement Analysis Results

Boring No.	Calculated Liquefaction Settlement (inches)	Calculated Dynamic Compaction Settlement (inches)	Calculated Total Seismic Settlement (inches)
B-1*	0.0	0.17+	0.17+
B-2	1.24	0.70	1.94
B-3**	0.0	0.36+	0.36+
B-4*	0.0	0.23+	0.23+
B-5*	0.0	0.17+	0.17+
B-6*	0.0	0.03+	0.03+

* Bottom of boring did not extend below the potential liquefaction zone/** Liquefiable layer extends below bottom of boring

In our opinion, based on available information, the site is not considered to be significantly susceptible to lateral spreading. The closest open slope face to the site is that of the Kirker Creek channel, which is on the order of 50 feet southeast of the project site at its closest point, and estimated to be 15 to 20 feet deep. However, the lack of significant potential liquefaction at the site due to the relatively deep groundwater table (i.e., exceeding 30 feet) suggests the potential for lateral spreading toward the adjacent open creek channel to be very low.

5.1.3 Dynamic Densification (Settlement)

Dynamic densification or settlement is a process in which unsaturated, relatively clean sands and silts are densified by the vibratory motion of a strong seismic event. The soils encountered during our exploration above the estimated historic high groundwater table generally consisted of medium stiff to very stiff clays, with a lesser extent of loose to medium dense sands, of variable fines content. Potential dynamic settlement induced by a design earthquake was also calculated by LiquefyPro as part of our liquefaction evaluation, as discussed in Section 5.1.2. Calculated dynamic settlement results, based on the assumption of clean sands, are shown on Table 1, and for the six borings ranged from near zero to on the order of 0.7 inches. Since many of the encountered sandy soil layers was found to contain variable amounts of clay, actual potential dynamic settlements are estimated to be somewhat lower than the calculated settlement values.

5.1.4 Fault Ground Rupture and Fault Creep

The State of California adopted the Alquist-Priolo Earthquake Fault Zone Act of 1972 (Chapter 7.5, Division 2, Sections 2621 – 2630, California Public Resources Code), which regulates development near active faults for the purpose of preventing surface fault rupture hazards to structures for human occupancy. In accordance with the Alquist-Priolo (A-P) Act, the California Geological Survey established boundary zones, or Earthquake Fault Zones (EFZs), surrounding faults or fault segments judged to be sufficiently active, well-defined, and mapped for some distance. Structures for human occupancy within designated Earthquake Fault Zone boundaries are not permitted unless surface fault rupture and fault creep hazards are adequately addressed in a site-specific evaluation of the development site.

The site is not currently mapped or within a designated EFZ as defined by the State (Hart and Bryant, 1997). The closest EFZs are associated with the Greenville Fault and Concord/Green Valley Fault, as indicated on Plate 4, *Regional Fault Map*. Since the site is not within or near an A-P Earthquake Fault Zone, the potential for fault ground rupture and fault creep hazards are judged to be very low.

5.2 Consolidation Settlement

Consolidation occurs as a result of water being squeezed out from a saturated soil as internal pore water pressures induced by an external load are dissipated over time. As the water moves out from the soil, the solid particles re-align into a more dense configuration with settlement resulting. Consolidation typically occurs as a result of new buildings or fills being placed over them, but consolidation can also occur from groundwater withdrawal. Consolidation of clayey soils is usually a long-term process, where-by the water is squeezed out of the soil matrix with time. Sandier soils consolidate relatively rapidly with an introduction of a load.

Some potentially moderately compressible, medium stiff clay soils were found in the borings. However, these clay soils are not saturated, and are not present to an extent such that applied new building loads or additional new fill placement would induce consolidation of the underlying clays to an extent that would significantly affect the development of relatively lightly loaded school buildings or related structures.

5.3 Expansive Soils

Visual observation and lab results of select samples of the near-surface soils indicated the site soils to generally be of medium to high plasticity and of moderately high expansion potential. In addition, local variation in near-surface soils should also be considered to be possible, as nearby borings by others for the synthetic turf field immediately northwest of the site encountered near-surface fat clays of high expansion potential. Expansive soils may have a moderate impact on the performance of foundations and site flatwork, as expansive soil pressures may develop that can manifest primarily as seasonal heaving and settlement effects where soils of locally higher expansion potential may possibly occur onsite. Potentially moderately to highly expansive soil pressures can and should be accounted for in the design of these project elements.

6.0 CONCLUSIONS AND SITE EVALUATION

The following conclusions and preliminary recommendations pertaining to the proposed redevelopment of this site are based upon the analysis of the information gathered during the course of this study and our understanding of the proposed improvements.

6.1 Conclusions

The site is considered to be geotechnically and geologically feasible for potential future development as being considered. The predominant geotechnical and geological issues that potentially impact development of this site are summarized below. Design-level studies for the proposed improvements should address these issues on a location-specific basis, as applicable.

Seismic Ground Shaking – The site is located within a seismically active region and expected to be subjected to moderately strong to very strong ground shaking during the life of new structures. As a minimum, new building designs should consider the effects of seismic activity in accordance with the latest edition of the California Building Code (CBC).

Potential Undocumented Fill Soils - Google Earth historical aerial photography of the site dated December 31, 1938 shows the Kirker Creek stream channel bordering the eastern property boundary to be a serpentine, braided channel that appears to impinge into the lower, northeastern corner of the property, including the eastern border of the northern soccer field. In addition, Boring B-2 drilled in this area encountered clay soils of relatively lower blow counts within the upper 5 to 10 feet of the soil profile as compared to the other borings, suggesting that the near-surface soils in this localized area may be undocumented fill related to the initial grading of the school site, and grading for the present channel of Kirker Creek. Due to the potential presence of undocumented fill soils in this area, soil bearing capacity in this area may be limited without soil improvement; shallow structural footing foundations may require a lower design capacity; or other foundations with lower bearing pressures, such as a structural mat may be required. Alternatively, a minimum setback distance from the top of creek slope for new classroom buildings could also be established.

Seismically-Induced Settlement – Isolated, discontinuous layers of potentially liquefiable granular soils subject to seismic settlements were encountered within the borings explored. As presented in Section 5.1.2, calculated seismic settlements where evaluated using ground shaking criteria specified in the 2016 CBC ranged between essentially zero and 1.9 inches for the design earthquake. The largest settlements (i.e., 1.2 inches for liquefaction

settlement and 0.7 inches for dynamic settlement) were calculated for Boring B-2, located closest to Kirker Creek, and in the aforementioned undocumented fill area of the creek. In other borings conducted for this study, computed settlements were zero for liquefaction settlement, and less than 0.4 inches for potential dynamic settlement. Therefore, seismically-induced settlement, based on our initial analyses, may be a factor for buildings sited in close proximity to the Kirker Creek channel along the eastern boundary of the site, but is not anticipated to be a significant issue affecting building development with increasing distance of any new structures from the creek channel.

Differential Fill Thickness - The rear, northeastern portion of the site, currently occupied by the track and soccer field, is approximately 10 to 12 feet lower than the southwest portion of the site adjacent to Yosemite Avenue. Placement of a significant thickness of fill to raise the grade of the rear of the site, if desired, may result in some immediate and long-term settlement of the filled area. Although such settlement may not be overly significant for relatively small and lightly loaded structures constructed over a uniform thickness of new fill, siting of new school structures should be generally avoided across zones of significant differential fill thickness such as across the boundary of the southwest field and the track area, should filling of the track and soccer field area be ultimately desired.

Expansive Soils – Some of the surficial soils encountered in our explorations as well as adjacent explorations at the synthetic turf field site were found to be moderately to highly expansive. Where such soils are not removed by site grading, measures to accommodate moderately to locally highly expansive soils should be implemented, such as keeping subgrade surfaces moist before placement of concrete or pavement sections; deeper than normal, shallow foundations; use of a non-expansive fill layer below interior floor slabs and exterior flatwork as appropriate; or removal of locally highly expansive soils (i.e., fat clays) if encountered below slabs, or concrete flatwork.

Winter Construction – If grading occurs in the winter rainy season, appropriate erosion control measures will be required and weatherproofing of the building pads, foundation excavations, and/or pavement areas should be considered. Winter rains may also impact foundation excavations and underground utility construction.

Potential geotechnical or geologic issues that are anticipated to not significantly affect future site development are discussed as follows:

Groundwater – Groundwater was encountered during our field exploration at about 42 feet below the existing grade in the 50-foot deep boring, and not encountered in other borings which were drilled to a maximum depth of 30 feet or less. A published small-scale map by CGS (2019) suggests a historic high groundwater depth to be on the order of 30 feet in the eastern portion of the project area, adjacent to Kirker Creek. Groundwater is not expected to be problematic during construction of shallow footing foundations, and shallow site utility excavations, although locally-perched groundwater from surface or near-surface sources should always be considered to be possible.

Consolidation Settlements - Subsurface soils subject to significant consolidation settlements under the relatively light loading of new school or related buildings would typically consist of near-surface, soft to medium stiff, saturated clay soils. Such soils were not encountered in our study, as the encountered soils predominately consisted of granular sandy soils with variable fines contents, or stiff to very stiff cohesive soils such as lean and sandy clays. In addition, the groundwater table is expected to be greater than 30 feet below ground surface. Therefore, potential consolidation settlement is not anticipated to be a significant development issue for the proposed school buildings, except in the aforementioned case of siting a building across a significant differential fill thickness.

6.2 Potential Building Foundation Options

Based on the results of this preliminary study, conventional spread footing foundations and structural mat foundations are considered to be suitable for replacement campus buildings located in this portion of the Hillview Elementary School site, as described in the sections below. Use of deep foundations such as driven piles or Cast-in–Drilled Hole (CIDH, or drilled pier foundations), or shallow foundations bearing on soils with significant underlying soil improvement, are not considered to be required for support of typical new school buildings, with a possible exception for special cases such as new buildings located directly adjacent to Kirker Creek, if so desired by the District, where more detailed study would be required for further evaluation.

6.2.1 Spread Footing Foundations

In general, conventional shallow spread or continuous footing foundations are considered feasible at this site for typical, single-story or two-story wood-frame school buildings not sited in potentially adverse areas or situations as described in Section 6.1. Such footings may be supported on competent native or cut materials or on engineered fill. Foundation embedment may need to be slightly deeper than normal to account for potentially expansive soil effects. Typical allowable dead plus live loads for footings would be in the range of 2,500 to 3,000

pounds per square foot (psf). Detailed footing design recommendations would be developed during the design-level geotechnical study phase of the project.

6.2.2 Structural Mat Foundations

As an alternative to footing foundations, a structural mat foundation system may be used for buildings located in areas susceptible to potential differential settlements such as in close proximity to the northeastern portion of the site adjacent to Kirker Creek, or in areas where a minor differential fill thickness (e.g., not exceeding four feet) may occur. In general, a structural mat foundation would bear on a minimum two to three-foot thick layer of engineered fill to provide uniform subgrade support. Existing subgrade soils may be reworked, as applicable, to engineered fill standards, or as an alternative, a thickened subgrade layer chemically treated with lime-cement may be acceptable as a mat slab subgrade. Specific grading and design details would be developed during the design-level geotechnical study phase of the project.

7.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

The findings and recommendations presented in this site characterization report are valid as of the present time for the development as currently proposed. However, changes in the conditions of the property or adjacent properties may occur with the passage of time, whether by natural processes or the acts of other persons. In addition, changes in applicable or appropriate standards may occur through legislation or the broadening of knowledge. Accordingly the findings and recommendations presented in this report may be invalidated, wholly or in part, by changes outside our control. Therefore, this report is subject to review by Geosphere after a period of five (5) years has elapsed from the date of issuance of this report.

This report was prepared upon your request for our services, and in accordance with currently accepted geotechnical engineering practice. No warranty based on the contents of this report is intended, and none shall be inferred from the statements or opinions expressed herein.

The scope of our services for this report did not include an environmental assessment or investigation for the presence or absence of wetlands or hazardous or toxic materials in the soil, surface water, groundwater or air, on, below or around this site. Any statements within this report or on the attached Plates, logs or records regarding odors noted or other items or conditions observed are for the information of our client only.

8.0 REFERENCES

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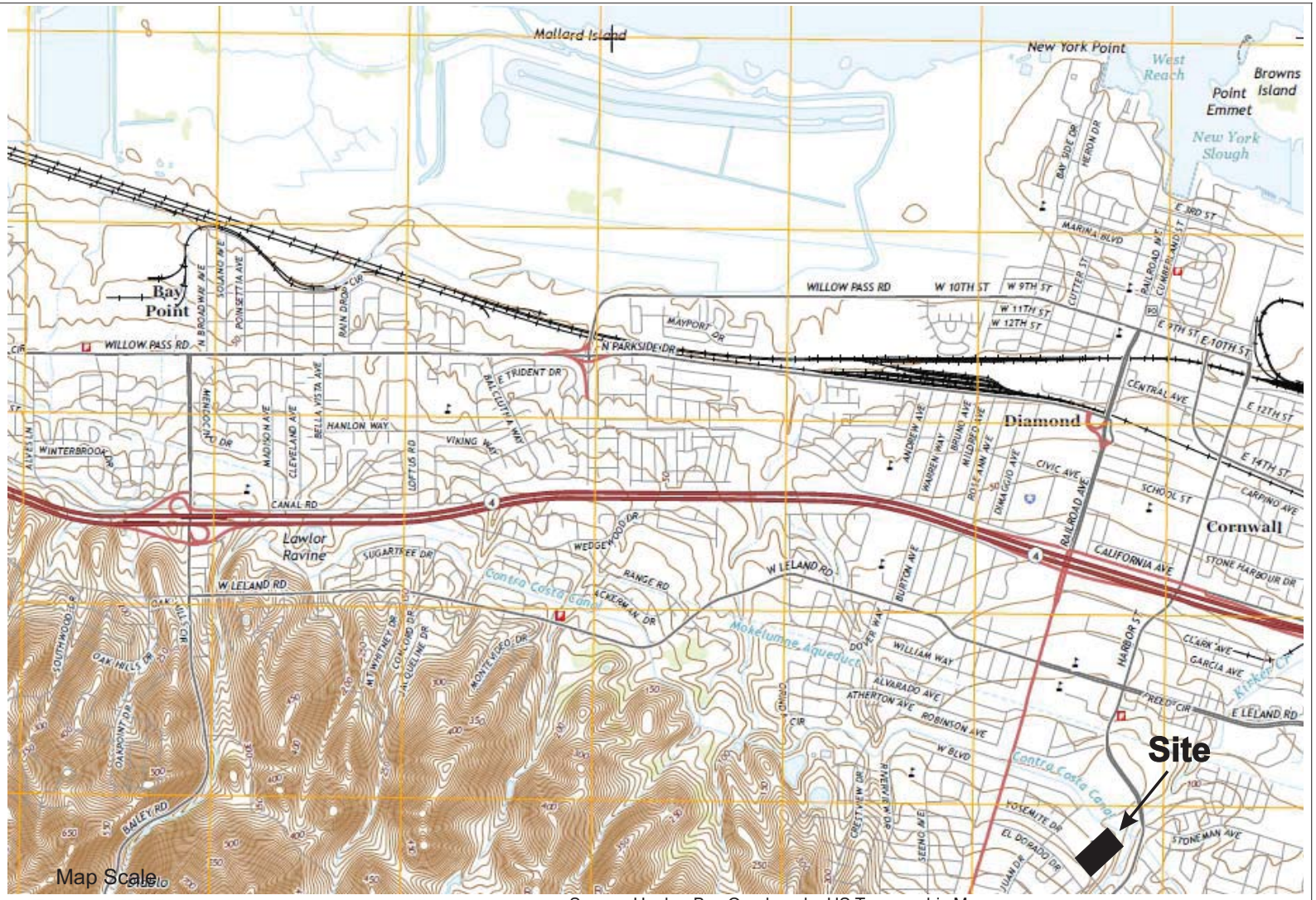
Publications may have been used as general reference and not specifically cited in the report text.

PLATES

Plate 1 - Site Vicinity Map
Plate 2 - Exploration Plan & Site Geology Map
Plate 3 - Regional Geologic Map
Plate 4 - Regional Fault Map
Plate 5 - Schematic Geologic Cross-Section A-A'
Plate 6 – Seismic Hazards Zones Map



CALIFORNIA

QUADRANGLE LOCATION

Map Scale

1 0.5 0 KILOMETERS 1 2

1000 500 0 METERS 1000 2000

1 0.5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET

Source: Honker Bay Quadrangle, US Topographic Map
7.5-Minute Series, United States Geological Survey (2015)

Hillview Junior High School - Campus Improvements 333 Yosemite Drive Pittsburg, California	91-04580-PW	June 2019
Geosphere Consultants, Inc.	Site Vicinity Map	Plate 1

- Approximate Boring Location
- Approximate Area of the Proposed Improvements
- Approximate Old Boring Location Kleinfelder (2010)
- Geologic Cross Sections

N

200 feet
Scale

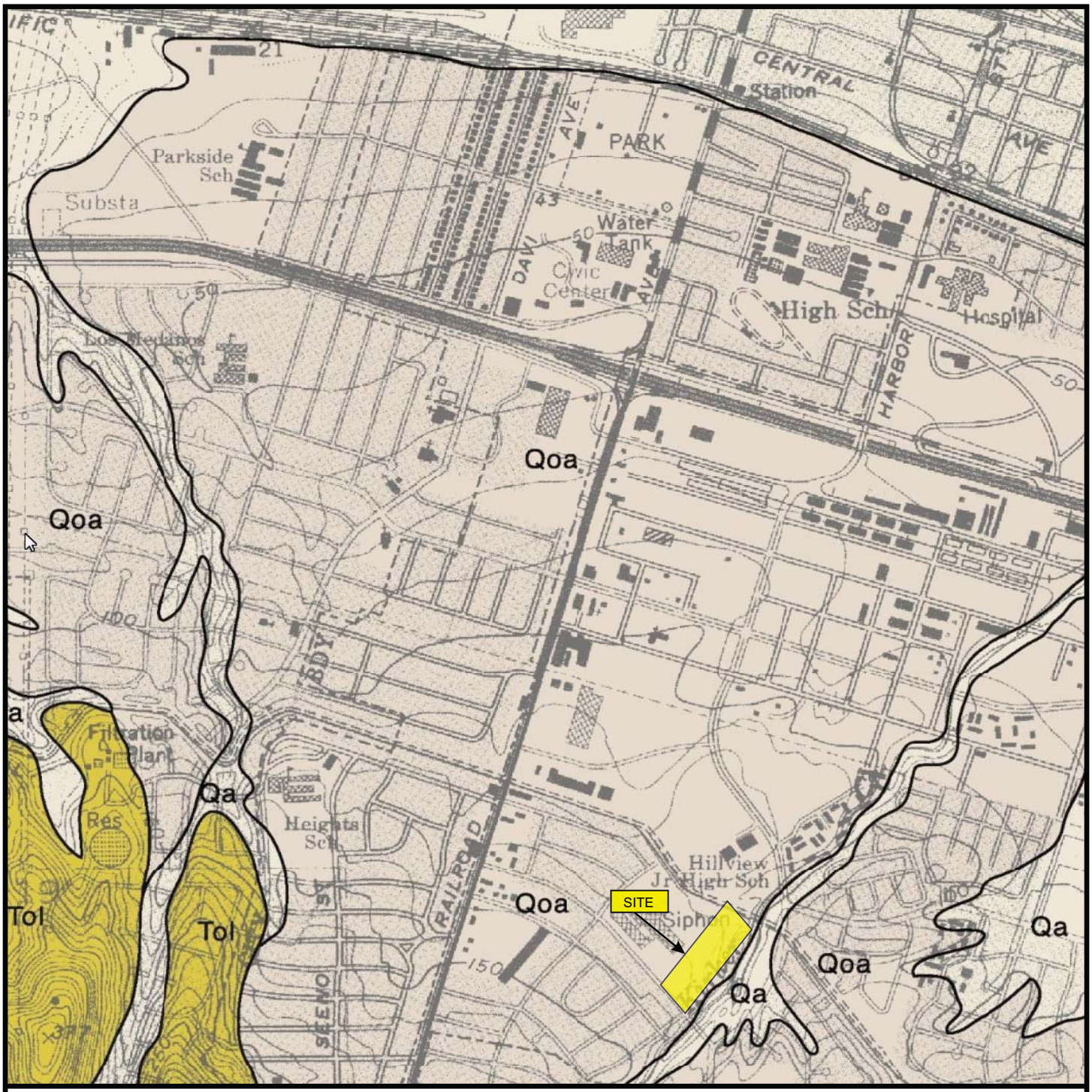
Base map: Google Earth Pro (2019)

Geosphere Consultants, Inc.
AN ATLAS COMPANY
Geotechnical Engineering · Engineering Geology
Environmental Management · Water Resources

Exploration Plan and Site Geology Map

Hillview Junior High School
Campus Improvements
333 Yosemite Drive, Pittsburg, California 94025

91-04580-PW	June 2019	Plate 2



af - Artificial Fill

Qa - Alluvial pebble gravel, sand, clay (Holocene)

Qoa - Alluvial gravel and sand (Pleistocene)

Tol - Pebble Conglomerate (Pliocene/Pleistocene)

USGS Gelogical Survey, Honker Bay Quadrangle 2006.

N

SCALE

1000 0 1000 2000

Feet

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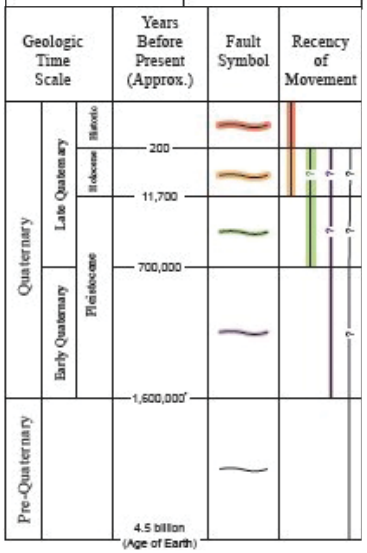
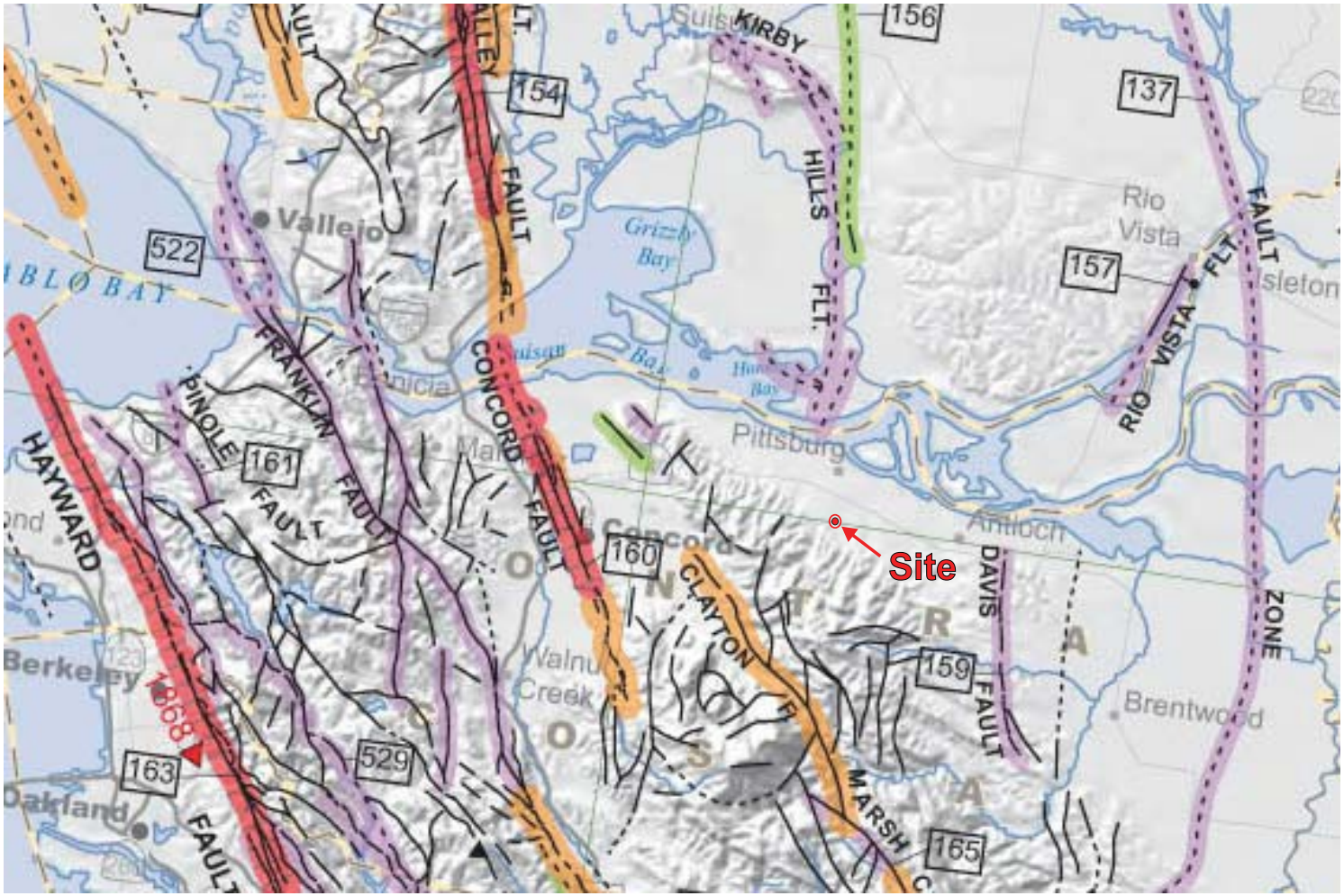
Regional Geologic Map

Hillview Junior High School
Campus Improvements
333 Yosemite Drive, Pittsburg, California 94025

91-04580-PW	June 2019	Plate 3

DESCRIPTION	
ON LAND	OFFSHORE
Displacement during historic time (e.g. San Andreas fault 1906). Includes areas of known fault creep.	
Displacement during Holocene time.	Fault offsets seafloor sediments or strata of Holocene age.
Faults showing evidence of displacement during late Quaternary time.	Fault cuts strata of Late Pleistocene age.
Undivided Quaternary faults - most faults in this category show evidence of displacement during the last 1,600,000 years; possible exceptions are faults which displace rocks of undifferentiated Plio-Pleistocene age.	Fault cuts strata of Quaternary age.
Faults without recognized Quaternary displacement or showing evidence of no displacement during Quaternary time. Not necessarily inactive.	Fault cuts strata of Pliocene or older age.





Scale
1/4" = 1 mi.
0 4 mi.

Base Map Reference: California Geological Survey - 2010 Fault Activity Map of California

Hillview Junior High School Campus Improvements 333 Yosemite Drive, Pittsburg, California 94025	91-04580-PW	June 2019
Geosphere Consultants, Inc.	Regional Fault Map	Plate 4

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2001 Crow Canyon Road
San Ramon, CA

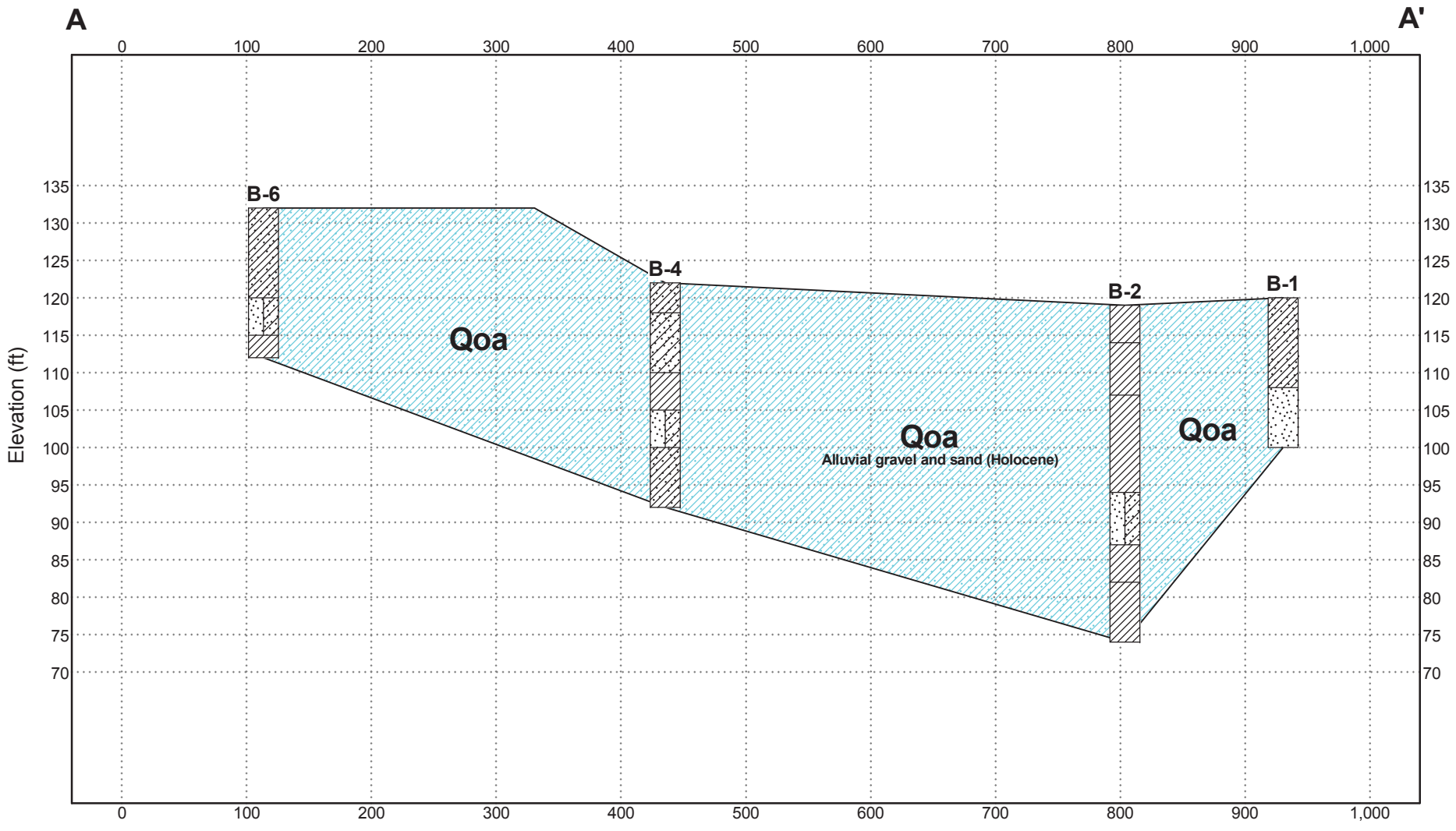
SUBSURFACE DIAGRAM

CLIENT Pittsburg Unified School District

PROJECT NAME Hillview Junior High School

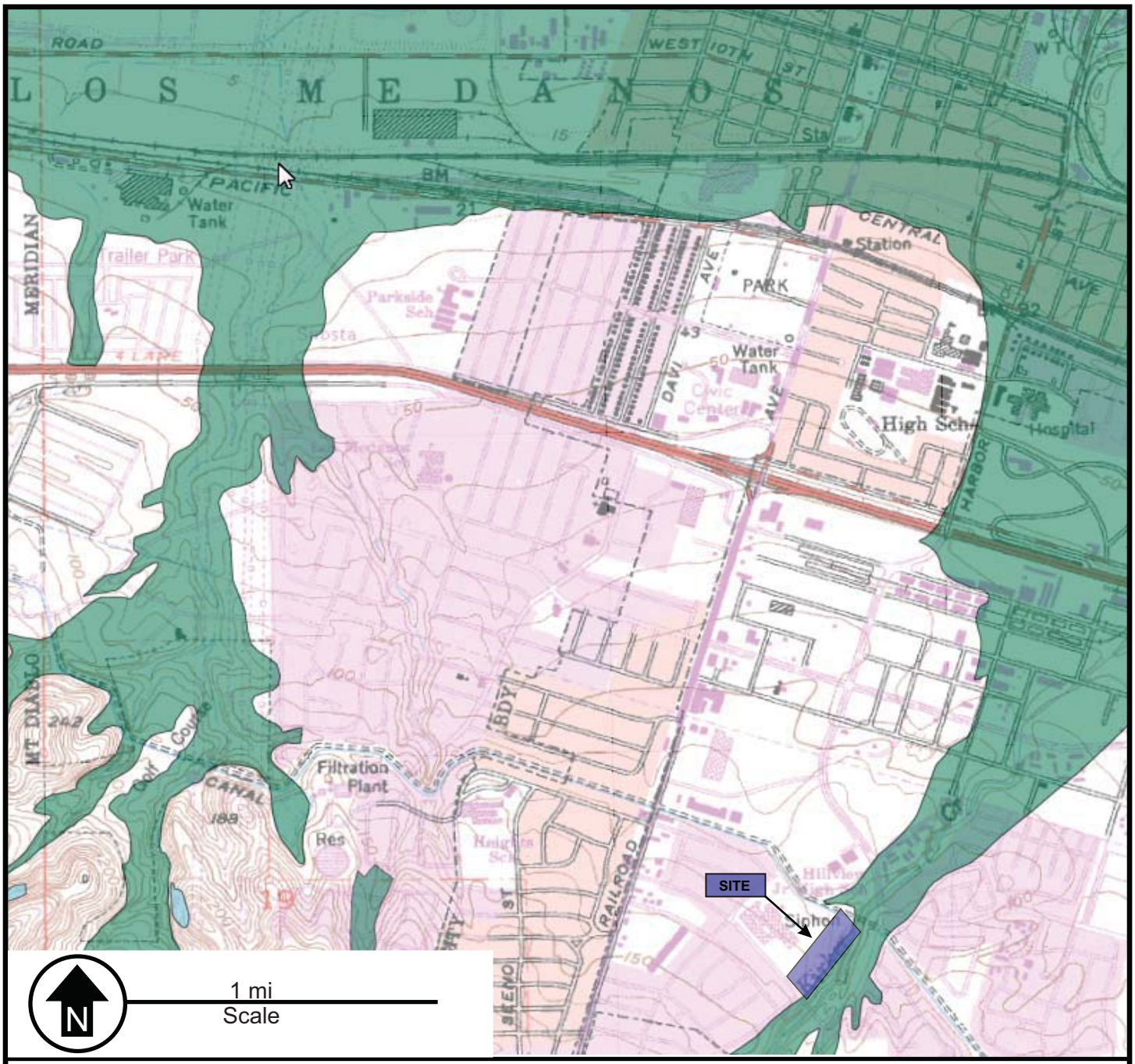
PROJECT NUMBER 91-04580-PW

PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025



SCALE: Horizontal: 1" = 120'
Vertical: 1' = 20'

Schematic Geologic Cross-Section A-A' | Plate 5



MAP EXPLANATION

ALQUIST-PRIOLO EARTHQUAKE FAULT ZONES

Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Active Fault Traces
Faults considered to have been active during Holocene time and to have potential for surface rupture: Solid Line in Black or Red where Accurately Located; Long Dash in Black or Solid Line in Purple where Approximately Located; Short Dash in Black or Solid Line in Orange where Inferred; Dotted Line in Black or Solid Line in Rose where Concealed; Query (?) indicates additional uncertainty. Evidence of historic offset indicated by year of earthquake-associated event or C for displacement caused by fault creep.

SEISMIC HAZARD ZONES

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Earthquake-Induced Landslide Zones
Areas where previous occurrence of landslide movement, or local topographic, geological, geotechnical and subsurface water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

Reference: California Geological Survey - Seismic Hazard Zones Honker Bay Quadrangle (2019)

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Seismic Hazards Zones Map

Hillview Junior High School
Campus Improvements
333 Yosemite Drive, Pittsburg, California 94025

91-04580-PW	June 2019	Plate 6

APPENDIX A

FIELD EXPLORATION
Key to Boring Log Symbols
Boring Logs
Older Boring Logs (Borings B-1 and B-2; Kleinfelder West, Inc., 2010)

UNIFIED SOIL CLASSIFICATION (ASTM D-2487)						
Material Types	**Criteria for Assigning Soil Group Names**			**Group Symbol**	**Soil Group Names**	**Legend**
Coarse Grained Soils	Gravels >50% of Coarse Fraction Passes on No. 4 Sieve	Clean Gravels <5% Fines	Cu≥4 and 1≤Cc≤3	GW	Well-Graded Gravel	
			Cu<4 and/or [Cc<1 or Cc>3]	GP	Poorly-Graded Gravel	
		Gravels with Fines >12% Fines	Fines Classify as ML or MH	GM	Silty Gravel	
>50% Retained on No. 200 Sieve			Fines Classify as CL or CH	GC	Clayey Gravel	
	Sands ≥50% of Coarse Fraction Passes on No. 4 Sieve	Clean Sands <5% Fines	Cu≥6 and 1≤Cc≤3	SW	Well-Graded Sand	
			Cu<6 and/or [Cc<1 or Cc>3]	SP	Poorly-Graded Sand	
		Sands and Fines >12% Fines	Fines Classify as ML or MH	SM	Silty Sand	
			Fines Classify as CL or CH	SC	Clayey Sand	
Fine Grained Soils	Silts and Clays	Inorganic	PI>7 and Plots≥"A" Line	CL	Lean Clay	
			PI<4 and Plots<"A" Line	ML	Silt	
	Liquid Limits<50	Organic	LL (Oven Dried)/LL(Not Dried <0.75)	OL	Organic Silt	
≥50% Passes No. 200 Sieve	Silts and Clays	Inorganic	PI Plots≥"A" Line	CH	Fat Clay	
			PI Plots<"A" Line	MH	Elastic Silt	
	Liquid Limits≥50	Organic	LL (Oven Dried)/LL(Not Dried <0.75)	OH	Organic Clay	
Highly Organic Soils		Primarily Organic Matter, Dark in Color and Organic Odor		PT	Peat	

PENETRATION RESISTANCE (RECORDED AS BLOWS/0.5 FEET)				
SAND AND GRAVEL		SILT AND CLAY		
RELATIVE DENSITY	N-VALUE (BLOWS/FOOT)*	CONSISTENCY	N-VALUE (BLOWS/FOOT)*	COMPRESSIVE STRENGTH
Very Loose	0 - 3	Very Soft	0 - 1	0 - 0.25
Loose	4 - 10	Soft	2 - 4	0.25 - 0.50
Medium Dense	11 - 29	Medium Stiff	5 - 7	0.50 - 1.0
Dense	30 - 49	Stiff	8 - 14	1.0 - 2.0
Very Dense	50 +	Very Stiff	15 - 29	2.0 - 4.0
		Hard	30 +	Over 4.0

SOIL MOISTURE	
DESCRIPTOR	**DESCRIPTION**
Dry	Dry of Standard Proctor Optimum
Damp	Sand Dry
Moist	Near Standard Proctor Optimum
Wet	Wet of Satandard Proctor Optimum
Saturated	Free Water in Sample

PARTICLES SIZES		
COMPONENTS		**SIZE OR SIEVE NUMBER**
Boulders		Over 12 Inches
Cobbles		3 to 12 Inches
Gravels	-Coarse	3/4 to 3 Inches
	-Fine	Number 4 to 3/4 Inch
Sand	-Coarse	Number 10 to Number 4
	-Medium	Number 40 to Number 10
	-Fine	Number 200 to Number 40
Fines (Silt and Clay)		Below Number 200

Grab Bulk Sample

Standard Penetration Test

2.5 Inch Modified California

Shelby Tube

No Recovery

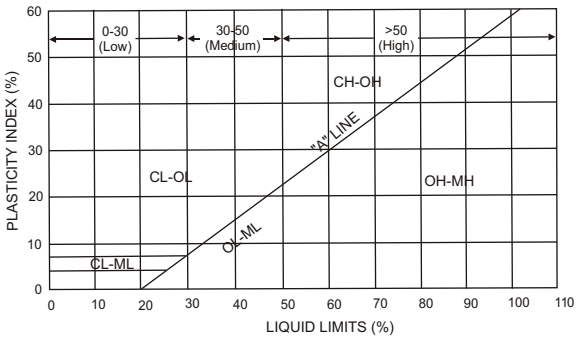
Initial Water Level Reading

Final Water Level Reading

Blow Count
The number of blows of the sampling hammer required to drive the sampler through each of three 6-inch increments. Less than three increments may be reported if more than 50 blows are counted for any increment. The notation 50/5" indicates 50 blows recorded for 5 inches of penetration.

N-Value
Number of blows 140 LB hammer falling 30 inches to drive a 2 inch outside diameter (1-3/8 inch I.D) split barrel sampler the last 12 inches of an 18 inch drive (ASTM-1586 Standard Penetration Test)

PLASTICITY CHART



CU -Consolidated Undrained triaxial test completed. Refer to laboratory results
DS - Results of Direct Shear test in terms of total cohesion (C, KSF) or effective cohesion and friction angles (C', KSF and degrees)
LL - Liquid Limit
PI - Plasticity Index
PP - Pocket Penetrometer test
TV - Torvane Shear Test results in terms of undrained shear strength (KSF)
UC - Unconfined Compression test results in terms of undrained shear strength (KSF)
#200 - Percent passing number 200 sieve
Cu - Coefficient of Uniformity
Cc - Coefficient of Concavity

General Notes

1. The boring locations were determined by pacing, sighting and/or measuring from site features. Locations are approximate. Elevations of borings (if included) were determined by interpolation between plan contours or from another source that will be identified in the report or on the project site plan. The location and elevation of borings should be considered accurate only to the degree implied by the method used.

2. The stratification lines represent the approximate boundary between soil types. The transition may be gradual.

3. Water level readings in the drill holes were recorded at time and under conditions stated on the boring logs. This data has been reviewed and interpretations have been made in the text of this report. However, it must be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, tides, temperature and other factors at the time measurements were made.

4. The boring logs and attached data should only be used in accordance with the report.

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KEY TO EXPLORATORY BORING LOGS

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2001 Crow Canyon Road
San Ramon
Telephone: 9253147173

BORING NUMBER B-1

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School
PROJECT NUMBER 91-04580-PW
PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025
DATE STARTED 4/25/19 **COMPLETED** 4/25/19
GROUND ELEVATION 120 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR H1 Drilling
GROUND WATER LEVELS:
DRILLING METHOD CME-75 Solid Flight Auger
AT TIME OF DRILLING --- No groundwater encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations based on Google Earth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) **SANDY CLAY :** Stiff, dark gray brown, moist.	GB 1-1									
			MC 1-2		3-4-6 (10)	3.7	107	21	45	16	29	
5		Becomes very stiff and brown.	MC 1-3		4-7-10 (17)	2.5	111	20				
10		Becomes yellowish brown.	MC 1-4		5-8-10 (18)	3.7						64
		(SP) **POORLY GRADED SAND :** Medium dense, light brown, moist.										
15			SPT 1-5		5-9-10 (19)							
20			SPT 1-6		10-10-9 (19)							

Bottom of borehole at 20.0 feet.

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BORING NUMBER B-2

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School
PROJECT NUMBER 91-04580-PW
PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025
DATE STARTED 4/25/19 **COMPLETED** 4/25/19
GROUND ELEVATION 119 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR H1 Drilling
GROUND WATER LEVELS:
DRILLING METHOD CME-75 Solid Flight Auger
▽ **AT TIME OF DRILLING** 42.50 ft / Elev 76.50 ft
LOGGED BY AK **CHECKED BY** CD
▼ **AT END OF DRILLING** 42.00 ft / Elev 77.00 ft
NOTES Elevations based on Google Earth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) **LEAN CLAY** : Stiff, dark brown, moist. (possible fill)	GB 2-1									
			MC 2-2		3-3-5 (8)	2.0	104	22				
5			MC 2-3		3-3-5 (8)	2.5	100	21	33	15	18	
		(CL) **LEAN CLAY WITH SAND** : Stiff, brown, moist. (possible fill)	MC 2-4		2-4-5 (9)	1.5	99	23				
10			MC 2-5		3-4-5 (9)	2.0	101	25				
		(CL) **LEAN CLAY** : Medium stiff, dark brown, moist.										
15			SPT 2-6		3-3-4 (7)							
			MC 2-7		8-8-8 (16)	2.0	92	30				
		Becomes very stiff.										
20			MC 2-8		3-5-8 (13)	3.2						
		Becomes stiff.										
25			MC 2-9		4-6-6 (12)							
		(SP-SC) **POORLY GRADED SAND WITH CLAY** : Loose, light orangish brown, moist.	SPT 2-10		3-4-5 (9)							
30			SPT 2-11		4-5-5 (10)							
		(CL) **LEAN CLAY WITH SAND** : Stiff, yellowish brown, moist.										
35			SPT 2-12		4-3-5 (8)							74

(Continued Next Page)

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BORING NUMBER B-2

CLIENT Pittsburg Unified School District **PROJECT NAME** Hillview Junior High School

PROJECT NUMBER 91-04580-PW **PROJECT LOCATION** 333 Yosemite Drive Pittsburg, CA 94025

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
35		(CL) **LEAN CLAY WITH SAND** : Stiff, yellowish brown, moist. *(continued)*										
		(CL) **SANDY CLAY** : Stiff, yellowish brown, moist.										
40			SPT 2-13		6-4-5 (9)							61
		▽										
45		Becomes medium stiff.	SPT 2-14		1-2-3 (5)							

Bottom of borehole at 45.0 feet.

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BORING NUMBER B-3

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School
PROJECT NUMBER 91-04580-PW
PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025
DATE STARTED 4/25/19 **COMPLETED** 4/25/19
GROUND ELEVATION 121 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR H1 Drilling
GROUND WATER LEVELS:
DRILLING METHOD CME-75 Solid Flight Auger
AT TIME OF DRILLING --- No groundwater encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations based on Google Earth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) **LEAN CLAY** : Stiff, dark brown, moist.	GB 3-1									
			MC 3-2		3-5-8 (13)	2.5						
5			MC 3-3		3-4-7 (11)	2.5	101	24				
		(CL) **SANDY LEAN CLAY** : Very stiff, yellowish brown, moist.										
10			MC 3-4		5-8-10 (18)	3.0	111	17				
15		Becomes stiff.	MC 3-5		1-4-6 (10)							
		(SP-SC) **POORLY GRADED SAND WITH CLAY** : Loose, brown, moist.	SPT 3-6		4-4-3 (7)							

Bottom of borehole at 16.5 feet.

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BORING NUMBER B-4

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School
PROJECT NUMBER 91-04580-PW
PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025
DATE STARTED 4/25/19 **COMPLETED** 4/25/19
GROUND ELEVATION 122 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR H1 Drilling
GROUND WATER LEVELS:
DRILLING METHOD CME-75 Solid Flight Auger
AT TIME OF DRILLING --- No groundwater encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations based on Google Earth.
AFTER DRILLING ---

DEPTH (ft)	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0	(CL) **SANDY CLAY** : Very stiff, dark yellow brown, moist.	GB 4-1									
		MC 4-2		3-6-9 (15)	>4.5	114	16				
5	(SC) **CLAYEY SAND** : Medium dense, yellow brown, moist.	MC 4-3		3-6-8 (14)	>4.5	106	13				
10	Becomes loose.	MC 4-4		4-3-5 (8)							12
	Becomes medium dense.	SPT 4-5		5-5-5 (10)							
	(CL) **LEAN CLAY WITH SAND** : Hard, yellowish brown, moist.										
15		SPT 4-6		6-17-18 (35)							
	(SP-SC) **POORLY GRADED SAND WITH CLAY** : Medium dense, light brown, moist.										
20		SPT 4-7		10-14-14 (28)							
	(CL) **SANDY CLAY** : Hard, yellowish brown, moist.										
25		SPT 4-8		12-15-16 (31)							
30	Becomes very stiff.	SPT 4-9		6-9-10 (19)							

Bottom of borehole at 30.0 feet.

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BORING NUMBER B-5

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School
PROJECT NUMBER 91-04580-PW
PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025
DATE STARTED 4/25/19 **COMPLETED** 4/25/19
GROUND ELEVATION 134 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR H1 Drilling
GROUND WATER LEVELS:
DRILLING METHOD CME-75 Solid Flight Auger
AT TIME OF DRILLING --- No groundwater encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations based on Google Earth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) **SANDY CLAY :** Stiff, yellowish brown, moist, with roots.	GB 5-1									
			MC 5-2		4-6-7 (13)	3.0	108	19				
5			MC 5-3		3-7-7 (14)	>4.5						
10		Becomes hard.	MC 5-4		10-15-20 (35)	>4.5						
		(SP) **POORLY GRADED SAND :** Medium dense, light brown, moist.										
15			SPT 5-5		5-6-6 (12)							
		(CL) **SANDY CLAY :** Very stiff, brown with white, moist.										
20			SPT 5-6		6-11-13 (24)							

Bottom of borehole at 20.0 feet.

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BORING NUMBER B-6

CLIENT Pittsburg Unified School District
PROJECT NAME Hillview Junior High School
PROJECT NUMBER 91-04580-PW
PROJECT LOCATION 333 Yosemite Drive Pittsburg, CA 94025
DATE STARTED 4/25/19 **COMPLETED** 4/25/19
GROUND ELEVATION 132 ft **HOLE SIZE** 4"
DRILLING CONTRACTOR H1 Drilling
GROUND WATER LEVELS:
DRILLING METHOD CME-75 Solid Flight Auger
AT TIME OF DRILLING --- No groundwater encountered.
LOGGED BY AK **CHECKED BY** CD
AT END OF DRILLING ---
NOTES Elevations based on Google Earth.
AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	ADJUSTED SPT BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS: LIQUID LIMIT	ATTERBERG LIMITS: PLASTIC LIMIT	ATTERBERG LIMITS: PLASTICITY INDEX	FINES CONTENT (%)
0		(CL) **SANDY CLAY :** Stiff, yellowish brown, moist.	GB 6-1									
			MC 6-2		4-5-8 (13)	>4.5						
5		Becomes very stiff with roots.	MC 6-3		5-8-7 (15)	4.0	110	15				
10			MC 6-4		7-8-12 (20)	>4.5						
15		(SP-SC) **POORLY GRADED SAND WITH CLAY :** Medium dense, light brown, moist.	MC 6-5		13-12-15 (27)							
20		(CL) **LEAN CLAY WITH SAND :** Hard, light brown, moist.	SPT 6-6		17-22-32 (54)							84

Bottom of borehole at 20.0 feet.

Date Completed: 1/8/10
Logged By: A. Elsayed
Total Depth: Approximately 16.5 ft
Drilling method: 6" Solid Stem Auger
Driller: Frontier Drilling
Hammer Wt: 140 lbs., 30" drop
Notes: Grass Field

Depth, ft	FIELD Sample	FIELD Blows/ft	LABORATORY Dry Density pcf	LABORATORY Moisture Content %	LABORATORY Compress. Strength tsf	LABORATORY Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated feet (MSL)**
		26	111	20.0		LL=55; PI=34 UC=7.5ksf	0.8	**SILTY FAT CLAY (CH)** - dark brown, wet, stiff, high plasticity, with trace of tree roots and debris within upper 2 to 3 feet
5		12				Passing -#200=35%		**SILTY SAND with CLAY (SM)** - yellow-brown, moist, medium dense, low plasticity, fine grained sand, trace of tree roots
10		24	102	20.0			2.5	**SANDY SILT (ML)** - yellow-brown, moist, stiff, low to medium plasticity, fine grained sand
15		25						**SILTY SAND (SM)** - yellow-brown, moist, dense, non-plastic, fine grained sand
20								Boring terminated at approx. 16.5 feet below ground surface. Free groundwater was not encountered. Backfilled with lean cement grout.
25								
30								

KLEINFELDER
Bright People. Right Solutions.

PROJECT NO. 108526

LOG OF BORING NO. B1

SYNTHETIC TURF PLAYFIELD, PARKING LOT AND RESTROOM
HILLVIEW JUNIOR HIGH SCHOOL
333 YOSEMITE DRIVE
PITTSBURG, CALIFORNIA

PLATE
A-2

C:\DOCUMENTS AND SETTINGS\AGEKAS\DESKTOP\PWGEO\108526.GPJ

2/12/2010 8:32:43 AM

Date Completed: 1/8/10
Logged By: A. Elsayed
Total Depth: Approximately 16.5 ft
Drilling method: 6" Solid Stem Auger
Driller: Frontier Drilling
Hammer Wt: 140 lbs., 30" drop
Notes: Grass Field

Depth, ft	FIELD: Sample	FIELD: Blows/ft	LABORATORY: Dry Density pcf	LABORATORY: Moisture Content %	LABORATORY: Compress. Strength ksf	LABORATORY: Other Tests	Pen, tsf	DESCRIPTION
								Surface Elevation: **Estimated feet (MSL)**
5		17				K_{20}=4.9x10^{-8} cm/sec	1.5	**SILTY FAT CLAY (CH)** - dark brown, moist, stiff, medium to high plasticity, trace of tree roots and fine grained sand within upper 2 feet
10		18				DS Ø=36 C=0.2ksf		**SILTY SAND with CLAY (SM)** - yellow-brown, moist, medium dense, low plasticity, fine grained sand
		16	115	13				
15		23					3.0	**SANDY SILT (ML)** - red-brown, moist, stiff, low to medium plasticity, fine grained sand
20								Boring terminated at approx. 16.5 feet below ground surface. Free groundwater was not encountered. Backfilled with lean cement grout.
25								
30								

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PROJECT NO. 108526

LOG OF BORING NO. B2

SYNTHETIC TURF PLAYFIELD, PARKING LOT, & RESTROOM
HILLVIEW JUNIOR HIGH SCHOOL
333 YOSEMITE DRIVE
PITTSBURG, CALIFORNIA

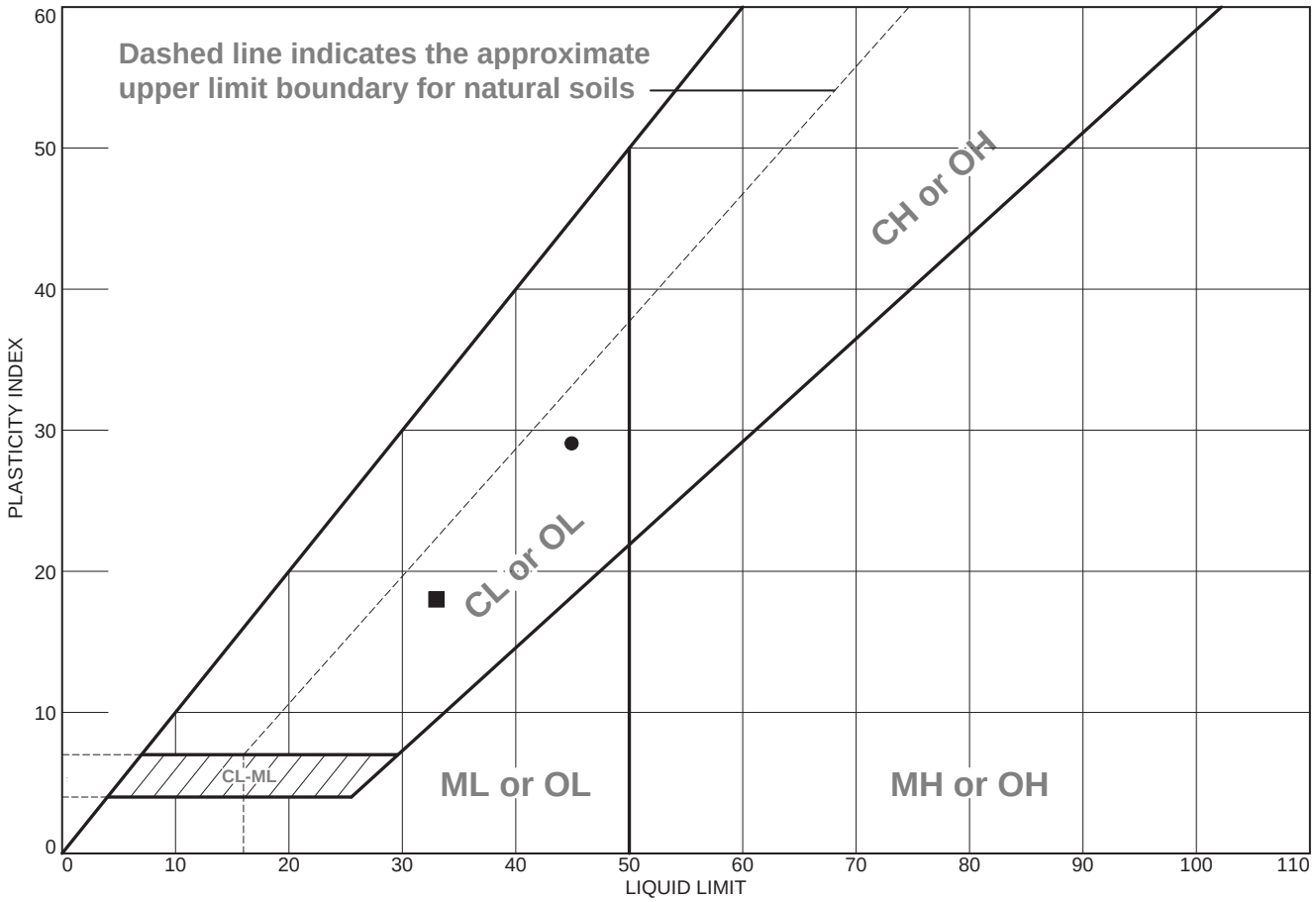
PLATE
A-3

L:\2010\10PROJECTS\108526-HILLVIEW JR HIGH SCHOOL\108526.GPJ
3/18/2010 3:44:41 PM

APPENDIX B

LABORATORY TEST RESULTS
Liquid and Plastic Limits Test Report
Particle Size Distribution Report

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Brown sandy lean CLAY	45	16	29			CL
■	Dark brown lean CLAY	33	15	18			CL

Project No. 91-04580PW **Client:** Geosphere Consultants, Inc

Project: Hillview JHS

●**Source of Sample:** B-1 **Depth:** 2.5' **Sample Number:** 1-2

■**Source of Sample:** B-2 **Depth:** 4.5' **Sample Number:** 2-3

Remarks:

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SoilTesting@aol.com

Figure

Tested By: BH

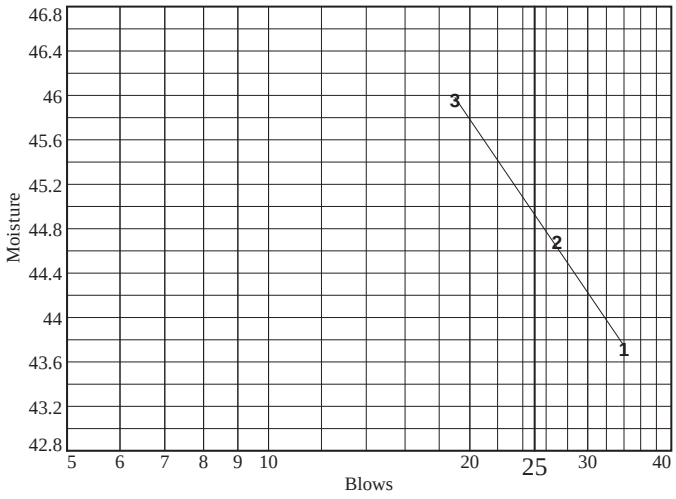
LIQUID AND PLASTIC LIMIT TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-1
Depth: 2.5' **Sample Number:** 1-2
Material Description: Brown sandy lean CLAY
USCS: CL
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	29.17	27.26	30.50			
Dry+Tare	23.71	22.26	24.47			
Tare	11.22	11.07	11.35			
# Blows	34	27	19			
Moisture	43.7	44.7	46.0			



Liquid Limit= 45
Plastic Limit= 16
Plasticity Index= 29
Natural Moisture= 21.1
Liquidity Index= 0.2

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	18.10	17.48			
Dry+Tare	17.15	16.58			
Tare	11.31	11.11			
Moisture	16.3	16.5			

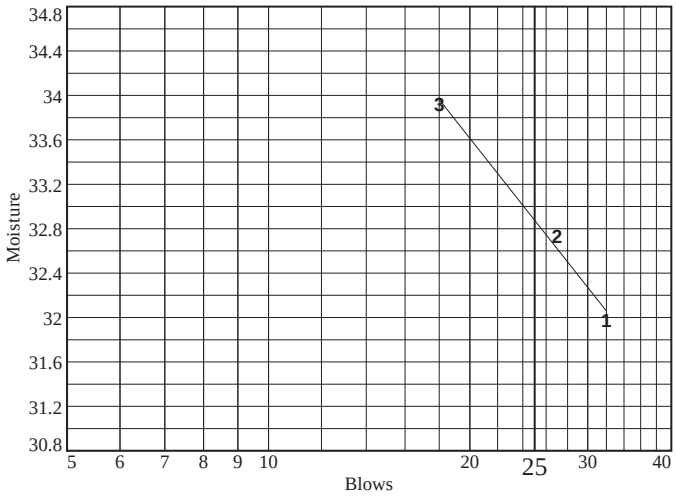
LIQUID AND PLASTIC LIMIT TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-2
Depth: 4.5' **Sample Number:** 2-3
Material Description: Dark brown lean CLAY
USCS: CL
Tested by: BH

Liquid Limit Data

Run No.	1	2	3	4	5	6
Wet+Tare	32.05	28.40	31.52			
Dry+Tare	27.02	24.19	26.39			
Tare	11.29	11.33	11.27			
# Blows	32	27	18			
Moisture	32.0	32.7	33.9			

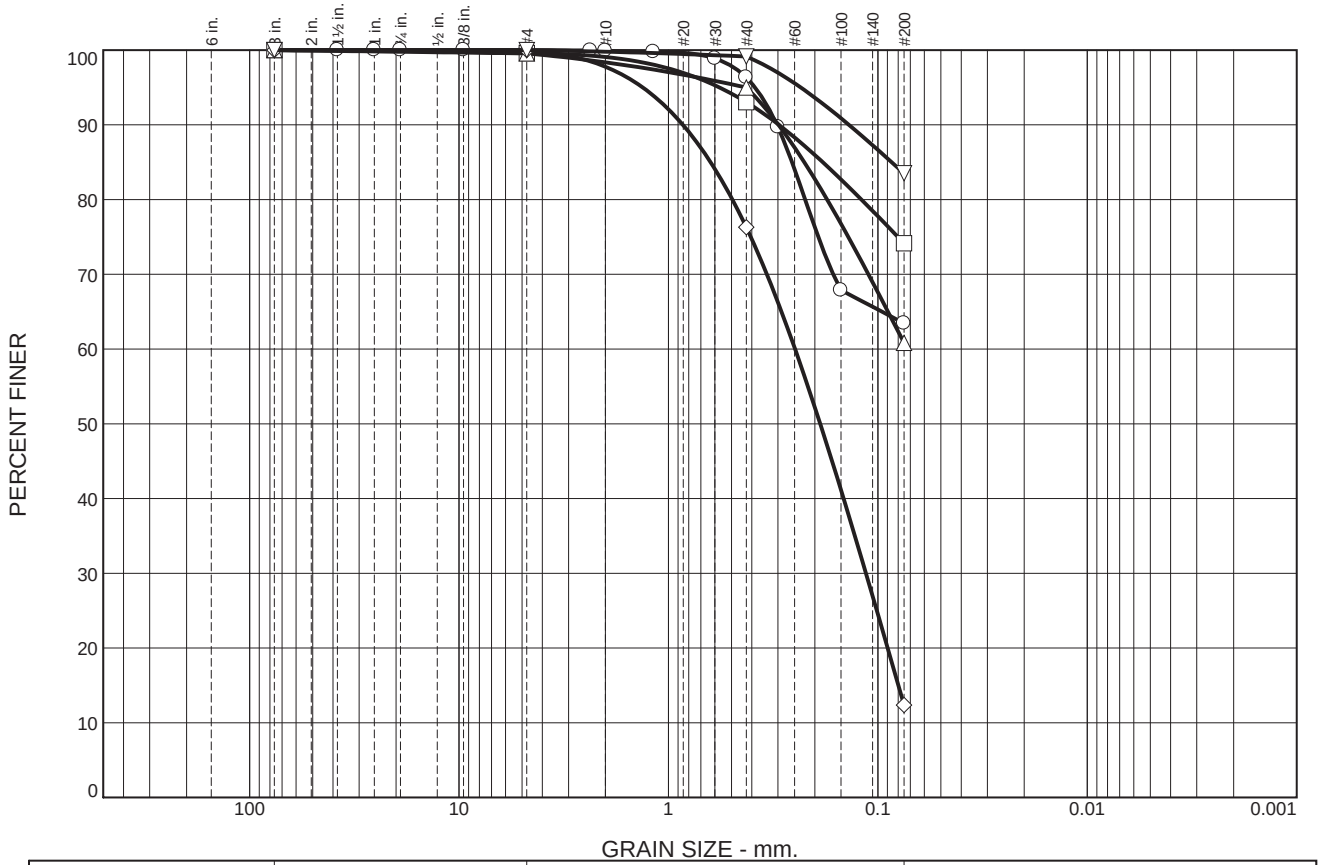


Liquid Limit= 33
Plastic Limit= 15
Plasticity Index= 18
Natural Moisture= 249.5
Liquidity Index= 13.0

Plastic Limit Data

Run No.	1	2	3	4	
Wet+Tare	18.11	17.63			
Dry+Tare	17.20	16.77			
Tare	11.06	11.33			
Moisture	14.8	15.8			

Particle Size Distribution Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	0.0	0.1	3.6	32.8	63.5	
□	0.0	0.1	0.3	0.5	6.1	18.8	74.2	
△	0.0	0.2	0.2	1.2	3.4	34.2	60.8	
◇	0.0	0.0	0.0	2.2	21.5	63.9	12.4	
▽	0.0	0.0	0.0	0.2	0.7	15.6	83.5	

SOIL DATA

SYMBOL	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	B-1	1-4	9.5'	Yellowish brown sandy CLAY	CL
□	B-2	2-12	34.5'	Yellowish brown CLAY with sand	CL
△	B-2	2-13	39.5'	Yellowish brown sandy CLAY	CL
◇	B-4	4-4	9.5'	Yellowish brown clayey SAND	SC
▽	B-6	6-6	19.5'	Yellowish brown CLAY with sand	CL

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Client: Geosphere Consultants, Inc
Project: Hillview JHS

Project No.: 91-04580PW **Figure**

Tested By: BH

GRAIN SIZE DISTRIBUTION TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-1
Depth: 9.5' **Sample Number:** 1-4
Material Description: Yellowish brown sandy CLAY
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
299.30	38.80	0.00	3"	0.00	100.0
			1.5"	0.00	100.0
			1"	0.00	100.0
			3/4"	0.00	100.0
			3/8"	0.00	100.0
			#4	0.00	100.0
			#8	0.15	99.9
			#10	0.24	99.9
			#16	0.64	99.8
			#30	2.94	98.9
			#40	9.56	96.3
			#50	26.83	89.7
			#100	83.67	67.9
			#200	95.21	63.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.1	3.6	32.8	36.5			63.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.2224	0.2571	0.3034	0.3858

Fineness Modulus
0.44

GRAIN SIZE DISTRIBUTION TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-2
Depth: 34.5' **Sample Number:** 2-12
Material Description: Yellowish brown CLAY with sand
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
197.50	33.90	0.00	3"	0.00	100.0
			#4	0.65	99.6
			#40	11.39	93.0
			#200	42.27	74.2

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.1	0.3	0.4	0.5	6.1	18.8	25.4			74.2

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1198	0.1833	0.2969	0.5706

Fineness Modulus
0.35

GRAIN SIZE DISTRIBUTION TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-2
Depth: 39.5' **Sample Number:** 2-13
Material Description: Yellowish brown sandy CLAY
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
198.70	38.10	0.00	3"	0.00	100.0
			#4	0.72	99.6
			#40	8.04	95.0
			#200	62.90	60.8

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.2	0.2	0.4	1.2	3.4	34.2	38.8			60.8

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
								0.1747	0.2246	0.2983	0.4260

Fineness Modulus
0.42

GRAIN SIZE DISTRIBUTION TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-4
Depth: 9.5' **Sample Number:** 4-4
Material Description: Yellowish brown clayey SAND
USCS: SC
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
259.30	38.10	0.00	3"	0.00	100.0
			#4	0.00	100.0
			#40	52.43	76.3
			#200	193.83	12.4

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	2.2	21.5	63.9	87.6			12.4

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
		0.0798	0.0898	0.1140	0.1457	0.1885	0.2485	0.4949	0.6292	0.8530	1.3256

Fineness Modulus
1.16

GRAIN SIZE DISTRIBUTION TEST DATA

5/14/2019

Client: Geosphere Consultants, Inc
Project: Hillview JHS
Project Number: 91-04580PW
Location: B-6
Depth: 19.5' **Sample Number:** 6-6
Material Description: Yellowish brown CLAY with sand
USCS: CL
Tested by: BH

Sieve Test Data

Dry Sample and Tare (grams)	Tare (grams)	Cumulative Pan Tare Weight (grams)	Sieve Opening Size	Cumulative Weight Retained (grams)	Percent Finer
237.10	39.30	0.00	3"	0.00	100.0
			#4	0.00	100.0
			#40	1.69	99.1
			#200	32.60	83.5

Fractional Components

Cobbles	Gravel			Sand				Fines		
	Coarse	Fine	Total	Coarse	Medium	Fine	Total	Silt	Clay	Total
0.0	0.0	0.0	0.0	0.2	0.7	15.6	16.5			83.5

D_5	D_{10}	D_{15}	D_{20}	D_{30}	D_{40}	D_{50}	D_{60}	D_{80}	D_{85}	D_{90}	D_{95}
									0.0859	0.1375	0.2336

Fineness Modulus
0.13

APPENDIX C

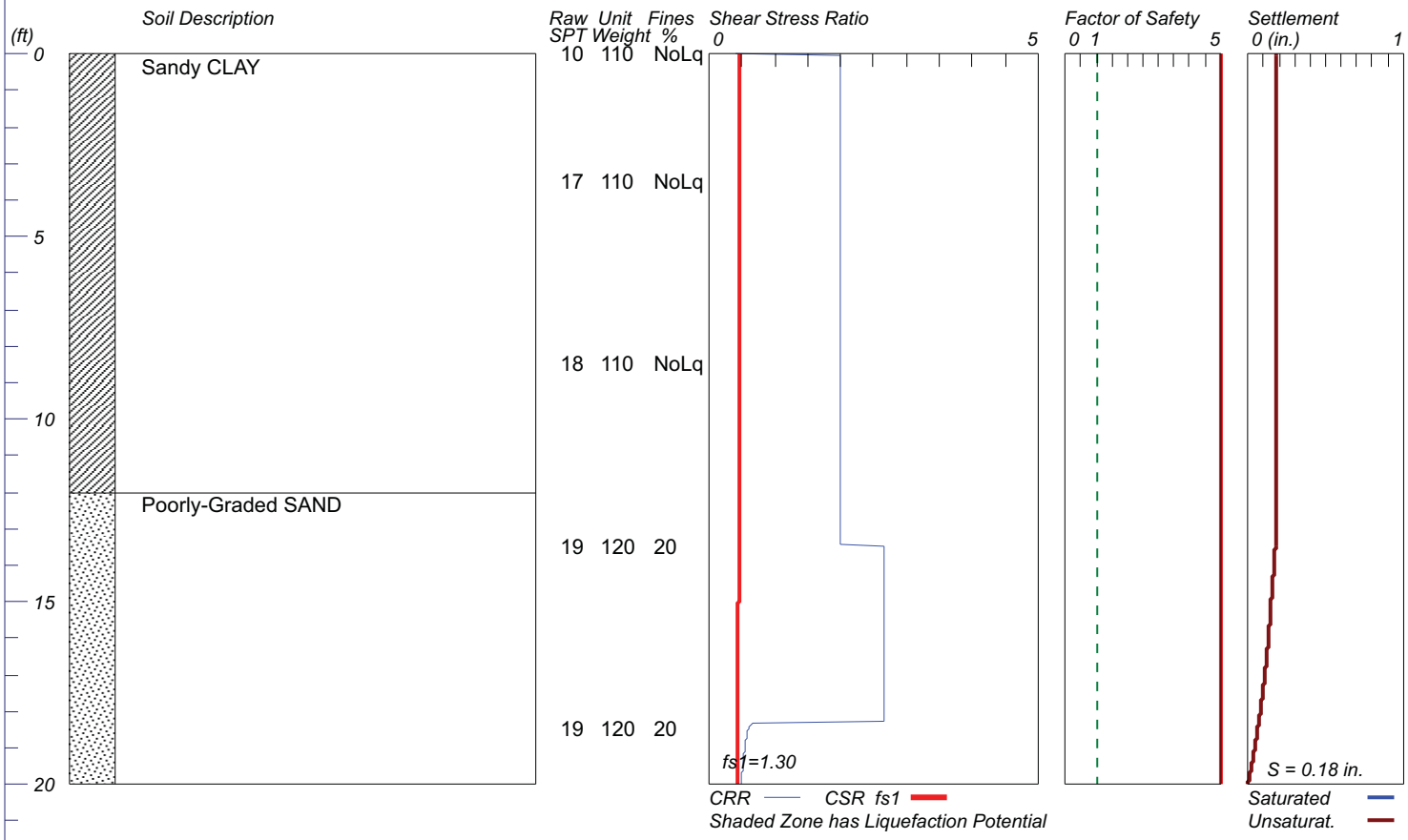
LIQUEFACTION EVALUATION RESULTS

LIQUEFACTION ANALYSIS

Hillview Junior HS

Hole No.=B-1 Surface Elev.=120

Magnitude=6.7
Acceleration=0.55g

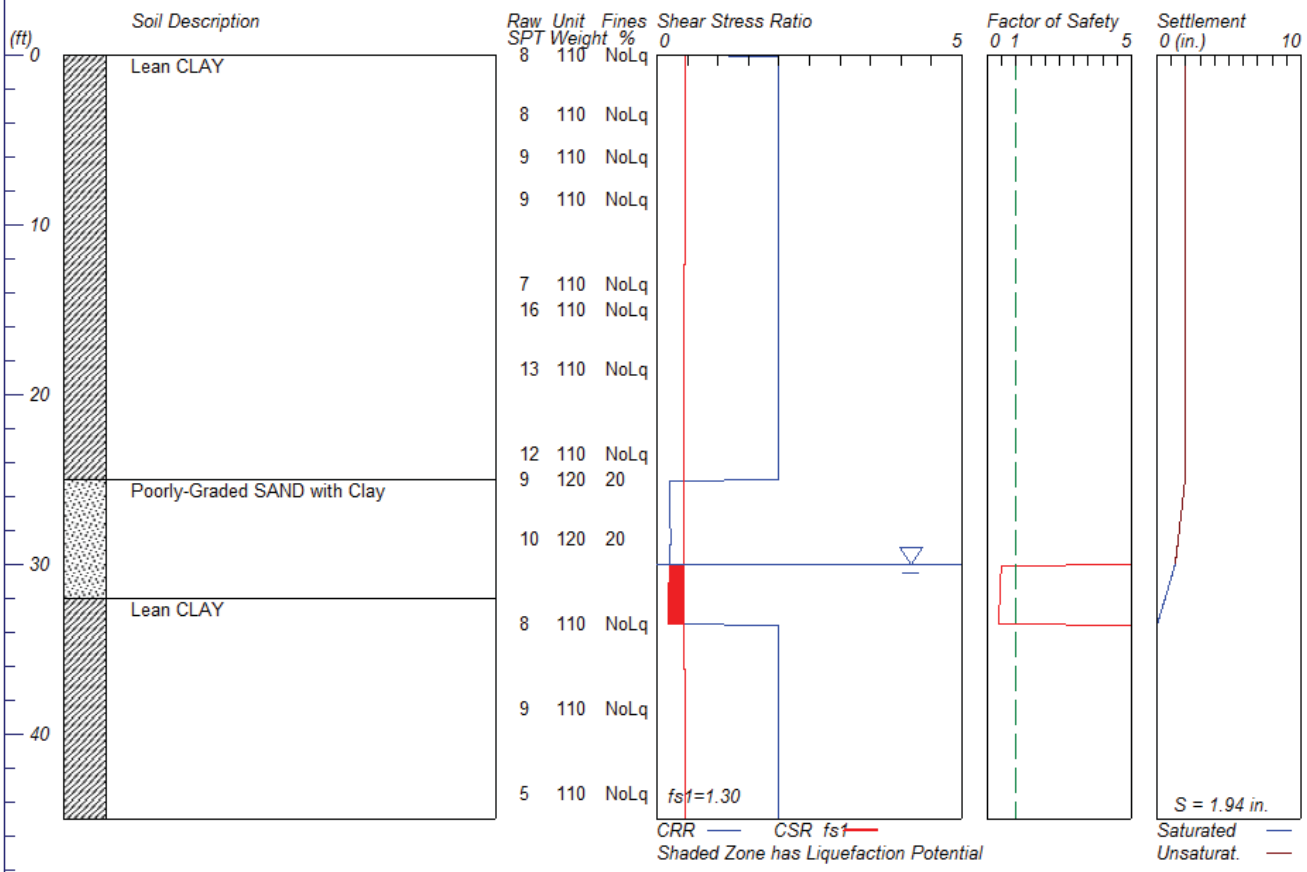


LIQUEFACTION ANALYSIS

Hillview Junior HS

Hole No.=B-2 Water Depth=30 ft Surface Elev.=119

Magnitude=6.7
Acceleration=0.55g

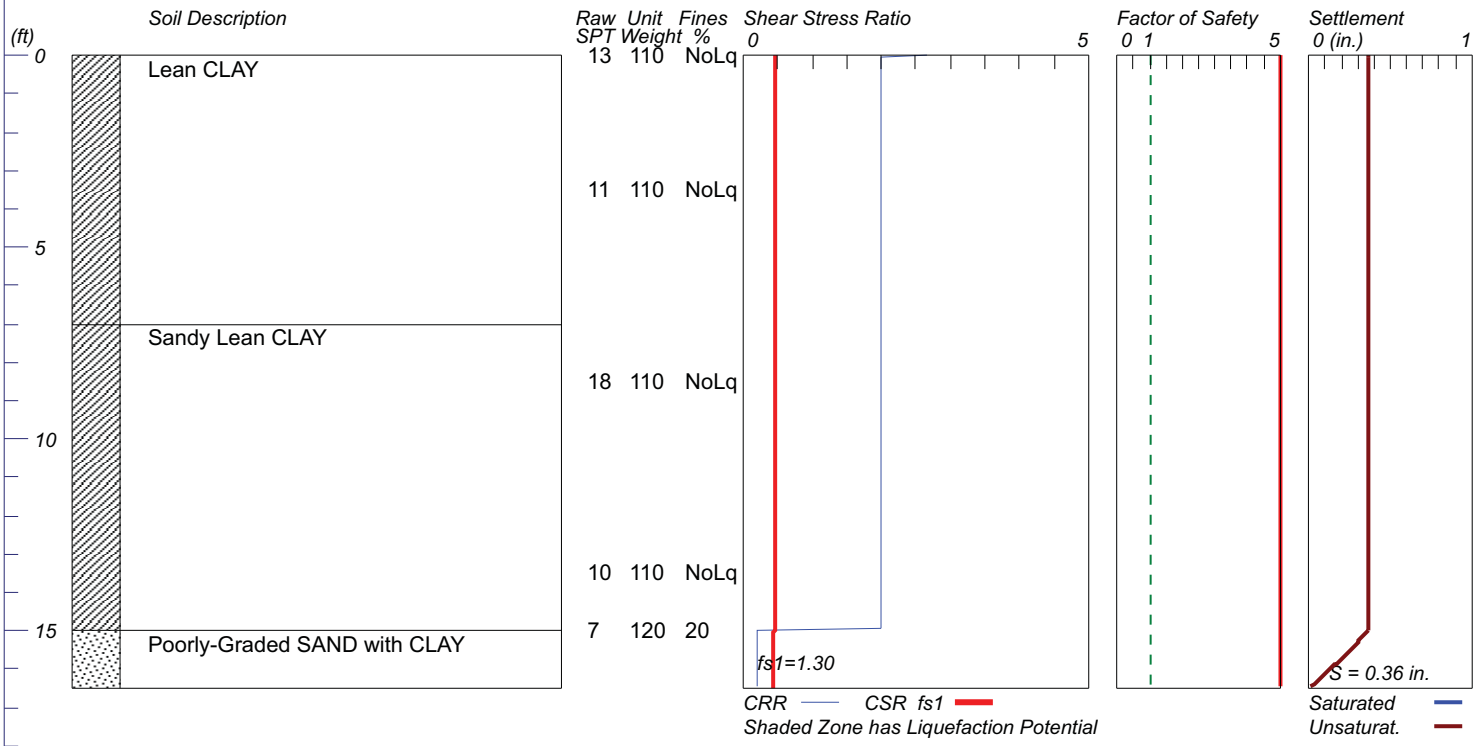


LIQUEFACTION ANALYSIS

Hillview Junior HS

Hole No.=B-3 Water Depth=30 ft Surface Elev.=121

Magnitude=6.7
Acceleration=0.55g

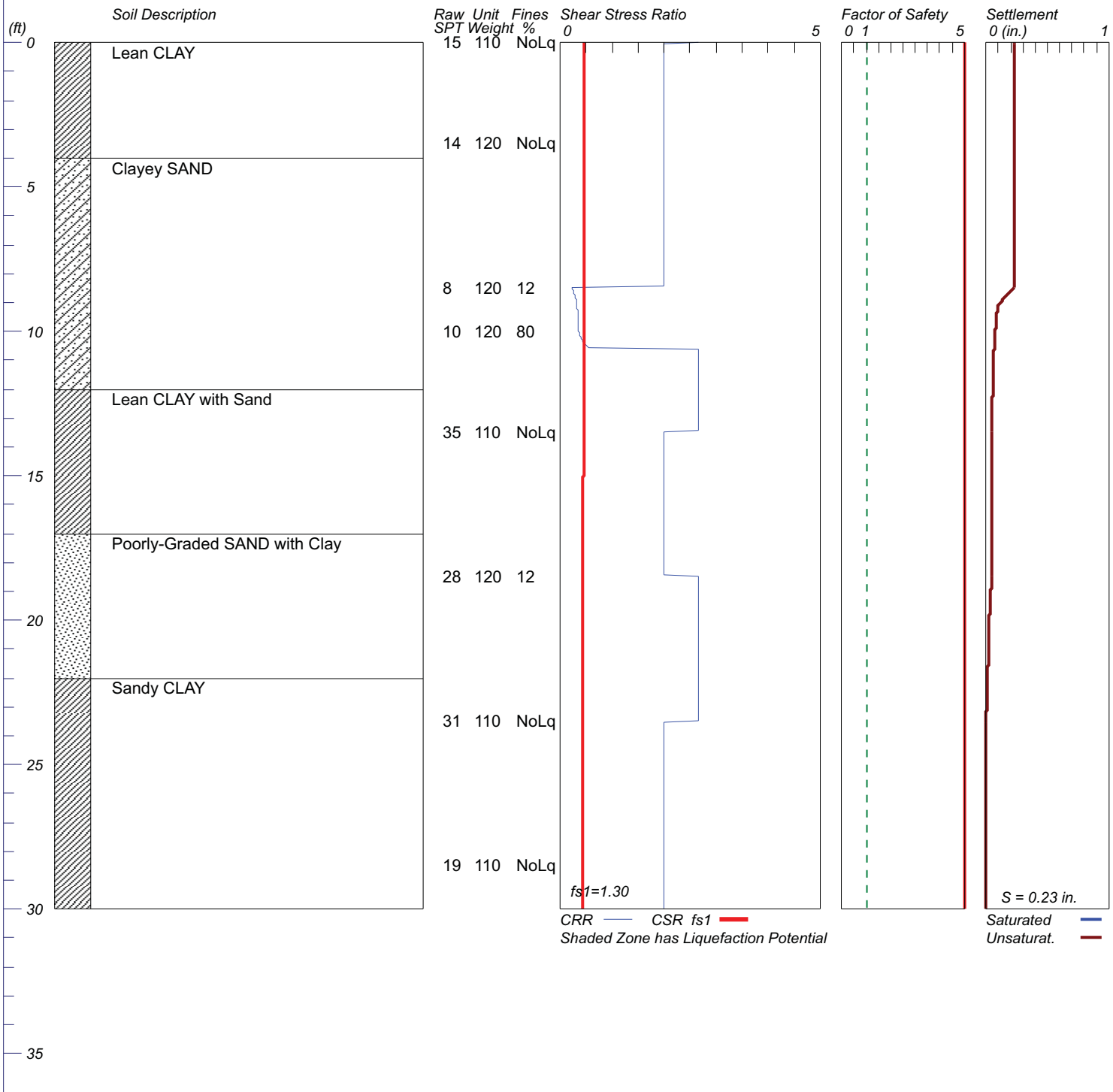


LIQUEFACTION ANALYSIS

Hillview Junior HS

Hole No.=B-4 Surface Elev.=122

Magnitude=6.7
Acceleration=0.55g

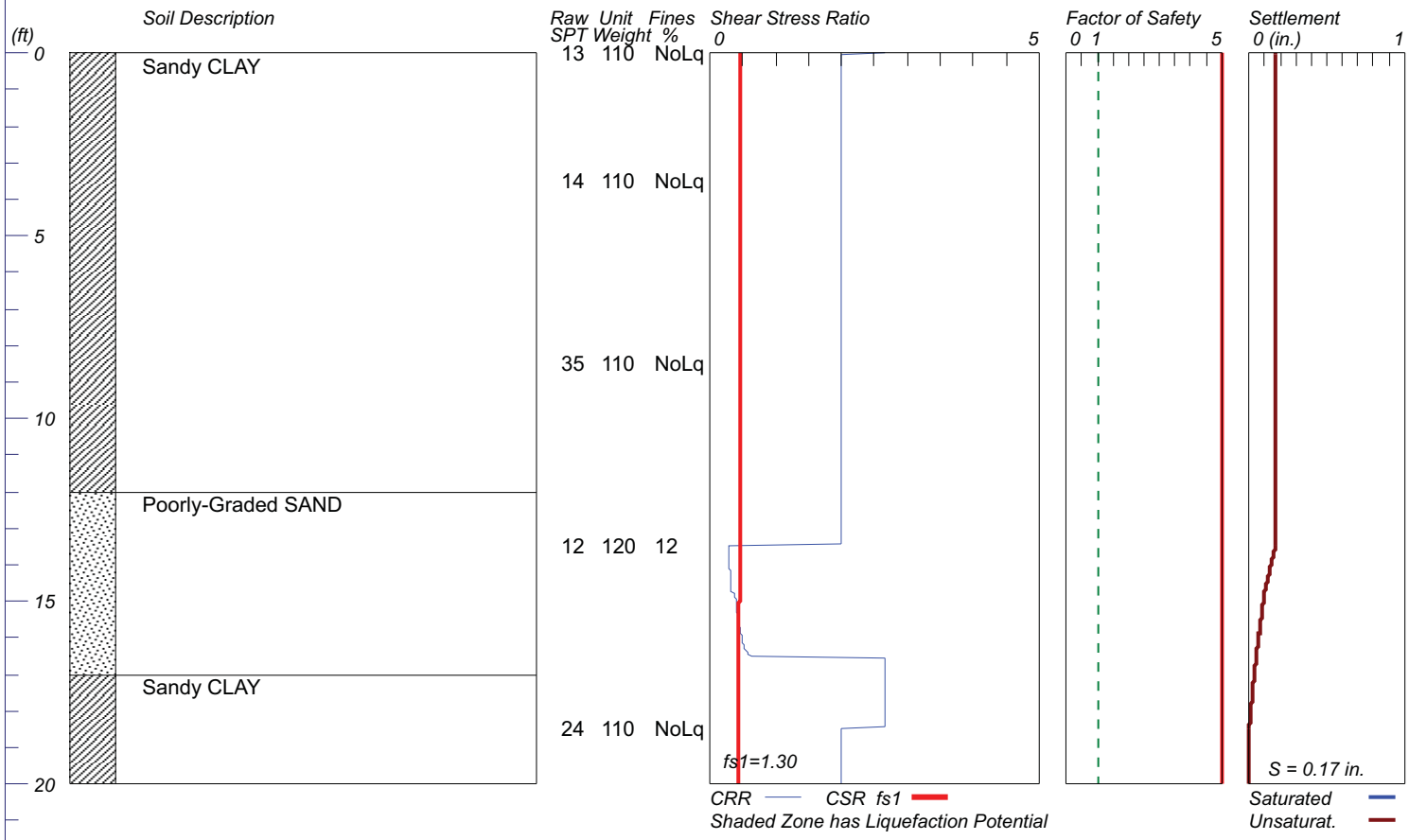


LIQUEFACTION ANALYSIS

Hillview Junior HS

Hole No.=B-5 Surface Elev.=134

Magnitude=6.7
Acceleration=0.55g

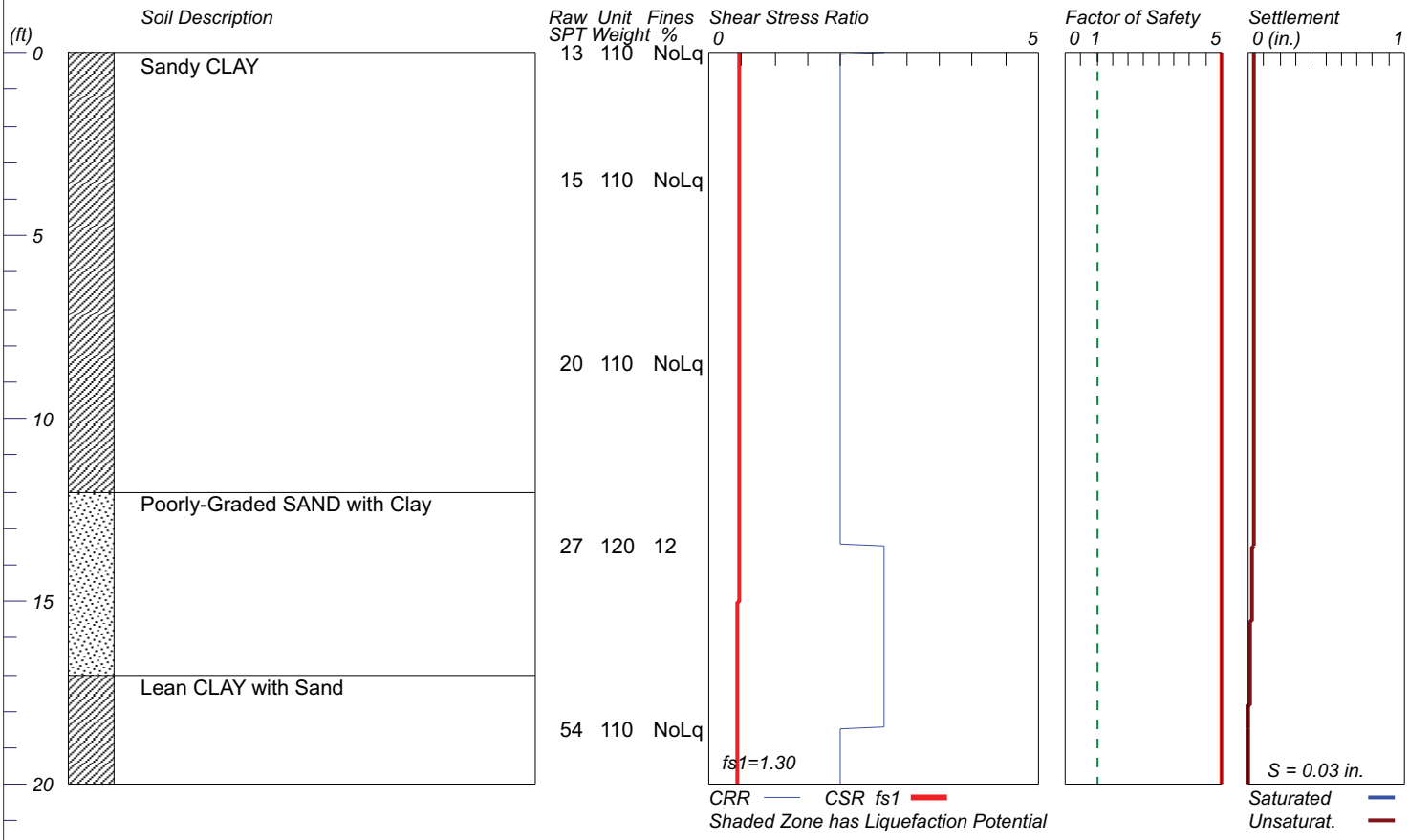


LIQUEFACTION ANALYSIS

Hillview Junior HS

Hole No.=B-6 Surface Elev.=132

Magnitude=6.7
Acceleration=0.55g



PLUM | **architects**

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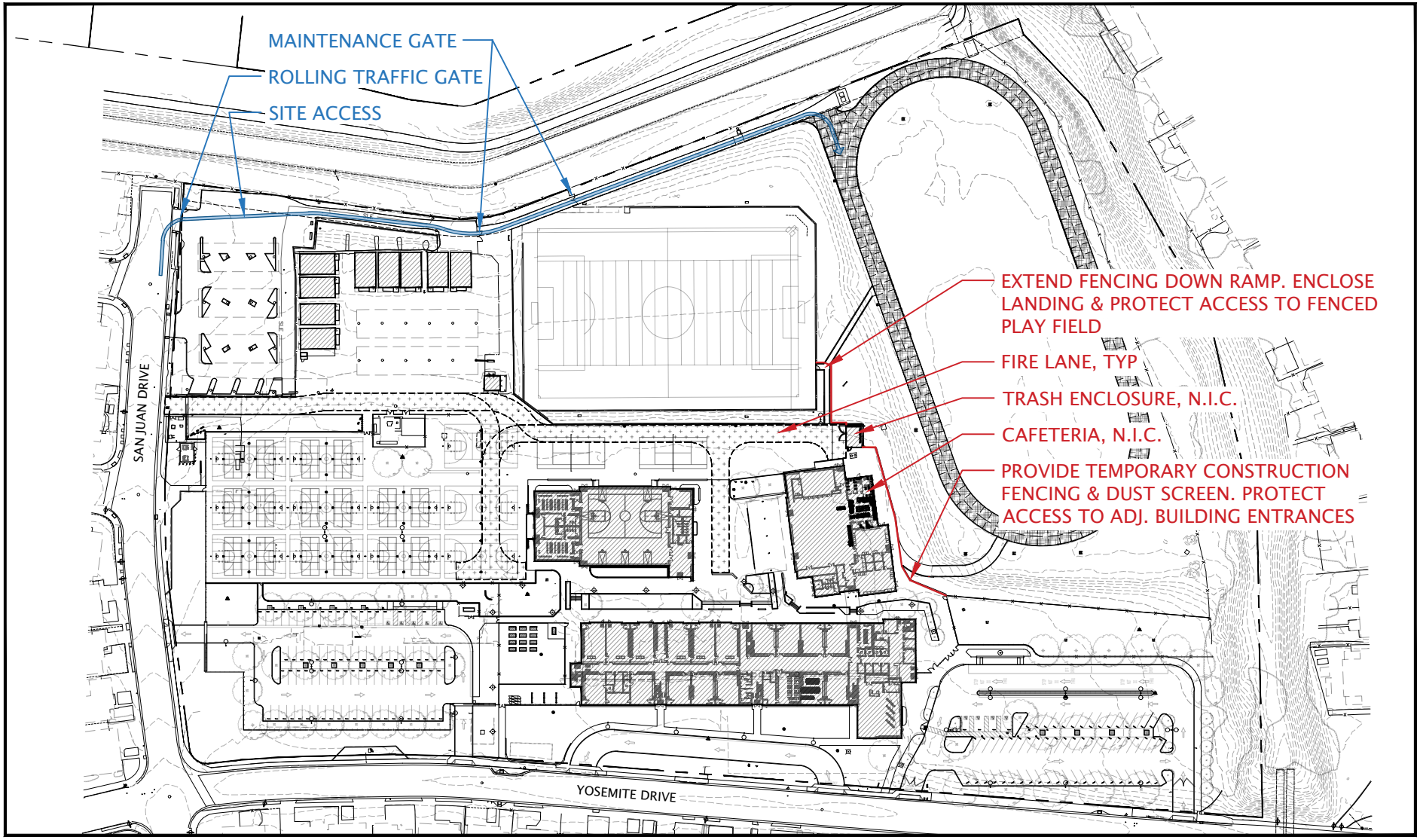
TEL: 415-837-0900

Hillview Junior High School
Track & Field Modernization Project
333 Yosemite Dr, Pittsburg, CA 94565
Pittsburg Unified School District
PUSD PTN No.: 61788-131



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REFERENCE DRAWING: T1
ISSUED VIA: ADDENDUM 01 (6/29/26)
SCALE: N.T.S.

ASK-01

CAD FILE: xsite.dwg

PLUM JOB NO: 2603