Central Area Guideway

Geotechnical Data Report – Phase Two 65% Engineering Design Investigation

December 16, 2008
Issued for Use

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GEOTECHNICAL DATA REPORT – PHASE TWO 65% ENGINEERING DESIGN INVESTIGATION

FOR

65% ENGINEERING DESIGN PHASE

Contract No. S03099

Submitted by: HMM/Bechtel SVRT, a Joint Venture

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1.0 Executive Summary

To supplement the 10% Conceptual Engineering geotechnical program (URS, 2003) and the 35% Preliminary Engineering Central Area Guideway (previously Tunnel Segment) geotechnical investigation program (HMM/Bechtel, 2005a), a Phase 2 (P2) 65% Engineering Design geotechnical investigation was carried out from March of 2007 to January of 2008. The P2 field investigation consisted of 19 boreholes and 25 Cone Penetration Tests intended to cover changes in the alignment, explore deeper strata at the locations of station excavations, and determine additional soil parameters for engineering design. In addition, soil samples were sent to several laboratories for general classification tests as well as for specialty testing needed to collect data required for seismic design, for obtaining additional soil strength data, and for estimating construction behavior of soils.

The results of the pumping test program, together with the associated boring and well information, are documented in a separate Pumping Test Data Report (HMM/Bechtel, 2008).

2.0 Introduction

2.1 Scope of Work

The information contained in this report only covers the results from the 19 boreholes, the 25 CPTs and the associated laboratory test results obtained during the P2 phase of the Project. Additional geotechnical data from the investigations listed below, with the exception of 35% PE Investigation Plan and Profile Drawings, are not included. The scope of this report is limited to presenting factual data without engineering interpretation by the Project. The results from the field and laboratory investigation involved interpretation from HMM/Bechtel subcontractors working under the regulations of the Tunnel Segment Design Quality Plan (HMM/Bechtel, 2007). HMM/Bechtel reviewed the subcontractor's work, but it was the responsibility of the engineer(s) in charge at the respective subcontractor firms to ensure that their work was performed under the normal standard of care in their locale of practice.

Additional SVRT sources of geotechnical data pertinent to the Central Area Guideway can be found in the following reports:

- 10% Conceptual Engineering Geotechnical Exploration Finds and Recommendations report (URS, 2003)
- 35% Preliminary Engineering Review of Available Geotechnical Data report (HMM/Bechtel, 2004)
- 35% Preliminary Engineering Geotechnical Data Report (HMM/Bechtel, 2005a)
- 35% Preliminary Engineering Hydrogeology Report (HMM/Bechtel, 2005b)

These reports also reference additional non-SVRT sources, including reports from public agencies, reports from private projects, and files from local geotechnical consulting companies that contain additional data relevant to the Project.

2.2 Report Organization

Chapter 3 of this report describes details of the field investigation and Chapter 4 describes details of the laboratory testing. Chapter 5 summarizes the results and outlines a tentative future geotechnical investigation program to be carried out prior to construction. The chapter also includes an updated version of the plan and profile drawings that were previously presented in Chapter 8 of the 35% PE Tunnel Segment Geotechnical Data Report (HMM/Bechtel, 2005a), incorporating the new borings and CPTs.

Results of the field investigations are presented in three appendices as follows:

Appendix 1: Logs of Borings

Appendix 2: Cone Penetration Test (CPT) Results

Appendix 3: Seismic Cone Penetration Test (SCPT) Results

Appendix 10: Dissolved Gas Sampling and Analysis Report

Laboratory test results are presented in six appendices as follows:

Appendix 4: Laboratory Classification Test Results

Appendix 5: Cyclic Triaxial Test Results

Appendix 6: Large-Scale Direct Shear Test Results

Appendix 7: Sticky Limit Test Results

Appendix 8: Direct Shear Test Results

Appendix 9: Consolidation and Cyclic Shear Test Results

Appendix 11: Soil Abrasion Test Results

Appendix 12: Mineralogy Test Results

2.3 Limitations

The geotechnical data presented in this report are results of the site investigation managed by HMM/Bechtel for the SVRT Project Central Area Guideway Section Phase 2, 65% Engineering Design Investigation. Data obtained by others for the 10% Conceptual Design are not included and results from the 35% PE investigation are only

shown in the Plan and Profile Drawings. The number of boreholes and CPTs was based on the level of design at the time of planning this phase of investigation. A future Phase 3 (P3) Investigation will include additional exploration to cover specific locations of the Central Area Guideway alignment that were not finalized at the time of this investigation.

3.0 Field Investigations

3.1 Introduction

The P2 65% Engineering Design Investigation provides additional geotechnical data about the stratigraphy, groundwater, and physical and engineering characteristics of the soil at specific locations along the alignment. Details of the field investigation are described in the following sections.

3.1.1 Team Organization

Several geotechnical engineering, drilling and specialty testing firms contributed to the investigation program. Subcontractors included Fugro West, Parikh Consultants, Pitcher Drilling, URS Corporation, ABE Engineering, and Towill.

Fugro's field investigation scope focused on the CPT explorations, which included seismic cone testing. Pitcher Drilling provided the drill rigs and drill crews necessary to complete all geotechnical borings and soil sampling. PCI provided coordination support and technical oversight for Pitcher Drilling. Field engineers from PCI performed all field logging of borings. URS Corporation provided part-time Quality Assurance support for subcontractor field activities. ABE Engineering calibrated Pitcher Drilling's automatic hammer on the Failing 1500 drill rig. Towill surveyed all borehole and CPT locations.

Kleinfelder, under subcontract to EarthTech for the Central Area Guideway Stations group for preliminary design work, reviewed the scope of the field investigation and observed a partial portion of the field exploration activities at underground Station locations. Kleinfelder also requested exploration at one location to investigate the potential for seismic liquefaction (see Section 3.2.1).

3.1.2 Project Restrictions

Restrictions imposed by local agencies, private property owners, neighborhood organizations, and commercial and residential tenants limited the access to some planned locations and impacted the work schedule.

Encroachment permits were required by several public and private agencies to perform borings and CPTs along different portions of the alignment. These agencies included the City of San Jose (CSJ), the Peninsula Corridor Joint Powers Board (PCJPB), San Jose Water Company, Union Pacific Railroad (UPRR) and Santa Clara Valley Water District (SCVWD). The CSJ also required traffic control permits. The SCVWD required exploration permits.

Design revisions made at the time the field program was on-going, were incorporated into the investigation as needed and when possible. Some of the major design revisions included the following:

- Consideration of north and south alternative tunnel alignments at the Coyote Creek crossing to avoid a deeper alignment at the Coyote Creek Bridge (borings and CPTs drilled north and south of the alignment on adjacent properties);
- Consideration of the locations for the proposed ventilation shaft structures

This report reflects the April 25th, 2008 tunnel alignment.

3.2 Boring Program

The boring program commenced on June 4, 2007. A total of 19 rotary-wash borings were completed as part of P2 65% Engineering Design Investigation (Figure 3-1 and Table 3-1).

One borehole (BH-81) was completed late in the P1 35% Preliminary Engineering Investigation. The boring log and information related to the investigation for BH-81 has been included in Appendix 1 and Table 3-1, respectively, of this report.

The six sonic borings completed as part of the pumping test program are included in Table 3-1. The boring logs and a description of sonic drilling and sampling is included in the Draft Pumping Test Data Report (HMM/Bechtel, 2008).

3.2.1 Overview

Of the 19 borings, six (6) were completed at the two portals, seven (7) were drilled at the three proposed underground stations, and six (6) were drilled at other locations along the tunnel alignment. Boring depths, sampling methods and sampling intervals were chosen based on design needs.

Borings at the two portals were drilled to obtain additional soil information at locations where the alignment had shifted and/or the portal had moved north. Borings were generally drilled to a minimum depth of twenty feet below the maximum depth of the proposed excavation cutoff wall. Soil sampling for portal borings was specified at 5-ft intervals or where changes in formation were observed.

Borings completed at the proposed Alum Rock Station, Downtown San Jose Station and Diridon/Arena Station were generally drilled to a depth of 200-ft, with the exception of BH-105. The depth of drilling and sampling was based on the need to better define soil stratigraphy between 150- and 200 ft, which is the maximum estimated depth of the station cut-off walls. At the request of Central

Area Guideway Stations group, BH-105 was drilled to a depth of 51.5-ft to investigate the potential for seismic liquefaction.

Soil sampling was specified at 10-ft intervals between 0 and 150 ft depths and at 5-ft intervals or where changes in formation were observed between 150- and 200-ft depths. Wider sampling intervals (10-ft) were selected where previous borings had captured enough geotechnical information down to 150-ft depths.

Borings drilled along the proposed tunnel alignment (tunnel borings) were planned based on potential realignments of the tunnel or where access to the planned boring locations were not permitted during the 35% Design Phase. Borings were generally drilled to depths of at least 20 ft below the tunnel invert, based on the tunnel alignment at the time of drilling. Continuous sampling in the "tunnel zone" (from 20 ft above the proposed tunnel crown to 20 ft below invert) was specified at all six (6) borings along the tunnel alignment. At BH-87, the tunnel boring was extended to 201.5 feet to provide preliminary soil information for the proposed FSS Ventilation Shaft structure located along Santa Clara St.

3.2.2 Drill Rig and Hammer Types

The drill rigs used for the project consisted of two types of truck-mounted equipment, a Fraste Multidrill XL drill rig and a Failing 1500 drill rig. The Failing 1500 drill rig is one of several typical rig types commonly used for rotary wash drilling. Fraste Multidrill XL drill rigs are top-drive (rotation and circulation are conducted at the top of the drill string), thus allowing a special type of continuous "geo-barrel" sampling (see Section 3.2.3.1 Sampler Types). The Failing 1500 and Fraste Multidrill XL drill rigs utilized an Automatic Trip Hammer system to advance split-spoon and Modified California samplers.

The drill rigs were equipped with a standard 140-lb hammer to drive thick-walled samplers. ABE Engineering calibrated the efficiency of the automatic hammer (Failing 1500 Rig) at the location of BH-85 (Section 3.2.10).

3.2.3 Sampling Methods and Equipment

3.2.3.1 Sampler Types

Four types of soil samplers were used: driven thick-walled samplers (split-spoon and Modified California), pushed thin-walled samplers (Shelby Tube), rotated thin-walled samplers (Pitcher Barrel) and a wireline soil coring sampler (101 Geo-Barrel Sampler). Bag samples were retrieved at a few selected depths and from split-spoon samplers. Modified California (MC) samples were placed in plastic tubes.

Split-spoon and Modified California samplers were used to obtain penetration resistance data of granular materials such as sandy or gravelly soils. The 140-pound drive hammer used for sample collection, casing installation, and removal was in conformance with ASTM D1586,

Standard Method for Penetration Test and Split-Barrel Sampling of Soils. The split-spoon sampler used had an outside diameter of 2 inches and an inside diameter of 1-3/8 inches and was in conformance with ASTM D1587, Standard Practice for Thin-Walled Tube Sampling of Soils for Geotechnical Purposes. The Modified California (MC) sampler used was in general conformance with ASTM D3550, Standard Practice for Thick Wall, Ring-Lined, Split Barrel, Drive Sampling of Soils. The MC sampler has an outside diameter of 3 inches and an inside diameter of 2.5 inches. The MC sampler was also used to obtain disturbed samples of sand and gravel soils. The MC sampler was able to retrieve larger gravel particles (up to 2.5 inches) that could not be obtained using the split-spoon sampler.

Soft to stiff clayey soils were generally sampled using a thin-walled Shelby Tube sampler in conformance with ASTM D1587. The Shelby Tube sampler consists of a 3-inch diameter, 36-inch long mild steel thin-walled tube that is hydraulically pushed by the drill rig. The sampler was used to obtain relatively undisturbed samples of clays and silts (fine-grained soils). For each push, the standard length of advancement was 30 inches.

Very dense soils and stiff to very stiff clays were generally sampled using a Pitcher Barrel sampler in conformance with ASTM D1587. Pitcher Barrel samplers consist of double-tube core-barrels; the inner barrel, which consists of a Shelby tube, is affixed to a spring-loaded sampler head that extends or retracts, relative to the cutting bit on the outer barrel, with changes in soil stiffness.

The magnitude and change in hydraulic pressure during Shelby Tube and Pitcher Barrel sampler advancement were recorded on the boring logs. A change in hydraulic pressure qualitatively indicates a change of material type or consistency at each depth or location, but may not be comparable between two separate rigs due to differences of hydraulic systems.

Pitcher Barrel sampling could not be performed in some gravelly formations. Thick drilling fluid is needed to lift the gravelly material from the bottom of the boring during the rotary wash process. The thick drilling fluid reduces the circulation within the sampler and around the drill bit. If the drilling fluid becomes too thick and the circulation ports of the sampler plug, the cutting bit heats up, causing the Pitcher Barrel cutting bit to wear out quickly or fracture.

Special sampling using a 101 Geo-Barrel (2.4-inch inside diameter) system (proprietary sampling system designed by Pitcher Drilling) was performed at a few selected boring locations where continuous sampling using a larger sampler was requested by the tunnel design team. At borings near the corner of Asbury St. and Stockton Ave. (BH-102, BH-

103 and BH-106) and near Coyote Creek tunnel alignment crossing (BH-88), the 101 Geo-Barrel sampling method was attempted so that continuous disturbed samples throughout the tunnel zone could be obtained. A MC sampler was used to obtain disturbed samples of sand and gravel soils at locations where difficulties recovering continuous samples using the 101 Geo-Barrel sampler arose.

3.2.3.2 Sampling Interval

In addition to the sample intervals described in Section 3.2.1, samples were also obtained at depths where material changes were detected for all borings. Cuttings in the drilling fluid were examined to identify changes in the soil conditions between sample locations. Material changes were also identified based on the driller's observations of drill rig response (i.e. chattering of drill rig, loss of fluid, etc.).

Occasionally soil samples could not be recovered due to wet and soft cohesive soils, loose granular soils, or obstructions, such as gravel or slough in the shoe or entrance of the samplers. When this occurred, the field engineer typically directed the driller to drill out the boring interval where sampling had been attempted and to sample below the disturbed zone of material.

3.2.4 Handheld Field Tests

In addition to visual observations of soil consistency, handheld field tests using pocket penetrometer and pocket torvane were performed in the field on the bottom of relatively undisturbed Shelby Tube and Pitcher Barrel samples. The estimated unconfined compressive strengths from pocket penetrometer tests are presented in the material description column on each boring log. Units for unconfined compressive strength are obtained in tons per square foot (tsf). Although the pocket penetrometer was used to estimate the unconfined compressive strength for cohesive soils, readings from the pocket penetrometer were also converted to undrained shear strength in units of kips per square foot, ksf. The pocket torvane was used to directly estimate the undrained shear strength for cohesive soils in ksf units. Both handheld field tests were used as a guide to strength and consistency variations. The undrained shear strength test results from handheld field tests are shown at the corresponding test depths on the boring logs presented in Appendix 1.

3.2.5 Groundwater Level Measurements

Groundwater levels are typically based on the assumption that the drilling fluid/mud reached equilibrium with natural groundwater level overnight and should not be used for design. For design purposes, readings from vibrating wire piezometers and observation wells that were installed to provide groundwater level and pore-water pressure information should be used.

3.2.6 Sample Handling

In order to obtain high-quality undisturbed samples for laboratory testing, every effort was made to minimize disturbance during handling and transportation of Shelby Tube and Pitcher Barrel samplers. Slough was typically removed from the tubes and empty spaces at the top and bottom of the sample tubes were filled with Styrofoam packaging peanuts prior to initial sealing in the field. Shelby Tubes and Pitcher Barrel samples were kept upright in wooden boxes.

Sample preservation and transportation followed ASTM D4220, Standard Practice for Preserving and Transporting Soil Samples. In general, all samples were protected from extreme temperatures and kept out of direct sunlight. Samples were carefully transported from the field to the laboratory and stored in locations where they were not exposed to extreme temperature changes and would not be disturbed.

Waxing of Shelby Tube sample tubes took place at Parikh Consultant's laboratory, generally within three (3) days of drilling. Waxing was performed in accordance with ASTM D4220.

3.2.7 Borehole Completion and Abandonment

Borings were generally terminated at the planned depth. At two locations, BH-102 and BH-103, borings were mistakenly terminated 10 ft shallower than planned. Subsequently, BH-103 was re-drilled down to the previous completed depth of approximately 80 ft and then drilled down to the specified depth of 90.5 ft.

Prior to completion of each boring, the Santa Clara Valley Water District (SCVWD) was contacted for notification of grouting. After the boring was drilled to the planned depth, the borehole was grouted from the bottom up using a tremie pipe per SCVWD requirements. All Investigation Derived Waste (IDW), including loose soil or cuttings from the drilling operation, was placed in 55-gallon drums and removed from the site. All drums containing IDW were characterized, labeled, and disposed of by Parikh Consultants' subcontractor Integrated Waste Management (IWM) in accordance with applicable regulatory requirements.

Pavement removed to drill borings was patched using a non-metallic, non-shrink, quick-setting grout.

3.2.8 Boring Log Organization and Presentation

Soil descriptions were made in general accordance with ASTM D2487, Standard Classification of Soil for Engineering Purposes (Unified Soil Classification System) and ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). The boring logs are presented in Appendix 1. Towill, Inc. surveyed the ground surface elevation of all borehole locations based

on NAVD88 (North American Vertical Datum, 1988). The coordinates and surface elevations are shown on each boring log.

Boring logs were prepared for all 19 borings of P2. The Boring Log Key (Figure A1-1) summarizes coarse-grained and fine-grained soils and corresponding group names. General notes, abbreviations, sampler types, soil structure definitions, consistency and relative density terminology and moisture content descriptions that are incorporated into each of the boring logs are also included on the Boring Log Key. Each boring log presents boring specific details including: Field Engineer (Logged By), Quality Control Manager (Checked By), Drilling Start and Completion Dates, Drilling Contractor and Operator Name, Project Location, Drilling Method, Hammer Type and Drill Rig Type. Drilling Start and End Times for each day of drilling are shown within the material description column.

The field engineer for Parikh Consultants recorded the soil conditions encountered as the borings were drilled. At depths where sampling was not performed, field engineers based soil information on soil cuttings recovered during the rotary wash drilling process and driller's comments regarding drilling response (i.e., "chattering" noise from drill rods during drilling in sands and gravels, changes in drilling pressures at soil layer intervals, etc.). Field engineers recorded handheld field test results from pocket penetrometer and pocket torvane tests on the field boring logs, as well as results of air monitoring tests of the breathing zone using a Photo-Ionization Detector (PID) and Lower Explosive Limit (LEL/O2) meters. The final boring depth was also recorded. The field engineer from Parikh Consultants also recorded observations of caving conditions and locations where loss of drilling fluid occurred. Upon completion of the borings and laboratory testing, information recorded on the field log was entered into a gINT database and printed out using a gINT boring log template.

Soil samples were visually classified in the laboratory (see Section 4.1.1 Laboratory Visual Classification) prior to soil strength and property testing (see Section 4.1.2 through 4.1.7 and Section 4.2). The soil information presented on the gINT boring logs was prepared based on the results of the laboratory visual classification and index tests and were reviewed for Quality Assurance by HMM/Bechtel.

3.2.9 Standard Penetration Test (SPT)

The Standard Penetration Test (SPT) is a measure of the resistance of the soil during sampling using the split-spoon sampler. This resistance is an indicator of the consistency in fine-grained soils and density and strength in coarse-grained soils. The standard penetration resistance of the soil is defined as the number of blows (N) required to drive the sampler one foot into the soil with a 140-pound hammer dropped 30 inches. The hammer is lifted using a mechanical device to elevate the hammer (automatic hammer).

The number of blows required to advance the split-spoon samplers was counted and recorded for each 1-inch interval of driving by the field engineer. The SPT, in accordance with ASTM D1586, was halted if the total number of blows exceeded 100, the number of blows exceeded 50 in any 6-inch increment, or if the sampler was not advanced as a result of 10 consecutive blows. The distance driven for each of these refusal conditions was recorded. When the final penetration increment was less than 6 inches, refusal was indicated and the actual inches-advanced is presented on the logs.

In cases when the sampler did not meet the refusal criteria, the SPT blow count shown on the boring logs is the sum of the blows for the final 12 inches. The first 6-inch interval is not presented on the boring logs unless the sampling interval was 6 inches or less. The Boring Log Key presents a summary of blow count information.

Undisturbed coarse-grained soil samples are not possible to obtain using typical driven thick-walled samplers, pushed thin-walled samplers or 101 Geo-Barrel samplers. It is possible, however, to estimate the in-situ density using the SPT. For the 65% Engineering Design Investigation, the SPT was generally performed only at locations and depths where granular material was expected.

A Modified California (MC) sampler was also used to sample coarse-grained soils at selected depths of chosen borings. The uncorrected blow count using a driven MC sampler was recorded and is shown on the boring logs in Appendix 1. In order to obtain a comparable correlation of strength and density of soils to the SPT blow count (N-value), the Modified California blow count may be corrected by multiplying it by a correction factor. This correction factor is typically a function of sampler size and type of soil being sampled. Uncorrected Modified California blow counts are presented on the boring logs and are enclosed in parentheses to differentiate the values from SPT blow counts.

3.2.10 SPT Energy Calibration

To estimate the energy transfer ratio of the hammer on the Failing 1500 drill rig, ABE Engineering calibrated the efficiency of the automatic hammer during drilling of BH-85. The results of the calibration showed that the mean energy transfer ratio, based on 315 blows of the automatic hammer, was approximately 79% of the theoretical energy (140-lb hammer at 30-inch drop). The results of the energy calibration are presented in Appendix 1 after Logs of Borings. The Automatic Trip Hammer System on the Fraste Multidrill XL drill rig was not calibrated due to the limited number of SPTs performed on that rig. However, a calibration was performed on the Fraste Multidrill XL drill rig on a previous project in San Francisco in July of 2006. The results from that calibration demonstrated that the mean energy transfer ratio was approximately 82% of the theoretical energy (140-lb hammer at 30-inch drop). Although these results were not taken from a calibration performed on the SVRT project, they indicate that the

energy transfer ratio is approximately 80 percent for SPTs taken along the alignment using an Automatic Trip Hammer System.

3.2.11 Air and Vapor Monitoring

Air monitoring of the work zone was conducted as part of the Work Plan to protect workers should exposure to contamination occur. The breathing zone around the drilling operations was monitored frequently using a Photo-Ionization Detector (PID) meter and a Low Explosive Limit/Oxygen (LEL/O_2) meter. The PID instrument used was an Environmental Instruments Co. Model "Determinator" Organic Vapor Meter (OVM) with a minimum detectable level of 0.1 parts per million (ppm). Monitoring of specific levels of hydrogen sulfide, ethane, butane and propane was not carried out. Monitoring of specific levels of methane was carried out. The LEL/O_2 meter was a GASTECH Model GT-201 with a minimum detectable level of oxygen (OXY) 0.1 ppm. The instruments were rented from Environmental Instruments, located in Concord, CA.

The initial work plan required air monitoring of the breathing zone surrounding the drill rig operation, primarily for worker safety. Readings were also taken of the soil samples as the sampler was extracted from the borehole. Generally, a minimum of three PID (OVM), LEL/O_2 (OXY) and methane (CH4) readings were each taken during drilling and sampling of all portal, station and tunnel borings. Along the tunnel alignment, three readings were typically taken within the 60-foot tunnel zone.

Readings (OVM, LEL/O_2 and methane) are shown at the corresponding borehole depths on the Logs of Borings (Appendix 1).

3.3 Cone Penetration Testing Program

3.3.1 Overview

The CPT program commenced on March 28, 2007. CPTs were conducted during two sequences March 28, 2007 through April 5, 2007 and August 13, 2007 through August 17, 2007. In addition to continuous CPT soundings, downhole seismic shear wave velocity measurements were obtained at several locations. Of the 25 CPTs, 13 were completed at the portals, six (6) were performed at the three proposed underground stations, and six (6) were completed at locations along the tunnel alignment. CPT frequencies and depths were selected based on design needs. The locations of all of the CPTs are presented in Figure 3-1 and Table 3-2.

3.3.2 Conventional CPTs

A total of 25 CPTs were conducted. The following sections describe the equipment, procedures, locations and results of the CPT program.

3.3.2.1 Equipment

Equipment utilized in conducting CPTs included a self-contained 25-ton CPT rig with hydraulic pushing system, a piezocone, cone rods and casing, a data acquisition system and a support truck and trailer.

The CPTs were performed using an International 25-ton capacity truck mounted rig with a self-contained power supply unit. The rig was equipped with hydraulic jacking systems to lift and level the pushing platform. The "dead weight" of the rig provided the reaction weight necessary for advancing the CPT tools. The conventional instrumented piezocone assembly used for the SVRT project included a cone tip with a 60-degree apex and a cone base area of 15 cm^2, a sleeve segment with a surface area of 200 cm^2, and a pore pressure transducer near the base (shoulder) of the cone tip (designated the u2 location).

Fugro's CPT cone rods are manufactured from high tensile strength steel and have a cross sectional area adequate to sustain up to 700 tsf tip pressure without buckling. A steel casing was generally placed in the upper clayey strata and was typically extended to depths of 20 to 75 ft, when used. The casing provided lateral support to prevent bending or buckling of the slender 10-foot sections of steel rod as they were hydraulically pushed into the ground.

The data acquisition system converted an analog signal from the cone penetrometer to a digital signal, which was monitored, recorded and presented in near-real time on the laptop computer. A support pickup truck/trailer contained a grout pump and mixer to properly abandon CPT holes after completion, a pressure wash system for cleaning the work area and maintaining clean equipment throughout field program, a steam cleaning system for environmental protocol if needed, and tools and supplies for daily operations.

3.3.2.2 Procedures

Prior to testing, the truck was lifted up and leveled on four pads to provide a stable reaction for the cone thrust. During the test, the instrumented cone was hydraulically pushed into the ground at the maximum rate of about 2 centimeters per second (cm/s), and readings of cone tip resistance, sleeve friction, and pore pressure were digitally recorded every second. As the test progressed, the CPT operator monitored the cone resistance and its deviation from verticality. Information collected during a push was stored digitally. The data files included project description and location, operator, data format information, and other pertinent information about the sounding.

After completing a CPT, the hole was backfilled with cement-bentonite grout by the tremie method using a grout pump and mixer. The surface of the CPT holes was finished with rapid setting quickcrete. Grout mix and grouting procedures were completed in accordance with Santa Clara Valley Water District regulations. The work area was cleaned per City of San Jose requirements.

Fugro conducted the CPTs in general accordance with ASTM D5778. The continuous CPT soundings were typically advanced to refusal (500 to 700 tsf tip pressure), which ranged from approximately 34 to 149.9 ft in depth. Each CPT generally lasted between 2 and 5 hours.

More detailed descriptions of the procedures and equipment specifications of the CPT operations can be found in Appendix 2.

3.3.2.3 Locations

CPTs performed along the proposed tunnel alignment ("tunnel CPTs") were spaced at 200 to 300-foot intervals (combining both the 35% and the P2 Programs). CPTs performed at the proposed stations ("station CPTs") were spaced approximately 100 ft apart.

CPTs performed at the two portal locations were performed to obtain additional soil information at locations where the alignment had shifted laterally or moved north. CPTs at the portal locations were generally planned to depths a minimum of twenty feet below the maximum depth of the portal structure or cutoff wall.

CPTs at the proposed Alum Rock Station, Downtown San Jose Station and Diridon/Arena Station were generally planned to depths of 150 ft. At all but one location the CPT probe met refusal at shallower depths, which ranged from 43.7-ft below ground surface (bgs) to 115.5-ft bgs.

Tunnel CPTs were planned based on potential realignments of the tunnel or where previous soil information was not obtained due to tunnel depth changes. CPTs were generally planned to depths of at least 20 ft below the tunnel invert, based on the tunnel alignment at the time of drilling, but were terminated shallower at several locations due to refusal.

3.3.2.4 Results

The CPT logs present the measured cone (tip) resistance in tons per square foot (tsf), the measured sleeve friction in tsf, the friction ratio in percentage (including the Soil Behavior Type according to Robertson and Campanella in 1990 (see CPT correlation chart in Appendix 2, Key to CPT logs), the measured pore pressure in tsf at the u2 sensor location, and the estimated soil undrained shear strength (s_u) in ksf.

Some of the data presented on the CPT logs is interpreted by Fugro and are based on assumptions that need to be verified with site-specific data. The interpreted data include the soil behavior type and the estimated soil undrained shear strength. The soil behavior type and estimated undrained shear strength are influenced by the soil unit weight (and resulting in-situ total stress condition), and the N_k-value. The range of selected N_k values was based on calibrations performed by Fugro comparing the CPT tip resistance with the strength determined from field vane shear testing in adjacent borings. A more detailed discussion regarding the undrained shear strength calibration is presented in Appendix 2.

The CPT logs show the range of undrained shear strengths calculated from CPT cone tip resistances (corrected for unequal end area effects) based on cone bearing capacity factors (N_k) of 12 and 15. CPT sounding logs for the 25 CPTs are presented in Appendix 2.

3.3.3 Seismic CPTs

A total of 12 SCPTs were conducted. The following sections describe the equipment, procedures, locations and results of the SCPT program.

3.3.3.1 Equipment

Downhole seismic shear wave velocity measurements were conducted using Fugro's seismic CPT system. The seismic CPT system includes the basic thrust system, a seismic cone assembly, a seismic wave source, and a digital recording seismograph.

3.3.3.2 Procedures

The seismic cone assembly is similar to the conventional cone assembly, with the addition of a three-component array of geophones. The geophones are orthogonally mounted inside the assembly about 15 cm above the cone tip. The seismic CPT system consists of a heavy metal beam that is positioned parallel to the cone truck and held firmly against the ground by the weight of the beam and additional weights placed on it. The beam is positioned at least 10 ft from the cone rods. Striking each end of the beam with a 12-pound sledgehammer generates seismic waves. The hammer blow from opposite ends of the beam generates shear waves with opposite polarity. Conventional CPT testing was temporarily halted at 5-foot intervals to perform the seismic testing and collect seismic data.

The hammer blows trigger the seismograph to record the time histories of the generated seismic waves as they travel through the soil. If the shear wave signal is clearly defined, the waveform is selected for stacking and the arrival time of the wave is recorded. Additional blows were similarly examined and stacked. A more detailed discussion regarding the signal selection and stacking is presented in Appendix 3.

Waveforms are digitally recorded and saved in the seismograph's hard drive for further processing. After a complete set of seismic data is recorded, the cone is advanced to the next depth, and the procedure is repeated until the hole reaches the required depth or refusal.

The shear wave arrival time at each depth is determined from the recorded "stacked" signals. The average arrival time is determined and based on the horizontal offset of the seismic source from the CPT rods, a strike angle is estimated. The average vertical arrival time is determined by taking the sine of the strike angle. The incremental seismic velocity is the difference in vertical average arrival time between two depth increments, divided by the length of the increment (typically 5 ft). This seismic velocity is presented on the seismic CPT logs (Appendix 2).

Seismic CPT testing was performed in accordance with ASTM D577 and "Seismic Cone Penetration Test," by Robertson, Campanella, and Gillespie (1986).

3.3.3.3 Locations

Seismic shear wave velocity tests were conducted at 12 locations. Tests were performed at both portal locations, at each of the proposed station locations and along two stretches of the tunnel alignment.

Seismic cone testing was successfully performed at the following locations:

- Two Seismic CPTs at the East Portal (CPT-158 and CPT-161)
- Two Seismic CPTs at Alum Rock Station (CPT-162 and CPT-172)
- One Seismic CPT at the proposed Coyote Creek realignment to the south of Santa Clara St. (CPT-165)
- Two Seismic CPTs at Downtown San Jose Station (CPT-167 and CPT-169)
- Two Seismic CPTs at Diridon/Arena Station (CPT-168 and CPT-179)
- One Seismic CPT at the deeper tunnel alignment near the intersection of Asbury St. and Stockton Ave. (CPT-171)
- Two Seismic CPTs at the West Portal (CPT-173 and CPT-174)

The locations of the 12 seismic CPTs are shown in Figure 3-1.

3.3.3.4 Results

CPT sounding logs for the 12 seismic CPTs are presented on the Logs of seismic CPTs in Appendix 3. The seismic CPT logs provide graphical plots of the same data presented on conventional CPT logs, along with measured shear wave velocity in ft per second (fps).

3.3.4 CPT Completion and Abandonment

CPT locations were generally terminated at refusal or at the planned depth.

Prior to completion of the CPT, the Santa Clara Valley Water District (SCVWD) was contacted for notification of grouting. After CPT was performed to the planned depth or was terminated due to refusal, the CPT hole was grouted from the bottom up using a tremie pipe per SCVWD requirements. All Investigation Derived Waste (IDW) and any loose soil or cuttings from the CPT operation were placed in 55-gallon drums and removed from site. All drums containing IDW were characterized, labeled, and disposed of in accordance with applicable regulatory requirements. Integrated Waste Management (IWM), a subcontractor of Fugro West, processed all drums containing IDW.

Pavement removed to perform CPTs was patched using a non-metallic, non-shrink, quick-setting grout.

Table 3-1 Summary of Exploratory Borehole Program

Exploration	Completion Date	Boring Depth (ft)	Station (ft)	Offset (ft)	Offset R/L	Structure Type	RW or S*	Purpose
East Portal								
BH-101	6/4/2007	52.5	564+38	22	L	Portal	RW	Obtain info where portal and alignment shifted north and east.
BH-82	6/18/2007	92.5	570+08	22	L	Portal	RW	Obtain info where portal and alignment shifted north and east.
Tunnel from East Portal to Alum Rock Station								
No borings performed.						Tunnel		
Alum Rock Station								
BH-83	8/28/2007	200.0	599+84	26	R	Station	S	Explore deeper strata and obtain info for pumping test program.
BH-84	7/16/2007	207.5	603+12	148	L	Station	RW	Explore deeper strata.
BH-85	7/10/2007	202.5	606+32	51	L	Station	RW	Explore deeper strata. Define sand layer at El. +10. MW location.
BH-86	7/31/2007	190.0	609+08	83	R	Station	S	Explore deeper strata and obtain info for pumping test program.
Tunnel from Alum Rock Station to Crossover/Downtown Station								
BH-87	7/20/2007	201.5	648+42	103	L	Tunnel	RW	Explore deeper strata near proposed vent structure.
BH-88	6/18/2007	112.5	645+03	66	R	Tunnel	RW	Obtain info for potential southern tunnel alignment at Coyote Creek.
Crossover/Downtown Station								
BH-89	6/8/2007	201.5	693+74	72	R	Station	RW	Explore deeper strata and obtain info for pumping test program.
BH-90	6/15/2007	211.5	699+59	16	L	Station	RW	Explore deeper strata.
BH-105	6/23/2007	51.5	701+51	2	R	Station	RW	Investigate for liquefaction at 1st St.
BH-104	10/4/2007	200.0	703+72	78	R	Station	S	Explore deeper strata and obtain info for pumping test program.
BH-91	6/22/2007	196.5	704+16	13	L	Station	RW	Explore deeper strata.
Tunnel from Crossover/Downtown Station to Diridon/Arena Station								
No borings performed.						Tunnel		
Diridon/Arena Station								
BH-92	11/17/2007	200.0	736+62	35	R	Station	S	Explore deeper strata and obtain info for pumping test program.
BH-93	6/27/2007	211.5	738+61	84	L	Station	RW	Station entrances and deeper stratigraphy.
BH-94	8/10/2007	200.0	741+61	82	R	Station	S	Explore deeper strata and obtain info for pumping test program.
Tunnel from Diridon/Arena Station to West Portal								
BH-81**	7/22/2005	150.5	789+62	19	L	Tunnel	RW	Explore deeper strata for stratigraphy and perform vibration monitoring.
BH-95	7/24/2007	101.5	774+14	49	R	Tunnel	RW	Unexplored length of tunnel alignment.
BH-102	6/25/2007	80.0	796+49	19	L	Tunnel	RW	Explore deeper strata for stratigraphy and grain size info.
BH-103	6/27/2007	90.5	798+17	19	L	Tunnel	RW	Explore deeper strata for stratigraphy and grain size info.
BH-106	6/27/2007	90.0	800+21	31	L	Tunnel	RW	Explore deeper strata for stratigraphy and grain size info.
West Portal								
BH-96	9/12/2007	135.0	831+98	5	R	Portal	S	Explore deeper strata and obtain info for pumping test program.
BH-97	6/11/2007	91.5	833+53	6	R	Portal	RW	Obtain info where portal moved north.
BH-98	7/3/2007	61.5	836+41	42	R	Portal	RW	Obtain info where portal moved north.
BH-99	6/29/2007	81.5	838+21	9	L	Portal	RW	Obtain info where portal moved north.
BH-100***	7/3/2007	41.5	842+89	15	L	Portal	RW	Obtain info where portal moved north.

Note: Stations and offsets based on the April 25, 2008 S1 track alignment.
* RW = Rotary Wash Boring, S = Sonic Boring. Sonic boring logs are included in the Pumping Tests Data Report (HMM/Bechtel, 2008).
** BH-81 was completed near the end of 35% design phase and therefore could not be included in the 35% GDR. Information from BH-81 is included in this Phase Two - 65% Engineering Design - Geotechnical Data Report.
*** Stationing for BH-100 shown is based on Western Area Guideway alignment stationing (outside of Central Area Guideway alignment stationing).

Table 3-2 Summary of Exploratory Cone Penetration Testing Program

Exploration	Completion Date	CPT Depth (ft)	Station (ft)	Offset (ft)	Offset R/L	Structure Type	Seismic Cone?	Purpose
East Portal								
CPT-158	04/03/07	45.0	562+47.2	30.3	L	Portal	Y	Obtain info where portal and alignment shifted north and east.
CPT-159	04/04/07	45.4	563+47.5	29.3	L	Portal	N	Obtain info where portal and alignment shifted north and east.
CPT-160	04/04/07	45.4	565+38.8	36.8	L	Portal	N	Obtain info where portal and alignment shifted north and east.
CPT-161	04/03/07	105.0	568+89.3	26.0	L	Portal	Y	Obtain info where portal and alignment shifted north and east.
Tunnel from East Portal to Alum Rock Station								
No CPTs performed.						Tunnel		
Alum Rock Station								
CPT-162	08/13/07	73.2	600+71.5	139.5	L	Station	Y	Obtain additional deeper info on soil stratigraphy.
CPT-172	08/16/07	113.4	607+63.3	65.5	R	Station	Y	Obtain additional info at station entrance location.
Tunnel from Alum Rock Station to Crossover/Downtown Station								
CPT-163	03/31/07	95.1	636+29.4	181.7	L	Tunnel	N	Obtain info for potential southern tunnel alignment at Coyote Creek.
CPT-164	03/28/07	86.0	639+53.6	203.5	L	Tunnel	N	Obtain info for potential southern tunnel alignment at Coyote Creek.
CPT-165	08/16/07	77.4	642+20.2	205.4	L	Tunnel	Y	Obtain info for potential southern tunnel alignment at Coyote Creek.
CPT-166	03/29/07	89.2	649+27.5	193.6	L	Tunnel	N	Obtain info for potential southern tunnel alignment at Coyote Creek.
Crossover								
No CPTs performed.						Station		
Downtown Station (Note: See below; additional CPTs planned based on finalized station entrance locations)								
CPT-167	04/02/07	90.7	701+08.6	10.8	R	Station	Y	Investigate for liquefaction at 1st St.
CPT-169	08/17/07	85.4	706+79.2	145.1	L	Station	Y	Obtain additional info at station entrance location.
Tunnel from Crossover/Downtown Station to Diridon/Arena Station								
No CPTs performed.						Tunnel		
Diridon/Arena Station								
CPT-168	04/05/07	149.9	734+51.2	100	L	Station	Y	Obtain additional deeper info on soil stratigraphy.
CPT-179	08/14/07	115.5	740+58.3	109	L	Station	Y	Obtain additional info at station entrance location.
Tunnel from Diridon/Arena Station to West Portal								
CPT-170	03/30/07	43.7	793+76.9	48.2	R	Tunnel	N	Investigate deeper stretch of alignment along Taylor St.
CPT-171	03/30/07	74.8	794+95.9	41.8	R	Tunnel	Y	Investigate deeper stretch of alignment along Taylor St.
West Portal								
CPT-173	03/29/07	38.4	828+05.7	91.3	L	Portal	Y	Investigate stretch of alignment with limited data.
CPT-173A	03/31/07	33.8	828+02.5	92.6	L	Portal	N	Investigate stretch of alignment with limited data.
CPT-173B	03/31/07	81.5	828+00.0	94.9	L	Portal	N	Investigate stretch of alignment with limited data.
CPT-174	03/31/07	55.6	834+47.1	20.8	L	Portal	Y	Obtain info where portal moved north.
CPT-174A	03/31/07	33.8	834+50.1	20.8	L	Portal	N	Obtain info where portal moved north.
CPT-175	03/28/07	80.5	835+67.9	20.0	L	Portal	N	Obtain info where portal moved north.
CPT-176	03/28/07	45.5	837+51.4	16.4	L	Portal	N	Obtain info where portal moved north.
CPT-177	03/30/07	45.5	838+85.9	18.7	L	Portal	N	Obtain info where portal moved north.
CPT-178*	03/29/07	45.5	841+50.2	15.4	L	Portal	N	Obtain info where portal moved north.

Note: Stations and offsets based on the April 25, 2008 S1 track alignment.
* Stationing shown is based on Western Area Guideway alignment stationing (outside of Central Area Guideway alignment stationing).

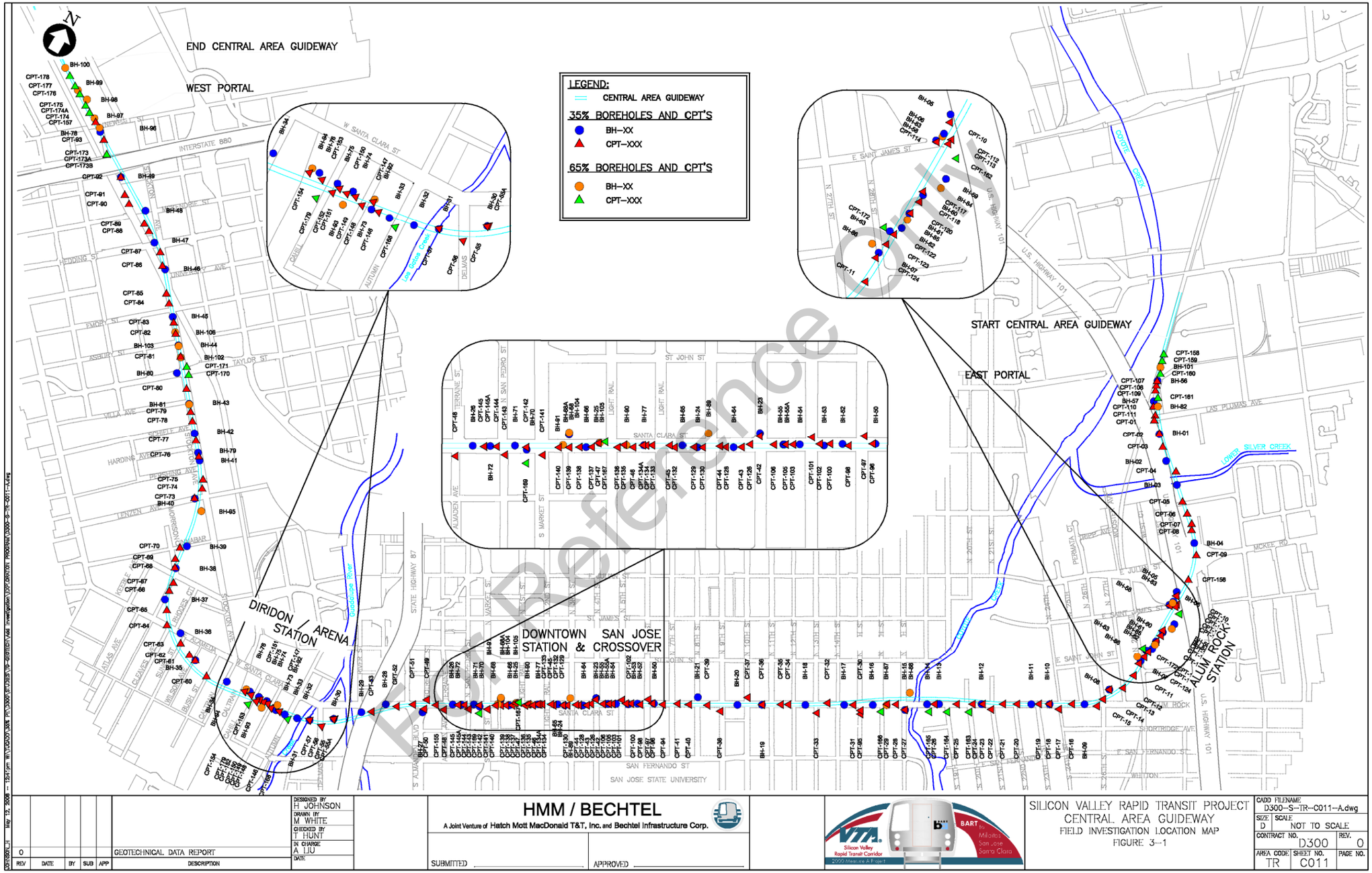

Figure 3-1 Field Investigation Location Map

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3.4 Groundwater Dissolved Gas Sampling

Locus Technologies performed two phases of groundwater sampling and laboratory analyses for 30 groundwater wells during 65% ED geotechnical investigation phase. Phase 1 consisted of sampling and testing groundwater from 12 wells on May 21st and 22nd, 2008. Phase 2 consisted of sampling and testing groundwater samples from the remaining 18 wells on July 22nd and 23rd, 2008. The samples were obtained using low-flow purge methods in accordance with Environmental Protection Agency (EPA) "Ground-Water Sampling Guidelines for Supefund and RCRA Project Manager (2002)". All samples were obtained in airtight bottles. In addition to test samples, duplicate, "rinsate blank", and "travel blank" samples were also collected for quality control purposes. The phase 1 samples were shipped to Bioremediation Consulting, Inc. (BCI) in Watertown, Massachusetts and Gusmer Enterprise, Inc. (Gusmer) in Napa, California for laboratory analysis. Phase 2 samples were sent only to BCI.

BCI analyzed the water samples for methane, ethane, ethanethiol, argon, nitrogen, carbon monoxide, carbon dioxide, ammonia-nitrogen, sulfide, oxygen, hydrogen, and hydrogen sulfide. Gusmer analysed the samples for free and total Sulphur dioxide. Phase 2 samples, tested after Phase 1 samples, were analyzed for methane, nitrogen, carbon dioxide and sulfide by BCI.

A short summary report including the summary of sampling, laboratory analysis, and quality control review is provided in Appendix 10. Field activity logs, water sampling logs, chain of custody records, and laboratory analytical reports are presented in the attachments to the report, which are also included in the Appendix. The laboratory test results are summarized in Tables 3-3a and 3-3b.

Table 3-3a Summary of Phase 1 Laboratory Test Results

			Sample ID																
	Det. Lim.	**Units**	**4767**	**4768**	**4769**	**MW-2E**	**MW-**	**MW-3D-(r)**	**MW-3D-(r)-dup**	**MW-5A**	**MW-6J**	**ST-3**	**ST-5**	**TW-2B**	**TW-2B-**	**TW-5A**	**TW-6A**	**TW-6B**	**TW-8A**	**Trip Bl**
Dissolved Gas, water matrix																				
Methane	0.2	**µg/L**	4.4	0.2	0.2	2.9	4.6	98	107	9.2	16	6.9	6.1	75	70	0.5	95	0.5	31	0.6
Ethane	0.2	**µg/L**	0.3	< 0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	0.2	< 0.2	< 0.2	< 0.2
Ethanethiol	0.07	**mg**/L	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07	< .07
Argon	2	**mg**/L	< 2	< 2	< 2	< 2	< 2	2	1.6 J	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	n.a.
Nitrogen	7	**mg**/L	34	15	15	33	36	34	28	25	24	33	32	33	29	34	24	24	33	21
Carbon monoxide	0.5	**mg**/L	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Carbon dioxide	0.2	**mg**/L	16	0.4	0.4	17	17	20	20	8	20	23	21	16	15	32	49	20	17	< 0.5
Free SO2		**ppm**	<5	<5	<5	<5	<5	<5		<5	<5	<5	<5	<5		<5 ppm	<5 ppm	<5 ppm	<5 ppm	
Total SO2		**ppm**	<5	<5	<5	<5	<5	<5		<5	<5	<5	<5	<5		<5 ppm	<5 ppm	<5 ppm	<5 ppm	
Chemical Tests																				
NH3-N Hach 8155	0.02	**mg/L**	0.03	< 0.02	< 0.02	< 0.02	< 0.02	0.06		0.10	0.02	< 0.02	0.08	0.03		0.10	0.04	0.52	0.03	
sulfide Hach 8131	0.003	**mg/L**	0.004	< 0.003	< 0.003	0.007	0	0.008		0	0.010	0.01	< 0.00	0.01		0.005	0.005	< 0.003	0.009	n.a.
Dissolved O2 Hach 8166		**mg/L**	n.a.	8.3	9.8	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	n.a.		n.a.	n.a.	n.a.	n.a.	
Dissolved H2, water matrix																				
Sample Dilution			*1*	*1*	*1*	*1*	*1*	*1*		*1*	*1*	*1*	*1*	*1*		*1*	*1*	*1*	*1*	
Sample Result	0.3	**nM**	1.6	4.9	2.8	1.1	0.9	0.4		1.0	0.5	1.3	< 2	0.8		0.9	0.8	1.2	0.7	
Field DO			2.92	n.a.	n.a.	2.8	2.9	2.98		1.74	4.45	4.01	2.62	2.58		1.81	1.37	4.98	1.97	

Table 3-3b Summary of Phase 2 Laboratory Test Results

			Sample ID														
	Det. Lim.	**Units**	**4783**	**4784**	**4785**	**4786**	**MW-1**	**MW-5B**	**MW-6D**	**NW-01**	**NW-05**	**NW-6**	**ST-10**	**ST-11**	**ST-12**	**ST-13**	**Trip Bl**
Dissolved Gas, water matrix																	
Methane	0.2	**µg/L**	35	0.7	1.8	1.0	0.5	0.9	1.9	2.0	2.1	2.1	0.1	0.4	1.0	1.0	0.4
Nitrogen	7	**mg**/L	27	15	22	18	17	28	21	35	20	26	27	27	23	27	29
Carbon dioxide	0.2	**mg**/L	23	< 0.2	66	< 0.2	1.5	37	72	11	2.7	12	17	17	110	56	0.7
Chemical Test																	
sulfide Hach 8131	0.01	**mg**/L	0.012	< 0.01	0.017	< 0.01	0.019	< 0.01	0.010	0.025	< 0.11 (1)	0.011	< 0.01	< 0.01	< 0.01	0.015	< 0.01

(1) interference from turbidity; Hach turbidity interference correction procedure unsuccessful

			Sample ID								
	Det. Lim.	**Units**	**MW-2C**	**MW-2G**	**MW-3C**	**MW-4A**	**MW-4A lab**	**ST-1**	**ST-2**	**ST-7**	**ST-8**	**ST-8 lab**
Dissolved Gas, water matrix, Headspace GC, EPA meth 5021A												
Methane	0.2	**µg/L**	7.7	39	9.9	8.3	8.2	2.0	31	1.5	1.7	1.3
Nitrogen	7	**mg/L**	32	26	35	24	24	28	22	31	37	37
Carbon dioxide	0.2	**mg/L**	< 0.2	24	22	< 0.2	< 0.2	38	3.7	29	31	31
Chemical Test												
sulfide Hach 8131	0.01	**mg/L**	< 0.01	0.028	< 0.01	0.033		< 0.01	0.017	< 0.01	< 0.01	

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4.0 Laboratory Testing

4.1 Introduction

The laboratory soil testing program for the Phase 2 65% Design Investigation expands the information gained from the 10% Conceptual Engineering (CE) Investigation (URS, 2003) and the 35% Preliminary Engineering (PE) Investigation (HMM/Bechtel, 2005a). The laboratory tests were performed from July 2007 through November 2007. In general, the majority of soil samples tested for classification purposes were selected from the strata that were relatively unexplored in previous investigations. Parikh Consultants, Inc. (PCI) in Milpitas, CA, performed the majority of index and classification testing, such as visual classifications, natural moisture contents, fines content, sieve analyses, sieve and hydrometer analyses, Atterberg Limits, and unit weights.

Additional specialty soil testing was performed on selected samples at various laboratories throughout the United States and outside the country. Some of these laboratories also performed classification and index tests on the samples used in the specialty testing. The soil tests, and the laboratories where they were performed, are summarized in Table 4-1. The testing program is discussed in subsequent sections. The test results are provided in the Appendices listed in Table 4-1.

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Table 4-1 Laboratory Testing Program – List of Appendices

Test Type	Parikh Consultants, Inc., Milpitas, CA	Fugro Consultants, Inc. (Fugro), Houston, TX	SGI Testing Services (SGI), Norcross, CA	Shanon & Wilson, Inc. (S&W), Seattle, WA	Cooper Testing Laboratory (Cooper), Palo Alto, CA	Praad Geotechnical, Inc. (Praad), and UCLA, Los Angeles, CA	CAMET Research, Inc. (CAMET), Goleta, CA	Chemistry of Concrete, Goleta, CA	Twining Laboratories of Southern California, Long Beach, CA	Pacific Materials Laboratory, Goleta, CA	SINTEF, Trondheim, Norway	Analytic Consulting Group, Inc., Ventura, CA	University of Texas at Austin, Geotechnical Laboratory, TX
Visual Classification	Appendix 4												
Moisture Content	Appendix 4	Appendix 5		Appendix 7		Appendix 9							
Unit Weight	Appendix 4	Appendix 5				Appendix 9							
Sieve Analyses	Appendix 4		Appendix 6		Appendix 8						Appendix 11		
Consolidation						Appendix 9							
Sieve Analysis and Hydrometer	Appendix 4									Appendix 12			
Materials Finer than No, 200 Sieve	Appendix 4												
Atterberg Limits	Appendix 4	Appendix 5		Appendix 7		Appendix 9					Appendix 11		
X-Ray Radiography		Appendix 5											
Cyclic Simple Shear						Appendix 9							
Cyclic Triaxial Shear		Appendix 5											
Large Scale Direct Shear			Appendix 6										
Direct Shear					Appendix 8								
Sticky Limit				Appendix 7									
Maximum Index Density			Appendix 6		Appendix 8								
Minimum Index Density			Appendix 6		Appendix 8								
Petrography												Appendix 12	
X-ray Fluorescence (XRF)								Appendix 12					
X-ray powder Diffraction (XRD)							Appendix 12						
Clay ID							Appendix 12						
Durability									Appendix 12				
Soil Abrasion											Appendix 11		Appendix 11

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4.1.1 Laboratory Visual Classification

Laboratory visual classification of soils was carried out in general accordance with ASTM D2487, Test Method for Classification of Soils for Engineering Purposes, and ASTM D2488, Practice for Description and Identification of Soils (Visual-Manual Procedures). Visual classification of soils collected in undisturbed Shelby tubes was performed on the soil at the bottom of the tube after removing excess disturbed material.

101 Geo-barrel samples were obtained as continuous cores, and were classified at regular intervals or when there was a change in material type. Field classifications were adjusted based on laboratory visual classifications and supplemented with results of laboratory testing. Final classifications appear in the boring logs (Appendix 1), and in the laboratory classification tests results (Appendix 4) of this report.

4.1.2 Moisture Content

Moisture content testing was performed in general accordance with ASTM D2216, Method for Laboratory Determination of Water (Moisture) Content of Soil, Rock, and Soil-Aggregate Mixtures. The tests were assigned to a selected portion of samples from each boring at varying depths.

The moisture content tests were generally conducted within three (3) days of the samples arriving at PCI's laboratory. The moisture content tests on specialty test samples were not performed within three (3) days because more time was required for their selection and testing. Shelby tube samples that were not tested, or that were stored for future testing, were sealed with heated microcrystalline wax. The 101 Geo-barrel core samples were not tested for moisture content because their sampling method kept them exposed for some time during sampling. Moisture content data appears at the corresponding sample depth on the boring logs in Appendix 1 and Figures and Tables in Appendices 4, 5, 7 and 9 (for PCI, Fugro West, Inc. (FWI), Shannon & Wilson, Inc. (S&W), and Praad Geotechnical/UCLA (PGI/UCLA) data, respectively).

4.1.3 Unit Weight

Unit weight testing was performed in general accordance with U.S. Army Corps of Engineers "Engineer Manual", EM 1110-2-1906 (1970). The tests were assigned to portions of the tube samples from each boring at varying depths.

The total unit weight was obtained by dividing the weight of a sample by the volume of the sample container. The dry unit weight was obtained by oven drying the sample and measuring the change in weight. This change in weight was used to determine the moisture content. The 101 Geo-barrel core samples were not tested for unit weight because their sampling and storing methods do not allow accurate determination of volumes. Dry unit weight data appear at the

corresponding sample depth on the boring logs in Appendix 1 and figures and tables in Appendices 4, 5 and 9 (for PCI, FWI and PGI/UCLA data, respectively).

4.1.4 Sieve Analysis

Sieve analysis testing was carried out in general accordance with ASTM D422, Standard Method for Particle-Size Analysis of Soils. Sieve analyses were assigned for granular samples obtained at varying depths.

As applicable, test results included percentage by weight finer than each of the ASTM Sieves 3 in., 2 in., 1-1/2 in., 1 in., 3/4 in., 1/2 in., 3/8 in., No. 4, No. 10, No. 20, No. 40, No. 60, No. 100, and No. 200 for each sample tested. Test results for sieve analyses in the form of gradation curves (particle size versus percent passing by dry unit weight) can be found in Appendices 4, 6 and 8 (for PCI, SGI and Cooper Testing Laboratory (CTL) data, respectively). Also, the fines content determined by the percentage (by weight) of material passing the No. 200 sieve is indicated in the boring logs (Appendix 1).

4.1.5 Sieve and Hydrometer Analysis

Combined sieve and hydrometer analyses were performed in general accordance with ASTM D422. These tests were performed on a limited number of fine-grained and coarse-grained samples obtained at varying depths.

The results are presented in a summary table and as gradation curves in Appendix 4. The fines content determined by the percentage of material (by weight) passing the No. 200 sieve is also reported in the boring logs (Appendix 1).

4.1.6 Atterberg Limits

The Liquid Limit, Plastic Limit, and Plasticity Index were determined in general accordance with ASTM D4318, Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils. These tests were assigned for fine-grained soils obtained at varying depths.

The test results are shown on the boring logs in Appendix 1 (for PCI's data, respectively), and Figures and Tables in Appendices 4, 5, 7 and 9 (for PCI, FWI, Shannon & Wilson and PGI/UCLA data, respectively).

4.1.7 Materials Finer than No. 200 Sieve

The determination of the total amount of material finer than the No. 200 Sieve was performed in general accordance with ASTM D1140, Standard Test Method for Amount of Material in Soils Finer than the No. 200 Sieve. The test results are presented on the boring logs in Appendix 1 as well as on the gradation curves in Appendix 4.

4.2 Specialty Geotechnical Testing

Specialty geotechnical testing consisted of evaluating shear strength properties and maximum/minimum index densities of sandy and gravelly soils, dynamic soil properties of silty sand to sandy silt and clayey soils, and adhesive properties of high-plasticity clays.

4.2.1 Direct Shear (Conventional)

Direct shear tests were performed on sand samples to measure the drained shear strength parameters, friction angle (ϕ') and cohesion (c'). The tests were performed in general accordance with ASTM D 3080, Standard Test Method for Direct Shear Test of Soils Under Consolidated Drained Condition.

Three (3) disturbed sand samples were collected from borings MW-2D, MW-6K, and MW-4A that were performed for the pumping test. The boring logs and laboratory test results for these borings are presented in Pumping Test Data Report (HMM/Bechtel, 2008). The samples were then transported to CTL for testing. Maximum and Minimum index density tests and sieve analyses were performed on the samples before performing direct shear tests (See Sections 4.2.4 and 4.1.4, respectively). A total of 27 initial direct shear tests were performed: three (3) samples at three (3) relative densities under (3) confining pressures. Four additional tests were performed for one sample (MW-4A) at four different confining pressures. Gravel size particles greater than 4.75 mm were sieved out from the specimens to eliminate boundary effects of test apparatus. Each specimen was prepared by compacting to a specified relative density ranging from 65 % to 95 % based on the minimum and maximum densities determined. The specimen was then subjected to a specified surcharge pressure before testing at a constant rate of strain. It should be noted that one of the samples (MW-6K) yielded a fines content greater than 15%, thus invalidating the maximum density. Thus, the relative density values for this sample will be biased and therefore correlations between relative density and strength should not be used. The test results are provided in Appendix 8.

Additionally, one (1) disturbed sand sample obtained using Modified California sampler was also shipped to CTL to perform three (3) direct shear tests at different normal pressures.

4.2.2 Large Scale Direct Shear

Larger scale direct shear tests were performed on gravel samples to measure the drained shear strength parameters, friction angle (ϕ') and cohesion (c'). The tests were performed in general accordance with ASTM D 3080. The difference between conventional and large-scale direct shear tests is the size of the test specimens. The test specimens in large-scale direct shear tests were 1-foot square in cross-section and 5 inches thick. The larger specimen size allowed the testing of gravel size particle up to 1.25 inches. Testing of specimens containing larger

than 1.25 inches gravel size particles is not conventionally performed in United States.

Three (3) disturbed gravel samples from the borings performed for the pumping test program were transported to SGI Laboratories for testing. Approximately 100 lb of material was collected for each specimen. Maximum/Minimum index density tests, and sieve analyses were performed on the samples before performing direct shear tests (See Sections 4.2.4 and 4.1.4, respectively). A total of 11 direct shear tests were performed. Each specimen was prepared by compacting to a specified relative density ranging from 65 % to 95 %. The specimen was then subjected to a specified surcharge pressure before testing at constant rate of strain. The test results are provided in Appendix 6.

4.2.3 Sticky Limit

High plasticity (fat) clay is expected to adhere or stick to metal surfaces under certain conditions of plasticity and water content, thus affecting tunneling and excavation operations. Therefore, for high plasticity clays, the concept of adhesion or sticky limit has been introduced and is defined as the lowest water content at which soil adheres to metal tools. This test is not standardized by the ASTM and is uncommon in typical geotechnical applications. The tests were performed following the procedure developed by S & W (Appendix 7).

A total of 32 samples were tested for sticky limits. The samples were tested in two batches. The first batch consisted of 15 samples from the 35% PE and Phase 2 65% Engineering Design investigation. The samples, classified as lean and fat clay visually and/or by laboratory tests by PCI, were sent to S&W who also determined Atterberg Limits. Lean clay samples were included for comparison with fat clays. The second batch consisted of 17 clay samples from Phase Two 65% Engineering Design investigation and Pumping Test investigation (Pumping Test Data Report, HMM/Bechtel, 2008). Sticky limit tests were not performed on lean clay samples from the second batch. The samples from 35% PE investigations and Pumping Test investigations were used because relatively few high plasticity clay samples were found in the Phase 2 65% Engineering Design Investigation. The test results are provided in Appendix 7.

4.2.4 Maximum and Minimum Index Density

Maximum and minimum index density tests were performed on sand and gravel samples prior to direct shear tests by CTL and SGI, respectively. For test specimens at CTL, gravel size particles retained on No. 4 (4.75 mm) sieve were removed. For test specimens at SGI, particles retained on 1.25-inch sieve were removed. The maximum index density tests were performed in general accordance with ASTM D 4253, Standard Test Methods for Maximum Index Density and Unit Weight of Soils Using a Vibratory Table. The minimum index density tests were performed in general accordance with ASTM D 4254, Standard

Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density.

Three (3) disturbed sand and three (3) gravel samples were sent for testing to CTL and SGI, respectively. For maximum index density, each oven-dried test specimen was placed in a mold and subjected to a constant surcharge of 2 pound per square inch (psi). The specimen was then electromagnetically vibrated for 8 to 10 minutes. The maximum density was calculated by dividing the mass of the densified soil by its volume (average height of densified soil times area of mold). For minimum index density, each specimen was poured into a container of known volume in such a manner that bulking and particle segregation was prevented and compaction minimized. The test results for gravels and sands are provided in Appendices 6 and 8, respectively. As discussed in Section 4.2.1, one of the samples sent to CTL had a fines content greater than 15%, thus nullifying the maximum index density test. For more details, refer to Appendix 8.

4.2.5 Shipping and X-ray of Relatively Undisturbed Samples

Relatively undisturbed Shelby tube samples were sent to PGI/UCLA in Los Angeles and FWI's laboratory in Houston, Texas. Six (6) sealed Shelby Tubes were shipped by car to PGI and UCLA, and three (3) were shipped via air to FWI's laboratory in specially fabricated, padded containers designed to minimize disturbance of the samples and that maintained the tubes in a vertical position. The soil samples sent to the laboratory consisted of silty sand, clayey sand, silty, clayey sand, and lean clay with sand. The Shelby tubes received by FWI's laboratory were X-rayed to determine the availability and quality of the material inside the tubes. Interpretation of soils using X-ray radiographs were performed in accordance with ASTM D4452, Methods for X-Ray Radiography of Soil Samples, with the slight modifications that are described in detail in Appendix 5. Images of the X-ray sample radiography are presented in Appendix 5.

4.2.6 Cyclic Triaxial Shear

Cyclic triaxial shear tests were performed by FWI on silty sand, clayey sand, silty, clayey sand, and lean clay with sand samples. The samples were tested to evaluate the ability of soil to resist the shear stresses induced in soil mass due to cyclic loading. The tests were performed in general accordance with ASTM D 5311, Standard Test Method for Load Controlled Cyclic Triaxial Strength of Soil.

Nine (9) cyclic triaxial shear tests were performed. Each selected test specimen was water saturated followed by isotropic consolidation in a consolidation cell. Each specimen was then subjected to sinusoidally varying axial load to produce a specific cyclic stress ratio. Pore water pressures generated under undrained conditions during the tests were recorded. The test results are provided in Appendix 5. Index and classification tests such as natural moisture content, unit weight, Atterberg Limits and fines content were also performed on the samples.

4.2.7 Cyclic Simple Shear

Cyclic simple shear tests were performed by PGI/UCLA on clay samples to measure the rate of straining effect on the cyclic shear strength. To increase saturation levels, the soil samples were soaked under a vertical stress corresponding to the in-situ vertical stresses for 24 to 48 hours while still inside the tubes. A suite of shear tests consisting of monotonic loading and cyclic stress-strain applications were then performed over the extruded and trimmed specimens. The test results are provided in Appendix 9. Details of the testing apparatus are described in Duku et al. (2007). In addition, index and classification tests such as natural moisture content, unit weight, Atterberg Limits and fine content were also performed on the samples

Although strain-dependent modulus degradation and damping ratio increase with strain could also be obtained from this type of tests, limitations of the equipment used did not permit to fully saturate the specimen under back pressure. Thus the test results are questionable and should not be taken into consideration for design purposes.

4.2.8 Soil Abrasion

Soil Abrasion Testing (SAT) was performed to determine the abrasiveness of soil to the Tunnel Boring Machine (TBM) disc cutter steel. This test is not standardized by ASTM, but is currently under development. The test procedure consists of measuring the cutter steel wear. The test is based on the NTNU Abrasion test (AV/AVS) for measuring steel wear due to hard rock. It was performed in general accordance with "New test methodology for estimating the abrasiveness of soils for TBM tunneling" (Nilsen B. et al. 2007). The testing was performed between August 12 and September 9, 2008.

Four bulk soil samples were sent for testing at SINTEF Rock and Soil Mechanics laboratory in Trondheim, Norway. The soil samples consisted of four soil types: Lean Clay (USCS: CL), Clayey Sand (SC), Poorly Graded Sand (SP), and Poorly-graded Gravel with Silt and Sand (GP-GM). The soil samples were selected from 35% PE phase and 65% ED phase geotechnical investigations. Although clays are known to be non-abrasive, the clay sample was included as a baseline comparison. The tests were performed on the portions of samples passing through 1 mm sieve size. Prior to the tests, Atterberg Limits were determined for clay sample, and gradation analysis performed on sand and gravel samples.

In addition to the four soil samples sent to SINTEF, a portion of gravel sample was sent to the geotechnical laboratory at University of Texas at Austin (UT). The purpose of sending a specimen for similar testing at UT was to compare the effect of grinding the bigger size soil particles on test results, and also to verify if SAT could be carried out at an alternative laboratory within United States for any future testing for the project. The testing at UT included testing on virgin as well as modified soil specimens passing through 1mm and 4mm size sieves. The

modified soil specimens consisted of gravel-size particles grinded to less than 1 and 4mm size. UT performed testing on specimens passing through 1mm size sieve after they observed problems during testing on specimens passing through 4mm size sieve. The details and results of abrasion tests are provided in Appendix 11.

4.2.9 Mineralogy

The mineralogy testing program consisted of X-ray powder diffraction analysis (XRD), wavelength dispersive X-ray flourescense analysis (XRF), clay ID; and petrography. The testing program also included sieve and hydrometer analyses, and durability testing on selected cohesionless samples. The XRD, XRF, and Clay ID measurements were performed according to generally accepted industry standards[*]. The Clay ID measurements were performed only on cohesive samples. Petrography analyses were performed in accordance with ASTM C295; durability testing: ASTM D 3744; and sieve and hydrometer analyses: ASTM D422. The testing program was conducted from April through June 2008, and results provided to us in July.

A total of 11 samples were selected from 35% PE and 65% ED investigation phases, and sent to CAMET Research (CAMET) located in Goleta, California. CAMET performed XRD and Clay ID testing on a portion of the provided samples, and sent the remaining portions to the following California laboratories for different testing: Chemistry of Concrete laboratory in Goleta carried out XRF measurements, Analytical Consulting Group, Inc. in Ventura carried out petrography analyses, Twining Laboratories of Southern California in Long Beach performed durability testing, and Pacific Materials Laboratory in Goleta conducted sieve and hydrometer analyses. These laboratories performed the testing under the overview of CAMET.

The samples included both cohesive and cohesionless soils. The XRD, XRF, Clay ID and petrography tests consisted of determining mineralogical composition of soil samples using spectrometers. The durability tests were performed to determine the resistance of soil samples to generating fines on mechanical agitation in the presence of water. Though the durability testing is not conventional for tunneling purposes; CAMET performed the tests due to insufficiency of samples for Los Angeles Abrasion testing. Sieve and hydrometer analyses were performed to determine the USCS classification of cohesionless soil samples. The test results are provided in Appendix 12.

[*]The references for testing are mentioned in CAMET's report in Appendix 12.

5.0 Summary and Future Data Reports

The content of this report summarizes the data from 19 boreholes, 25 CPTs, and associated laboratory tests conducted during the Phase Two 65% Engineering Design Investigation. Sticky Limit, mineralogy and soil abrasion tests were performed on samples from the 35% PE Investigation and the 65% Engineering Design Investigation. The Plan and Profile Drawings presented in Figures 5-1 through 5-43 of this report are updated from those presented in the 35% Preliminary Engineering Geotechnical Data Report (HMM/Bechtel, 2005a) to include the information from the additional borings and CPTs.

The Plan and Profile Drawings include information from the six sonic borings completed during the pumping test program. The Pumping Test Data Report (HMM/Bechtel, 2008) presents the boring logs and summarizes the sonic drilling, sampling and laboratory samples obtained from the sonic borings.

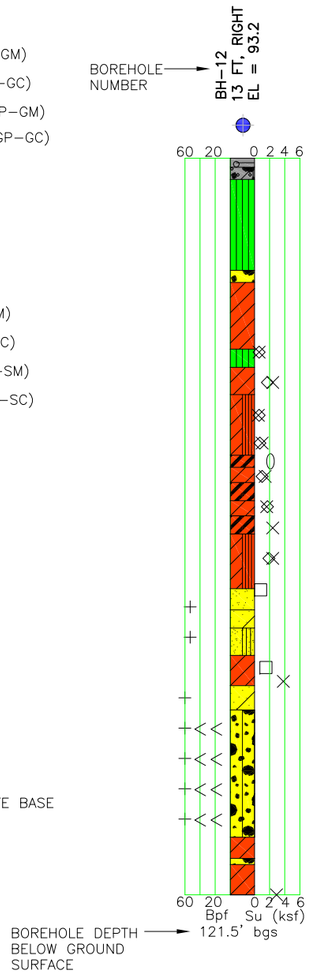
A Phase Three (P3) Geotechnical Investigation Data Report will be prepared to include information from the boreholes advanced during the final stages of design.

Figure 5-1 Geotechnical Plan and Profile Legend

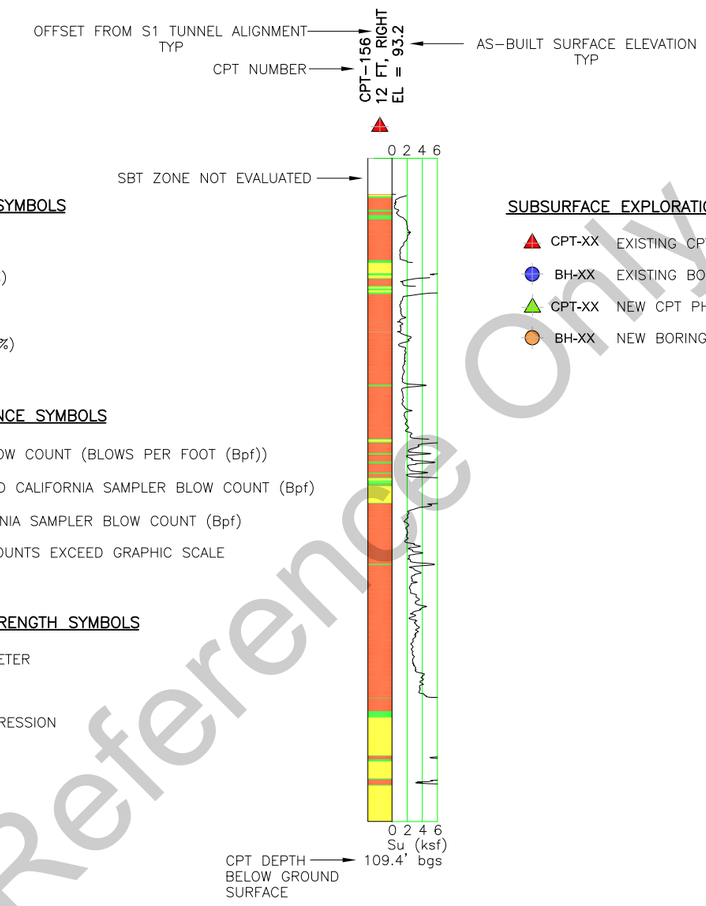
SOIL TYPE:

- WELL-GRADED GRAVEL (GW)
- POORLY-GRADED GRAVEL (GP)
- WELL-GRADED GRAVEL WITH SILT (GW-GM)
- WELL-GRADED GRAVEL WITH CLAY (GW-GC)
- POORLY-GRADED GRAVEL WITH SILT (GP-GM)
- POORLY-GRADED GRAVEL WITH CLAY (GP-GC)
- CLAYEY GRAVEL (GC)
- SILTY GRAVEL (GM)
- SILTY, CLAYEY GRAVEL (GC-GM)
- WELL-GRADED SAND (SW)
- POORLY-GRADED SAND (SP)
- WELL-GRADED SAND WITH SILT (SW-SM)
- WELL-GRADED SAND WITH CLAY (SW-SC)
- POORLY-GRADED SAND WITH SILT (SP-SM)
- POORLY-GRADED SAND WITH CLAY (SP-SC)
- SILTY SAND (SM)
- CLAYEY SAND (SC)
- SILTY, CLAYEY SAND (SC-SM)
- SILTY SAND/SANDY SILT (SM-ML)
- CLAYEY SAND/LEAN CLAY (SC/CL)
- SILT (ML)
- LEAN CLAY (CL)
- SILTY CLAY (CL-ML)
- LOW PLASTICITY ORGANICS (OL)
- ELASTIC SILT (MH)
- FAT CLAY (CH)
- CLAY (CH-MH)
- HIGH PLASTICITY ORGANICS (OH)
- PAVEMENT WITH OR WITHOUT AGGREGATE BASE
- FILL
- NO DATA

SOIL BORING LITHOLOGY WITH UNDRAINED SHEAR STRENGTH (Su) EXAMPLE



CPT SOUNDING WITH INTERPRETED LITHOLOGY AND UNDRAINED SHEAR STRENGTH (Su) EXAMPLE



CLASSIFICATION TEST SYMBOLS

- γ = DRY DENSITY (pcf)
- ω = WATER CONTENT (%)
- LL = LIQUID LIMIT (%)
- PI = PLASTICITY INDEX (%)

PENETRATION RESISTANCE SYMBOLS

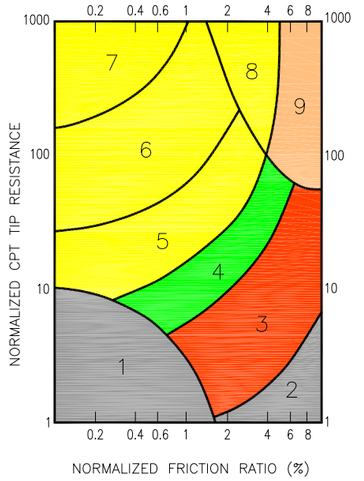
- + = MEASURED SPT BLOW COUNT (BLOWS PER FOOT (Bpf))
- $\ominus$ = MEASURED MODIFIED CALIFORNIA SAMPLER BLOW COUNT (Bpf)
- ∇ = MEASURED CALIFORNIA SAMPLER BLOW COUNT (Bpf)
- << = INDICATES BLOW COUNTS EXCEED GRAPHIC SCALE

UNDRAINED SHEER STRENGTH SYMBOLS

- × = POCKET PENETROMETER
- ◇ = TORVANE
- □ = UNCONFINED COMPRESSION
- () = FIELD VANE
- ○ = MINI VANE

SUBSURFACE EXPLORATIONS

- CPT-XX EXISTING CPT PHASE 1
- BH-XX EXISTING BORING PHASE 1
- CPT-XX NEW CPT PHASE 2
- BH-XX NEW BORING PHASE 2



ZONE	SOIL BEHAVIOR TYPE (SBT)
1	SENSITIVE FINE-GRAINED
2	ORGANIC MATERIAL
3	CLAY TO SILTY CLAY
4	CLAYEY SILT TO SILTY CLAY
5	SILTY SAND TO SANDY SILT
6	CLEAN SANDS TO SILTY SANDS
7	GRAVELLY SAND TO SAND
8	VERY STIFF SAND TO CLAYEY SAND*
9	VERY STIFF FINE-GRAINED*

*OVERCONSOLIDATED OR CEMENTED

CPT CORRELATION CHART
(MODIFIED FROM ROBERTSON, 1990)

LEGEND

- EXISTING GROUND SURFACE
- TUNNEL EXTENTS
- TUNNEL SPRINGLINE
- EXCAVATION BOUNDERIES

NOTES:

1. STATIONING AND PROFILE ARE RELATIVE TO S1 TUNNEL ALIGNMENT DATED APRIL 25, 2008.
2. ELEVATIONS ARE BASED ON 1988 NAVD.
3. MAXIMUM UNDRAINED SHEAR STRENGTH CAPACITY OF FIELD VANE IS ~ 2.0 ksf.
4. MAXIMUM UNDRAINED SHEAR STRENGTH CAPACITY OF POCKET PENETROMETER IS 4.5 ksf.
5 MAXIMUM UNDRAINED SHEAR STRENGTH CAPACITY OF TORVANE IS ~ 2.0 ksf.
6. CPT UNDRAINED SHEAR STRENGTH VALUES TRUNCATED AT 6.0 ksf.
7. CPT UNDRAINED SHEAR STRENGTH NOT APPLICABLE FOR SBT ZONES 5, 6, 7, AND 8, HENCE NOT SHOWN.
8. BORING LOGS FOR BH-83, BH-86, BH-92, BH-94, BH-96 AND BH-104 ARE INCLUDED IN PUMPING TEST DATA REPORT (HMM/BECHTEL, FEBRUARY 2008).
9. FOR BORINGS BH-24, BH-52, BH-58, BH-70 AND BH-74, CLASSIFICATION TEST RESULTS ARE NOT SHOWN AT CORRECT DEPTHS. REFER TO BORING LOGS IN APPENDIX 1 OF THIS PHASE TWO – 65% ENGINEERING DESIGN INVESTIGATION GEOTECHNICAL DATA REPORT.

REV	DATE	BY	SUB	APP	DESCRIPTION
0	20080429				FOR USE

DESIGNED BY A. JAIN
DRAWN BY R. VILLEGAS
CHECKED BY A. LIU
IN CHARGE A. LIU
DATE 20080429

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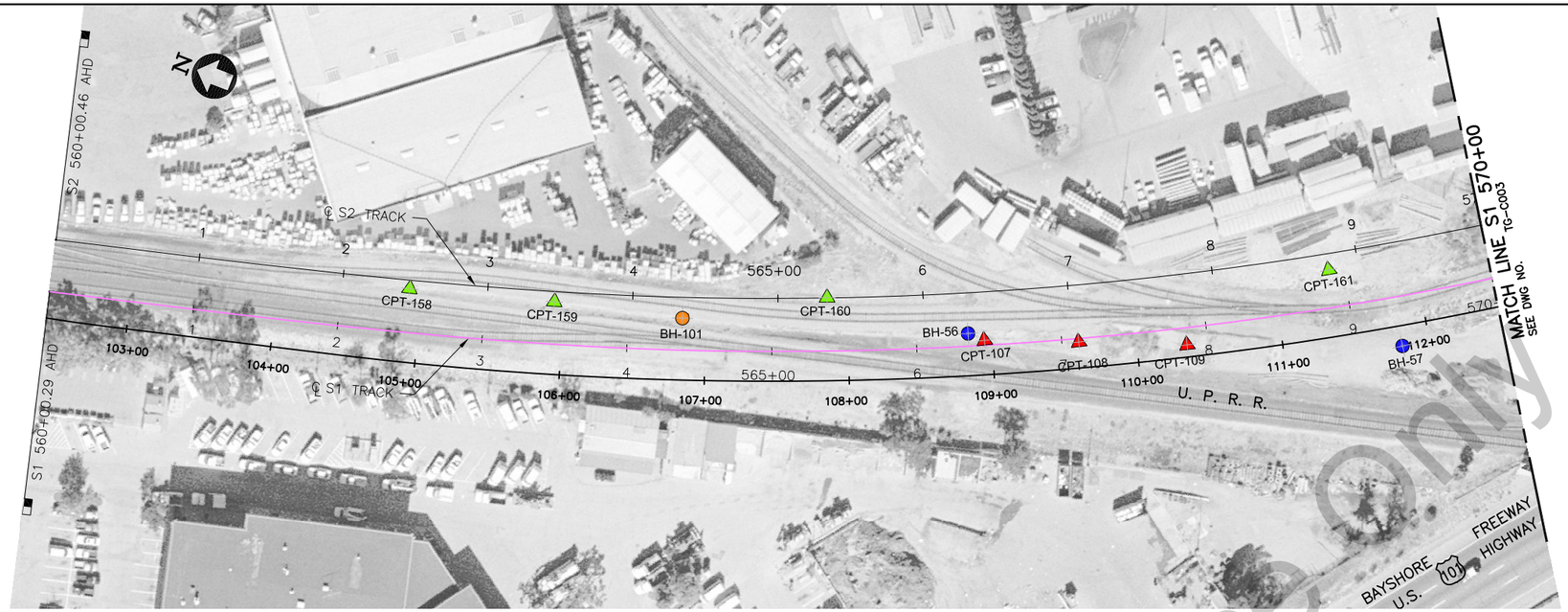
SUBMITTED _____ APPROVED _____

VTA Silicon Valley Rapid Transit Corridor — BART

SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
LEGEND

CADD FILENAME D300-S-TG-C001-A.dwg
SIZE B | SCALE NTS
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-1 | PAGE NO.

Figure 5-2 Geotechnical Plan and Profile with Classification Test Results: STA 561+00 to STA 570+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-158
30 FT, LEFT
EL = 91.6

CPT-159
29 FT, LEFT
EL = 91.0

BH-101
22 FT, LEFT
EL = 90.8

CPT-160
37 FT, LEFT
EL = 89.4

BH-56
9 FT, LEFT
EL = 89.7

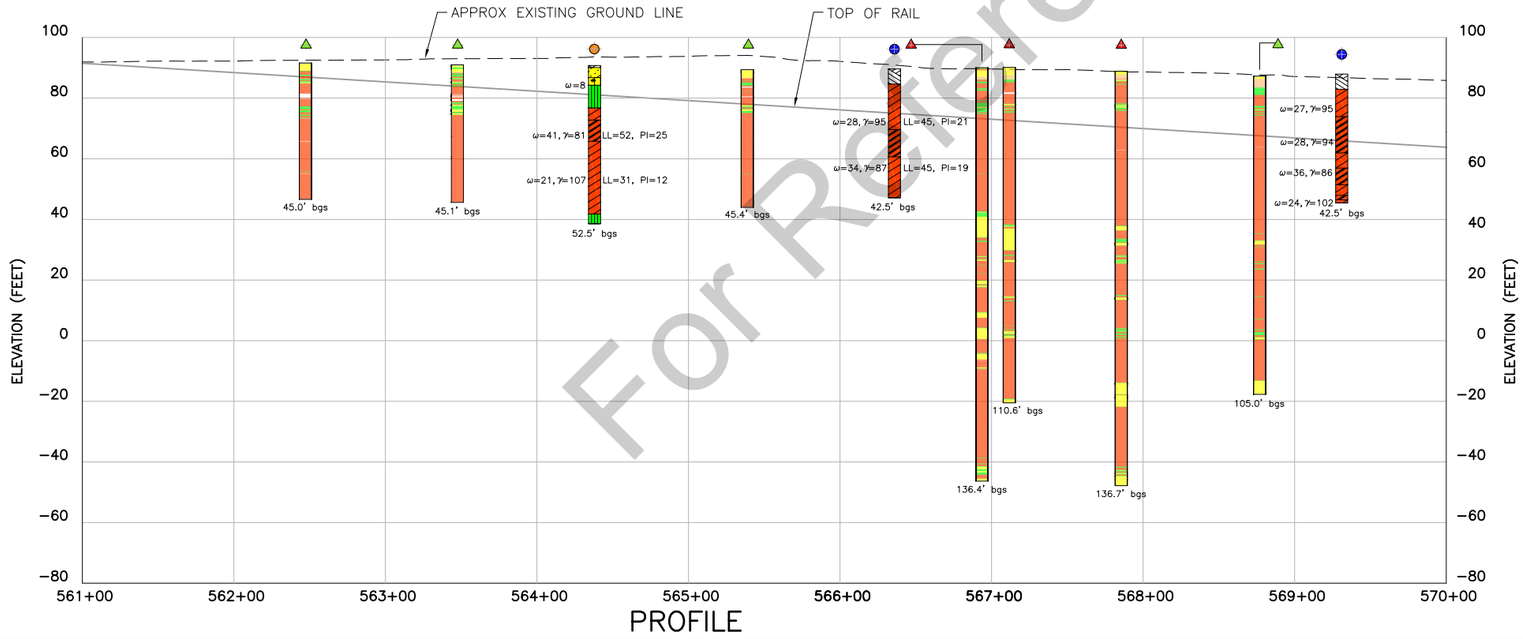
CPT-107
3 FT, LEFT
EL = 90.0

CPT-108
2 FT, RIGHT
EL = 90.1

CPT-109
12 FT, RIGHT
EL = 88.9

CPT-161
26 FT, LEFT
EL = 87.3

BH-57
34 FT, RIGHT
EL = 87.9



PROFILE

REV	DATE	BY	SUB	APP	DESCRIPTION
0	20080429				FOR USE

DESIGNED BY A. JAIN
DRAWN BY R. VILLEGAS
CHECKED BY A. LIU
IN CHARGE A. LIU
DATE 20080429

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VTA Silicon Valley Rapid Transit Corridor

SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Classification Test Results
S1 STA 561+00 TO STA 570+00

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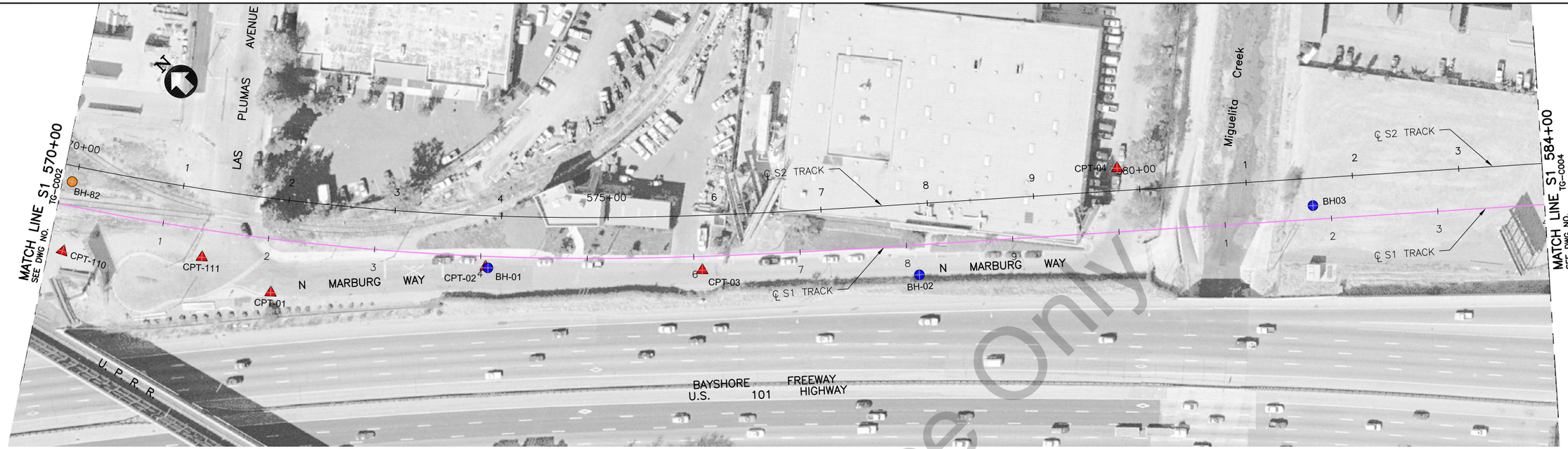
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-2 | PAGE NO.

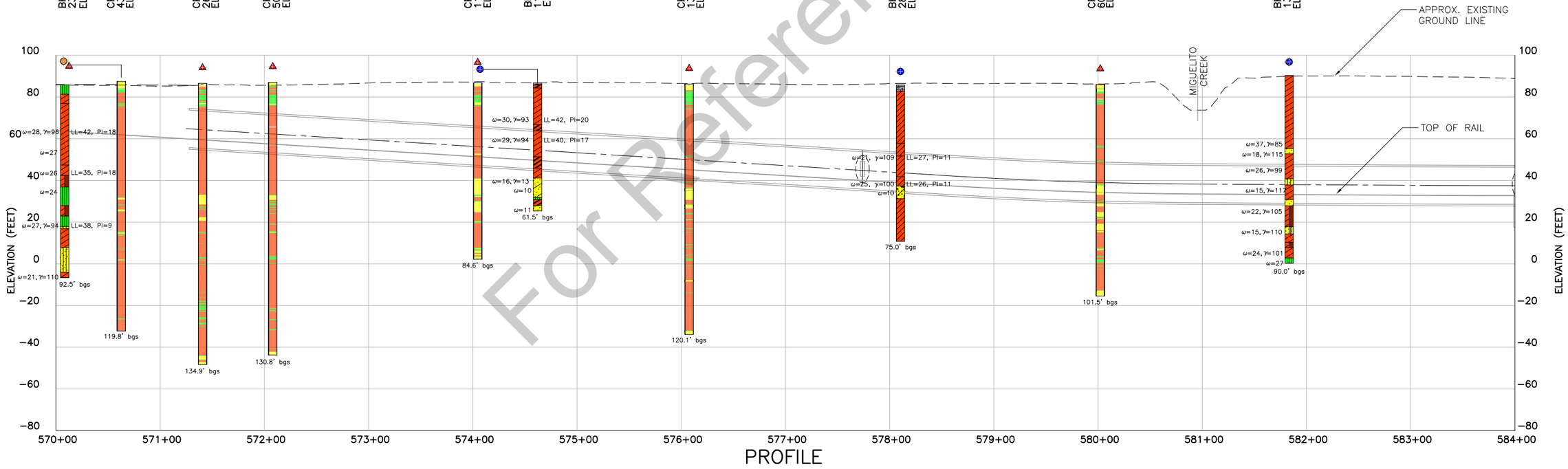
Figure 5-3 Geotechnical Plan and Profile with Classification Test Results: STA 570+00 to STA 584+00



PLAN

GRAPHIC SCALE 50' 0' 50' 100'

BH-82 23 FT, LEFT EL = 85.9
CPT-110 43 FT, RIGHT EL = 87.6
CPT-111 26 FT, RIGHT EL = 86.6
CPT-01 50 FT, RIGHT EL = 87.1
CPT-02 11 FT, RIGHT EL = 86.8
BH-01 11 FT, RIGHT EL = 86.9
CPT-03 13 FT, RIGHT EL = 86.2
BH-02 28 FT, RIGHT EL = 85.8
CPT-04 60 FT, LEFT EL = 86.0
BH-03 13 FT, LEFT EL = 90.3



PROFILE

REV	DATE	BY	SUB	APP	DESCRIPTION
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DESIGNED BY A. JAIN
DRAWN BY R. VILLEGAS
CHECKED BY A. LIU
IN CHARGE A. LIU
DATE 20080429

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VTA Silicon Valley Rapid Transit Corridor

SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Classification Test Results
S1 STA 570+00 TO STA 584+00

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CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-3 | PAGE NO.

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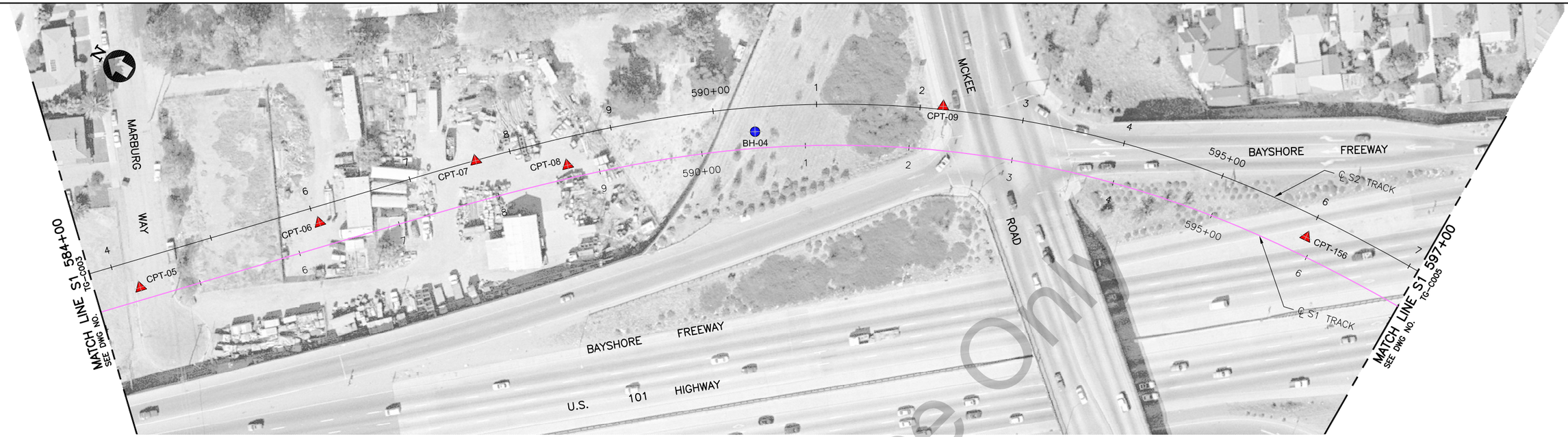
Figure 5-4 Geotechnical Plan and Profile with Classification Test Results: STA 584+00 to STA 597+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-05
12 FT, LEFT
EL = 87.1

CPT-06
23 FT, LEFT
EL = 87.0

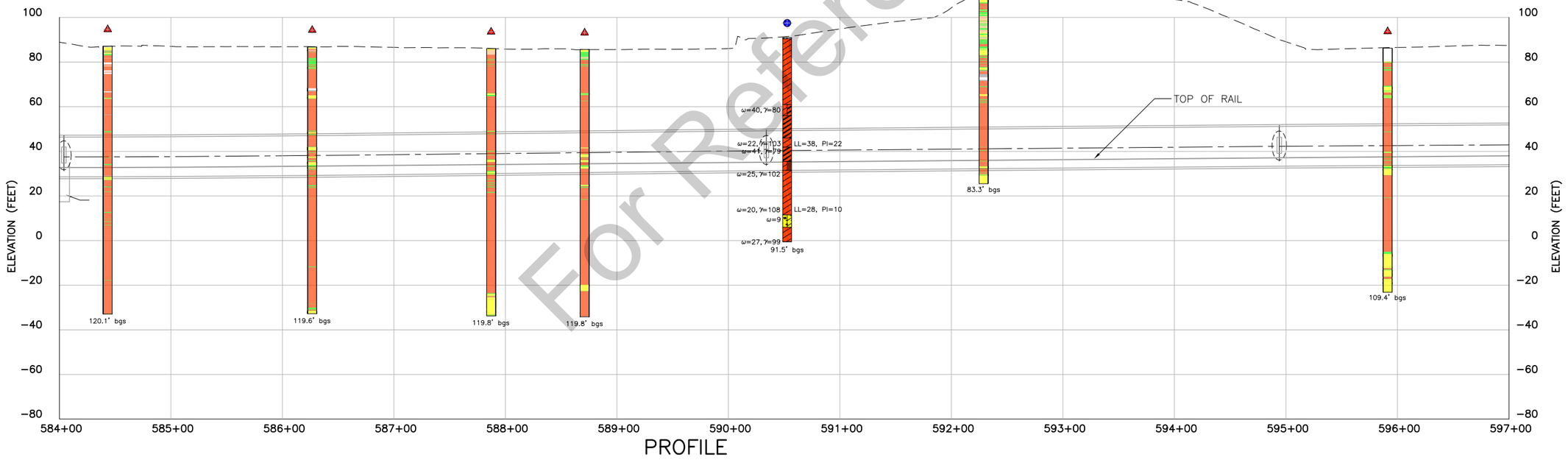
CPT-07
39 FT, LEFT
EL = 86.0

CPT-08
13 FT, LEFT
EL = 85.6

BH-04
16 FT, LEFT
EL = 91.0

CPT-09
43 FT, LEFT
EL = 108.8

CPT-156
18 FT, LEFT
EL = 86.2



PROFILE

REV	DATE	BY	SUB	APP	DESCRIPTION
A	20080407				IN PROGRESS

DESIGNED BY A. JAIN
DRAWN BY R. VILLEGAS
CHECKED BY
IN CHARGE A. LIU
DATE 20080407

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VTA Silicon Valley Rapid Transit Corridor

SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Classification Test Results
S1 STA 584+00 TO STA 597+00

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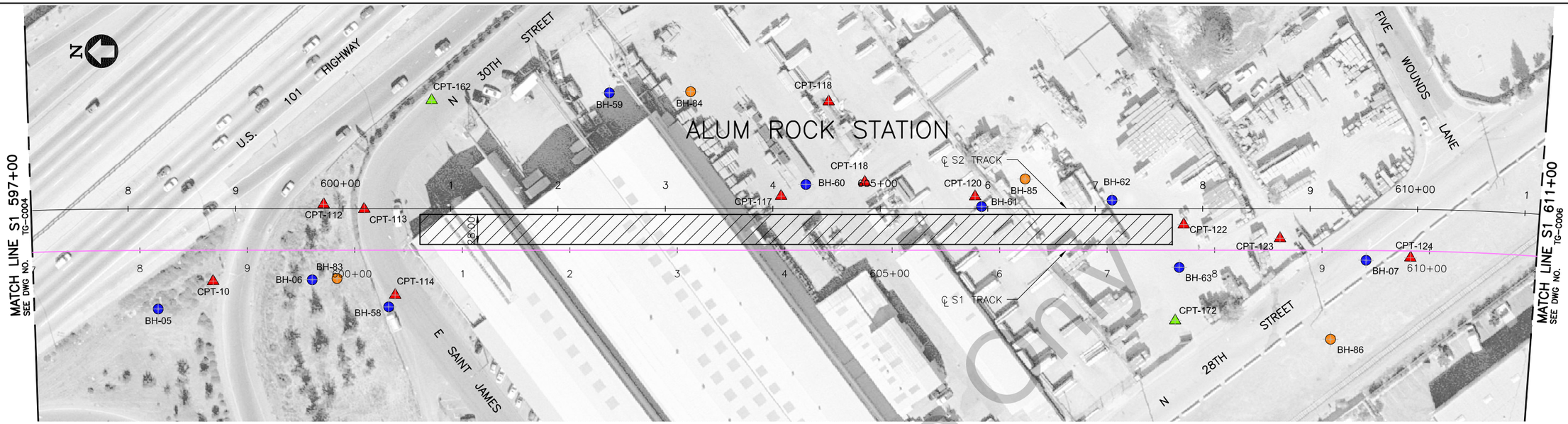
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-4 | PAGE NO.

Figure 5-5 Geotechnical Plan and Profile with Classification Test Results: STA 597+00 to STA 611+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-05
55 FT, RIGHT
EL = 85.5

CPT-10
29 FT, RIGHT
EL = 85.5

BH-06
27 FT, RIGHT
EL = 84.1

CPT-112
43 FT, LEFT
EL = 85.6

BH-83
26 FT, RIGHT
EL = 83.9

CPT-113
38 FT, LEFT
EL = 87.2

BH-58
53 FT, RIGHT
EL = 87.5
(SEE NOTE 9)

CPT-114
42 FT, RIGHT
EL = 87.3

CPT-162
139 FT, LEFT
EL = 87.1

BH-59
146 FT, LEFT
EL = 87.7

BH-84
147 FT, LEFT
EL = 87.4

CPT-117
50 FT, LEFT
EL = 87.5

BH-60
61 FT, LEFT
EL = 87.4

CPT-118
63 FT, LEFT
EL = 87.9

CPT-120
50 FT, LEFT
EL = 88.9

BH-61
41 FT, LEFT
EL = 89.1

BH-85
51 FT, LEFT
EL = 89.2

BH-62
47 FT, LEFT
EL = 88.9

CPT-172
65 FT, RIGHT
EL = 88.0

BH-63
16 FT, RIGHT
EL = 88.2

CPT-122
24 FT, LEFT
EL = 88.2

CPT-123
11 FT, LEFT
EL = 87.9

BH-86
83 FT, RIGHT
EL = 88.0

BH-07
9 FT, RIGHT
EL = 87.9

CPT-124
6 FT, RIGHT
EL = 88.3

APPROX. EXISTING GROUND LINE

TOP OF RAIL

ELEVATION (FEET)

100 80 60 40 20 0 −20 −40 −60 −80 −100 −120

597+00 598+00 599+00 600+00 601+00 602+00 603+00 604+00 605+00 606+00 607+00 608+00 609+00 610+00 611+00

92.5' bgs
121.3' bgs
82.5' bgs
99.0' bgs
200' bgs
102.0' bgs
151.5' bgs
108.5' bgs
73.2' bgs
200.5' bgs
207.5' bgs
108.4' bgs
152.2' bgs
112.9' bgs
104.2' bgs
151.5' bgs
202.5' bgs
151.0' bgs
113.4' bgs
151.5' bgs
88.7' bgs
118.1' bgs
190.0' bgs
86.0' bgs
120.0' bgs

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CADD FILENAME D300-S-TG-C005-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-5 | PAGE NO.

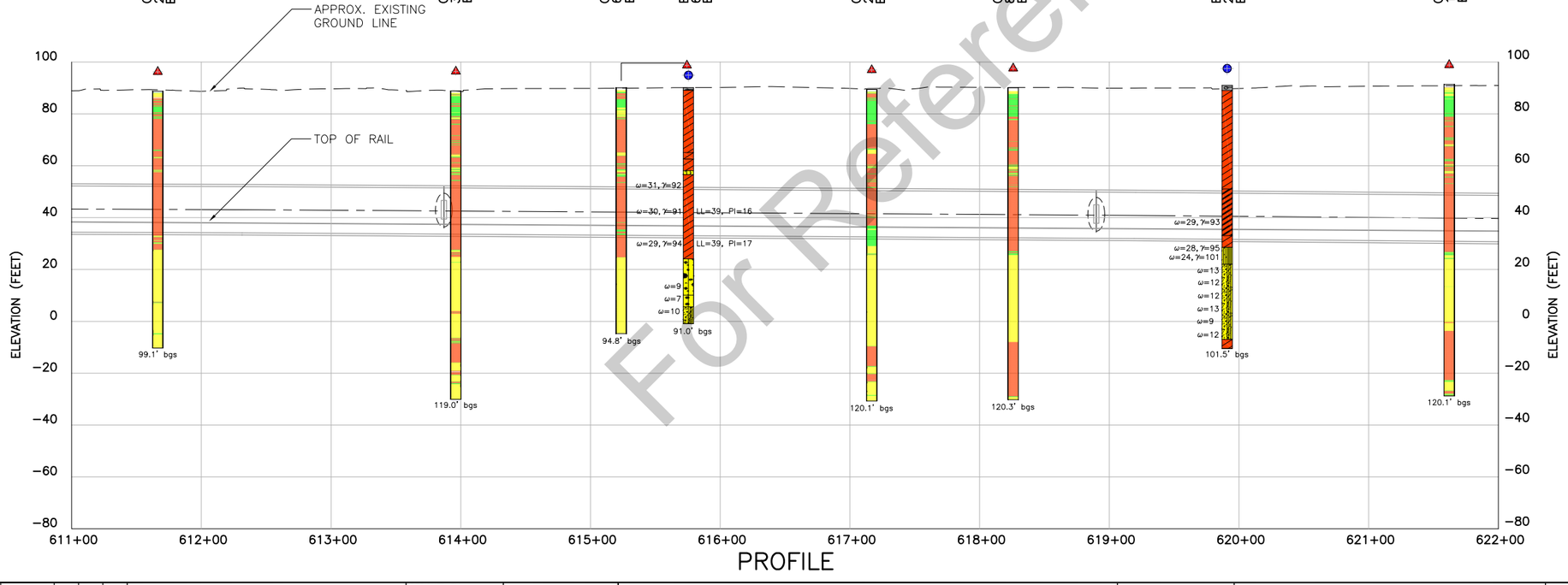
May. 08, 2008 - 4:39pm W:\TUCAD\35% PE\D300\STUDIES\TG-GEOTECH\GDR_REV1_DRAWINGS\D300-S-TG-C005-A.dwg
VILLEGAS_R

Figure 5-6 Geotechnical Plan and Profile with Classification Test Results: STA 611+00 to STA 622+00

PLAN

GRAPHIC SCALE 50' 0' 50' 100'

CPT-11 25 FT, LEFT EL = 88.8
CPT-12 36 FT, LEFT EL = 88.9
CPT-13 61 FT, RIGHT EL = 90.1
BH-08 64 FT, RIGHT EL = 90.1
CPT-14 24 FT, LEFT EL = 89.4
CPT-15 89 FT, LEFT EL = 90.1
BH-09 26 FT, LEFT EL = 91.0
CPT-16 13 FT, LEFT EL = 91.4



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With Classification Test Results
S1 STA 611+00 TO STA 622+00

CADD FILENAME D300-S-TG-C006-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-6 | PAGE NO.

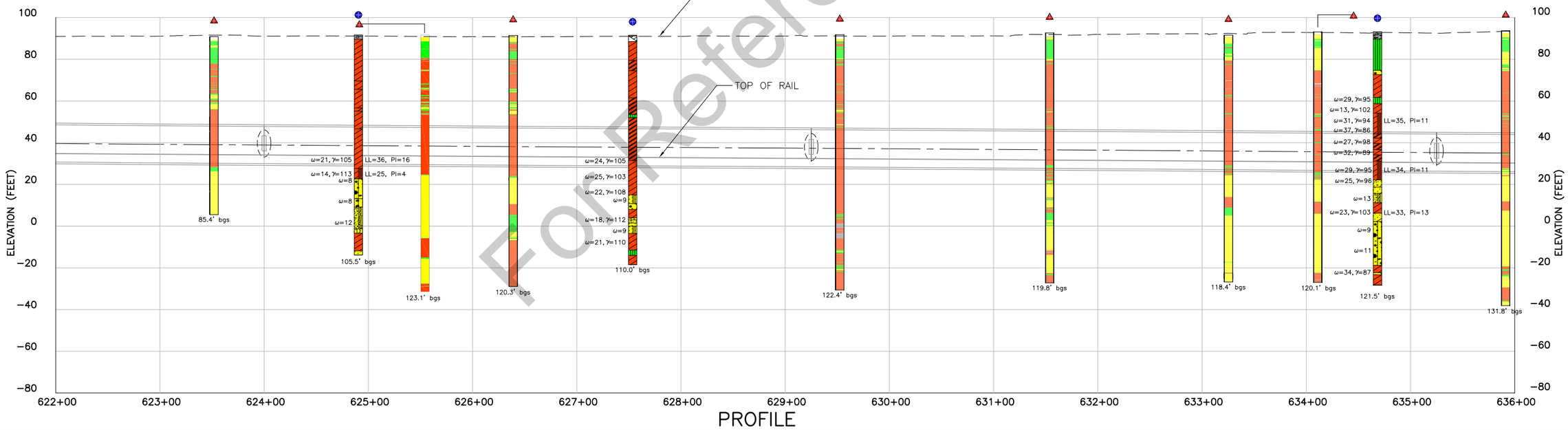
Figure 5-7 Geotechnical Plan and Profile with Classification Test Results: STA 622+00 to STA 636+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-17 86 FT, LEFT EL = 90.9
BH-10 14 FT, LEFT EL = 91.7
CPT-18 12 FT, LEFT EL = 91.7
CPT-19 12 FT, LEFT EL = 91.4
BH-11 14 FT, LEFT EL = 91.5
CPT-20 12 FT, LEFT EL = 91.8
CPT-21 24 FT, LEFT EL = 92.6
CPT-22 113 FT, LEFT EL = 91.6
CPT-23 48 FT, LEFT EL = 93.2
BH-12 51 FT, LEFT EL = 93.2
CPT-24 63 FT, LEFT EL = 93.7



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With Classification Test Results
S1 STA 622+00 TO STA 636+00

CADD FILENAME D300-S-TG-C007-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-7 | PAGE NO.

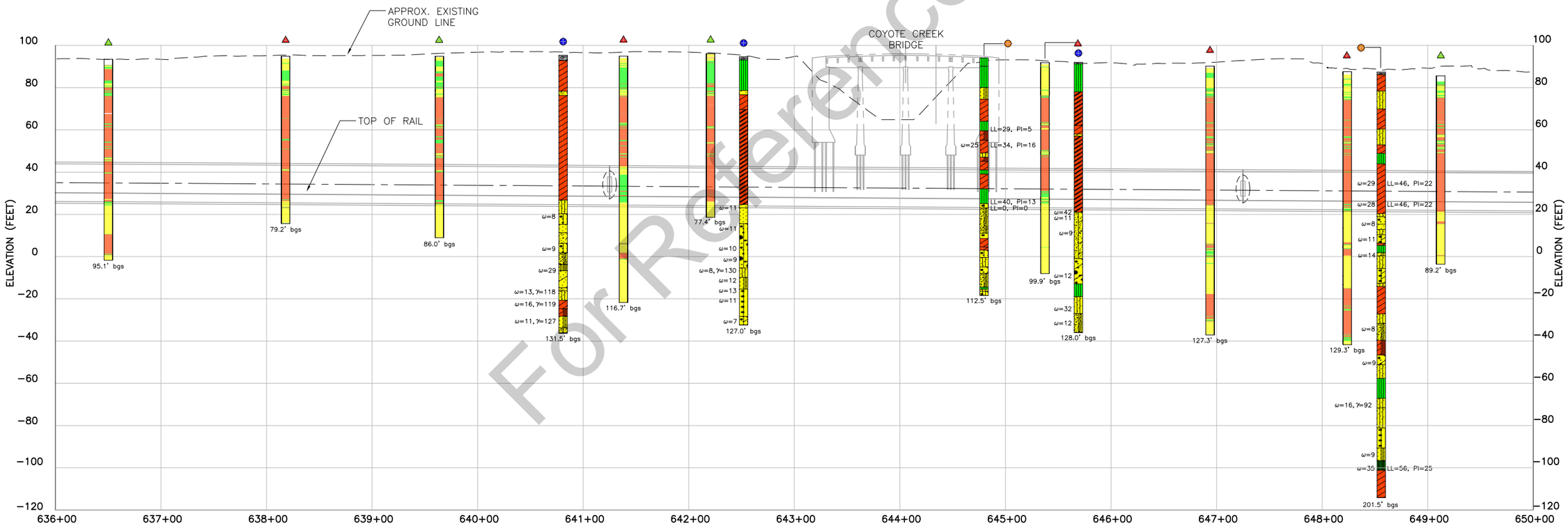
Apr 29, 2008 - 5:57pm W:\TUCADD\35% PE\D300\STUDIES\TG-GEOTECH\GDR_REV1_DRAWINGS\D300-S-TG-C007-A.dwg
VILLEGAS_R

Figure 5-8 Geotechnical Plan and Profile with Classification Test Results: STA 636+00 to STA 650+00

CPT-163 182 FT, LEFT EL = 93.4
CPT-25 83 FT, LEFT EL = 94.9
CPT-164 203 FT, LEFT EL = 94.9
BH-13 94 FT, LEFT EL = 95.3
CPT-26 95 FT, LEFT EL = 95.1
CPT-165 205 FT, LEFT EL = 96.1
BH-14 98 FT, LEFT EL = 94.6
BH-88 66 FT, RIGHT EL = 94.1
CPT-27 178 FT, LEFT EL = 92.0
BH-15 180 FT, LEFT EL = 92.0
CPT-28 98 FT, LEFT EL = 90.2
CPT-29 95 FT, LEFT EL = 87.6
BH-87 49 FT, LEFT EL = 87.4
CPT-166 205 FT, LEFT EL = 85.6

PLAN

50' 0' 50' 100'
GRAPHIC SCALE



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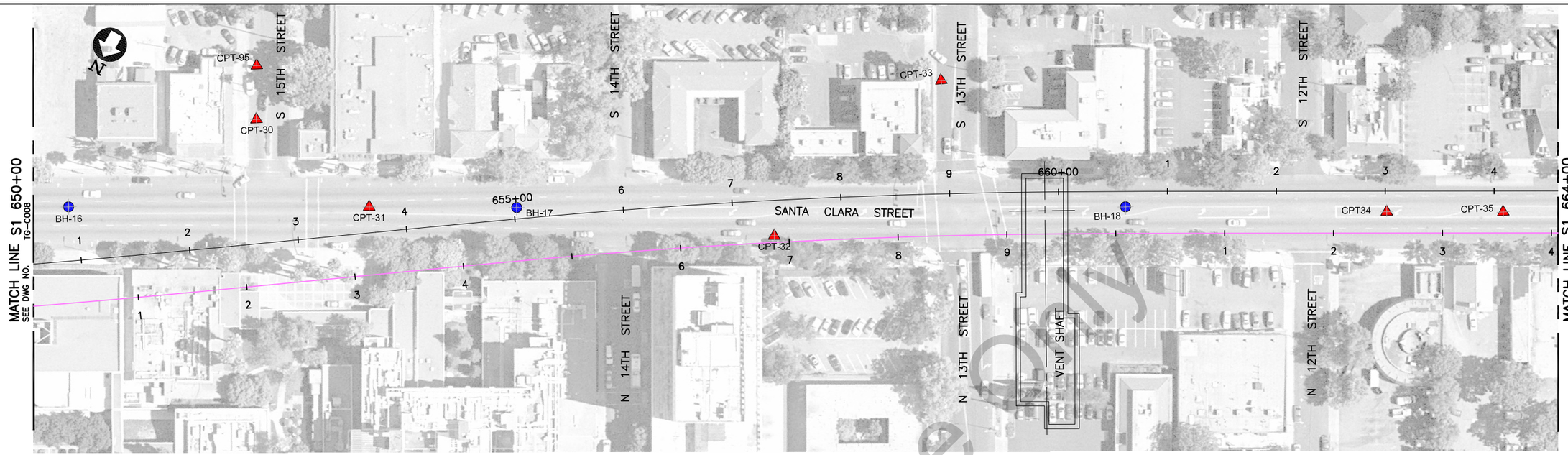
With Classification Test Results
S1 STA 636+00 TO STA 650+00

CADD FILENAME D300-S-TG-C008-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-8 | PAGE NO.

Figure 5-9 Geotechnical Plan and Profile with Classification Test Results: STA 650+00 to STA 664+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-16
88 FT, LEFT
EL = 85.3

CPT-30
152 FT, LEFT
EL = 83.2

CPT-95
201 FT, LEFT
EL = 83.5

CPT-31
62 FT, LEFT
EL = 83.1

BH-17
49 FT, RIGHT
EL = 82.5

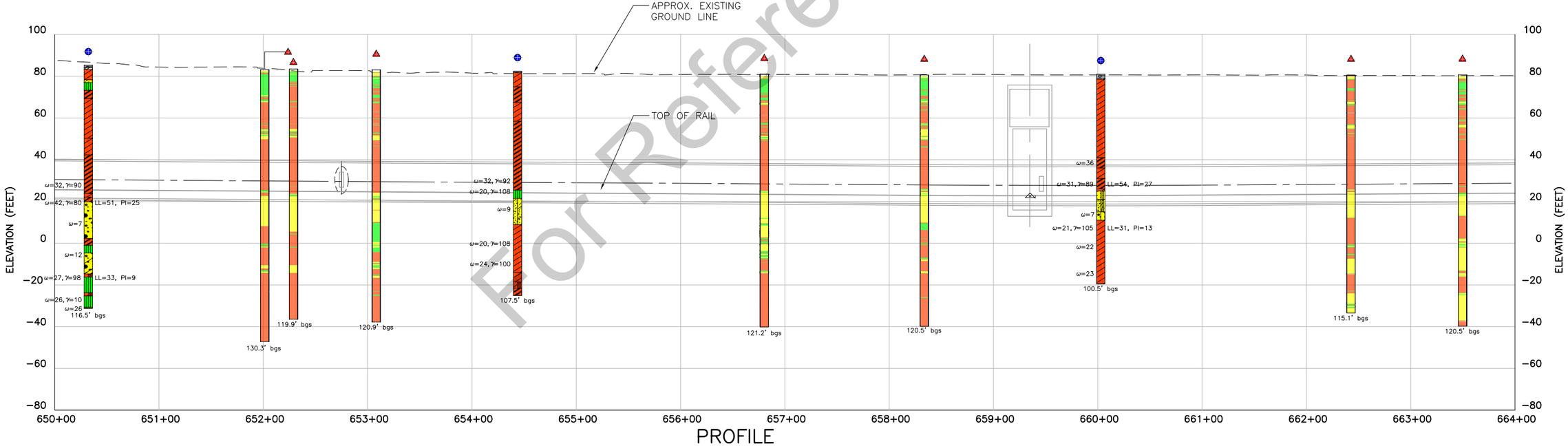
CPT-32
6 FT, LEFT
EL = 81.1

CPT-33
143 FT, LEFT
EL = 80.6

BH-18
24 FT, LEFT
EL = 81.0

CPT-34
20 FT, LEFT
EL = 80.6

CPT-35
19 FT, LEFT
EL = 80.7



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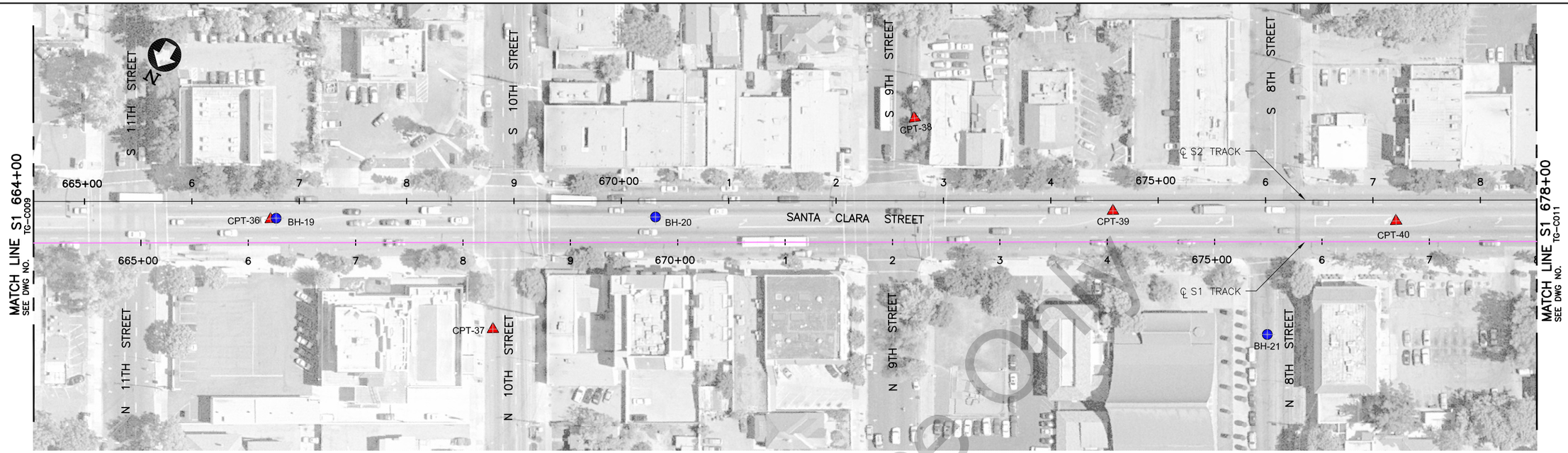
With Classification Test Results
S1 STA 650+00 TO STA 664+00

CADD FILENAME D300-S-TG-C009-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-9 | PAGE NO.

Figure 5-10 Geotechnical Plan and Profile with Classification Test Results: STA 664+00 to STA 678+00



PLAN

50' 0' 50' 100'
GRAPHIC SCALE

CPT-36
22 FT, LEFT
EL = 80.8

BH-19
23 FT, LEFT
EL = 80.8

CPT-37
81 FT, RIGHT
EL = 80.0

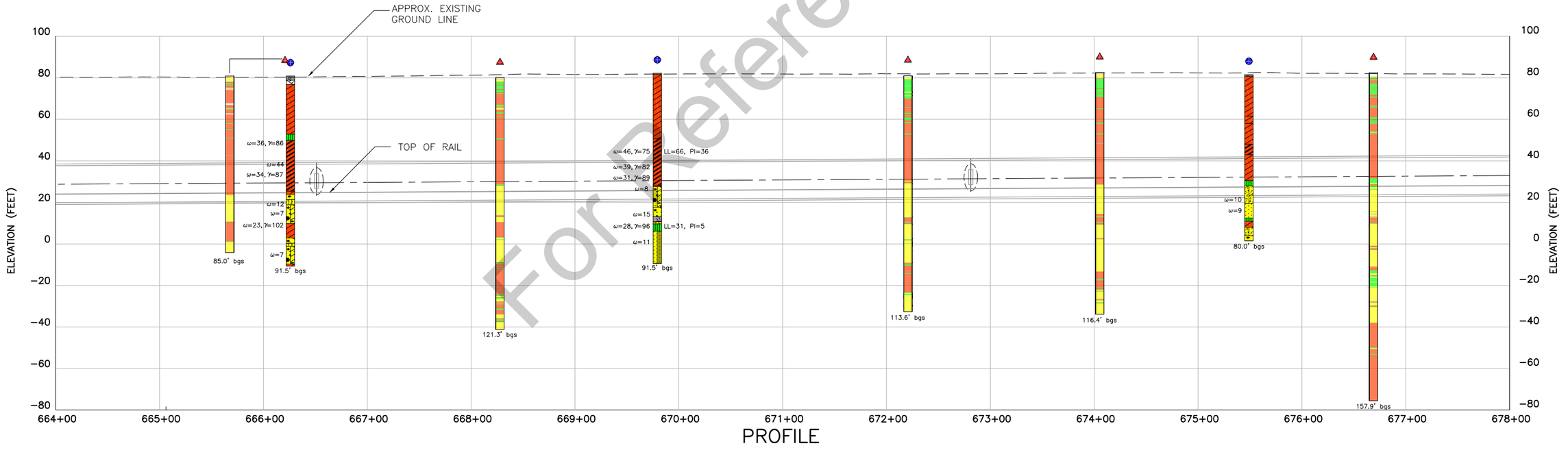
BH-20
24 FT, LEFT
EL = 82.2

CPT-38
115 FT, LEFT
EL = 81.0

CPT-39
29 FT, LEFT
EL = 82.5

BH-21
86 FT, RIGHT
EL = 81.5

CPT-40
19 FT, LEFT
EL = 82.4



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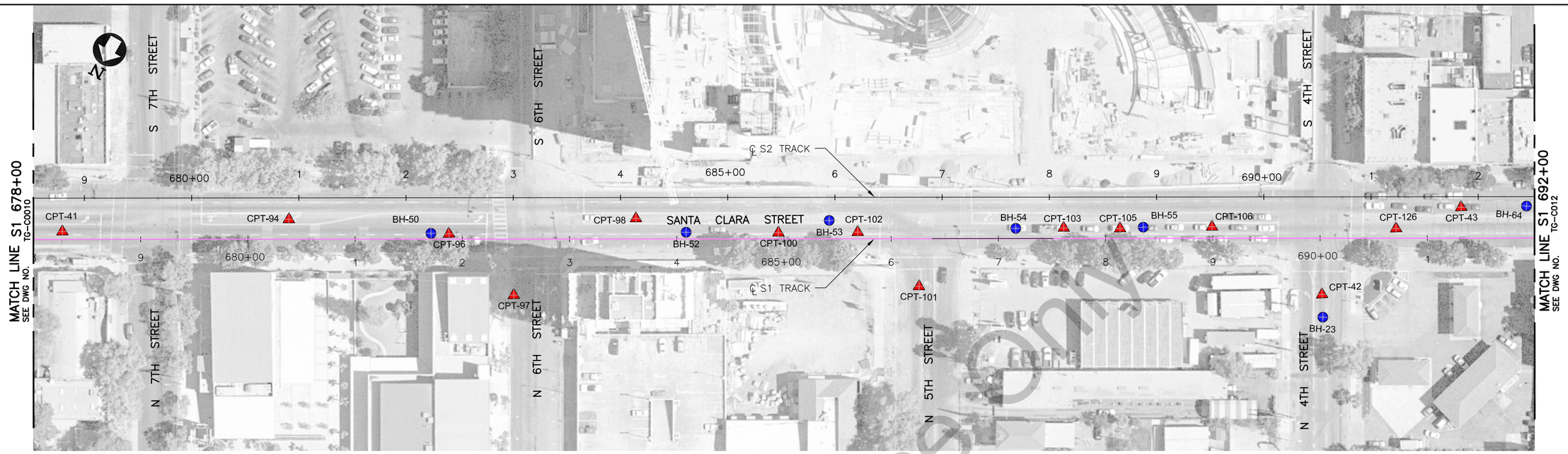
S1 STA 664+00 TO STA 678+00

CADD FILENAME D300-S-TG-C010-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-10 | PAGE NO.

Figure 5-11 Geotechnical Plan and Profile with Classification Test Results: STA 678+00 to STA 692+00

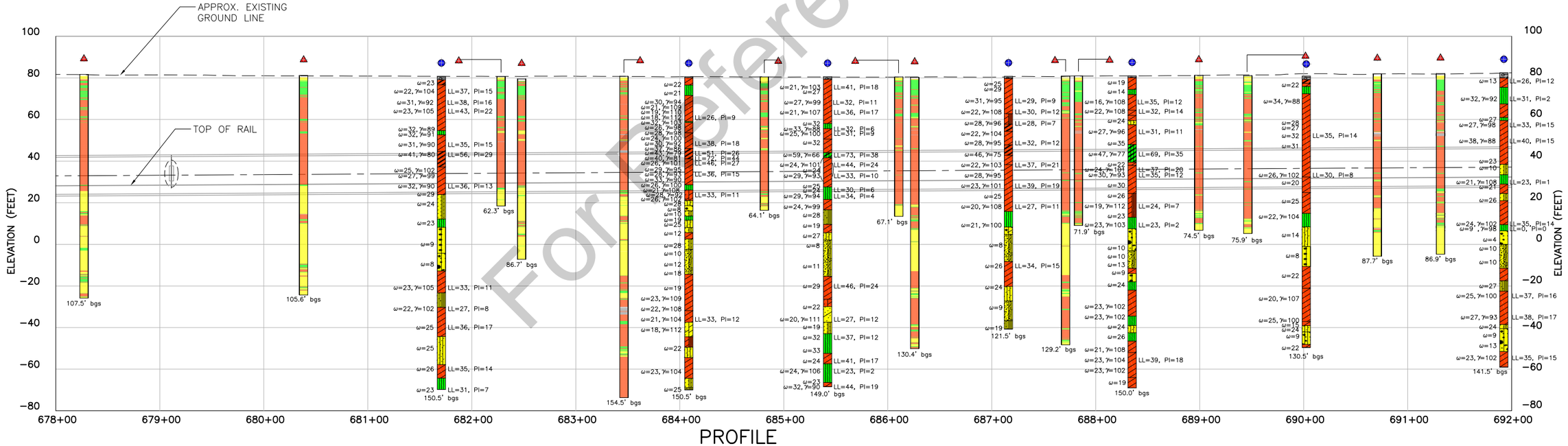


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-41 7 FT, LEFT EL = 81.7
CPT-94 19 FT, LEFT EL = 81.2
BH-50 5 FT, LEFT EL = 80.7
CPT-96 5 FT, LEFT EL = 80.7
CPT-97 52 FT, RIGHT EL = 79.5
CPT-98 19 FT, LEFT EL = 80.8
BH-52 6 FT, LEFT EL = 80.6 (SEE NOTE 9)
CPT-100 6 FT, LEFT EL = 80.5
BH-53 17 FT, LEFT EL = 80.6
CPT-102 6 FT, LEFT EL = 80.5
CPT-101 44 FT, RIGHT EL = 80.3
BH-54 10 FT, LEFT EL = 80.8
CPT-103 10 FT, LEFT EL = 80.9
CPT-105 9 FT, LEFT EL = 81.0
BH-55 11 FT, LEFT EL = 81.0
CPT-106 11 FT, LEFT EL = 81.3
CPT-42 52 FT, RIGHT EL = 81.1
BH-23 74 FT, RIGHT EL = 80.9
CPT-126 9 FT, LEFT EL = 82.0
CPT-43 29 FT, LEFT EL = 82.1
BH-64 30 FT, LEFT EL = 82.5



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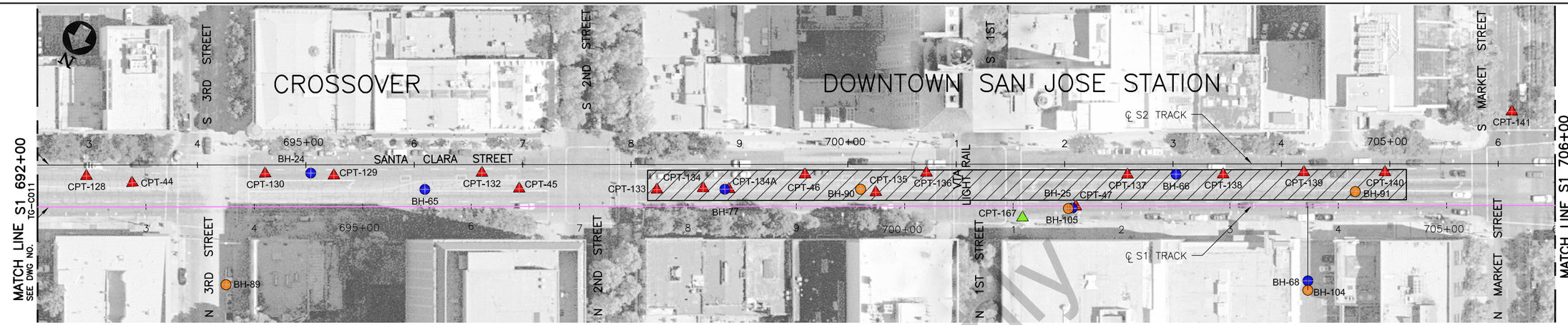
S1 STA 678+00 TO STA 692+00

CADD FILENAME D300-S-TG-C011-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-11 | PAGE NO.

Figure 5-12 Geotechnical Plan and Profile with Classification Test Results: STA 692+00 to STA 706+00

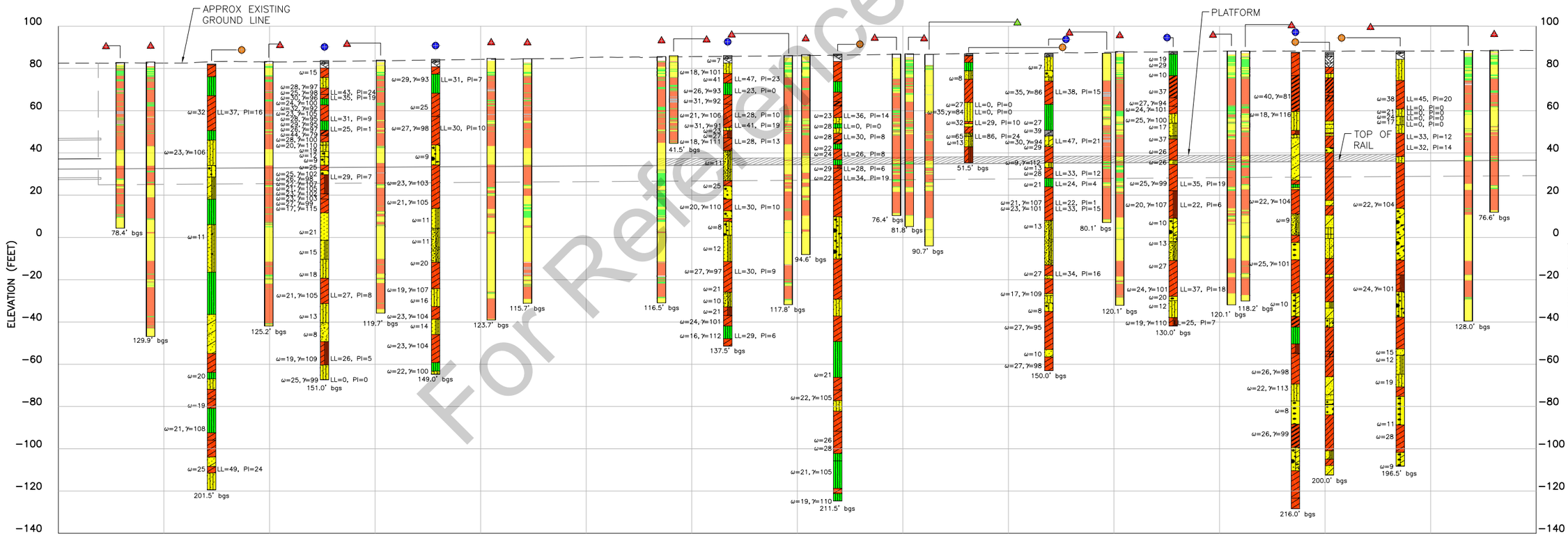


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-128 28 FT, LEFT EL = 82.8
CPT-44 22 FT, LEFT EL = 83.0
BH-89 72 FT, RIGHT EL = 82.1
CPT-130 31 FT, LEFT EL = 83.3
BH-24 31 FT, LEFT EL = 83.7 (SEE NOTE 9)
CPT-129 29 FT, LEFT EL = 83.9
BH-65 16 FT, LEFT EL = 84.3
CPT-132 31 FT, LEFT EL = 84.7
CPT-45 16 FT, LEFT EL = 84.6
CPT-133 15 FT, LEFT EL = 85.6
CPT-134 17 FT, LEFT EL = 86.0
BH-77 16 FT, LEFT EL = 86.1
CPT-134A 16 FT, LEFT EL = 86.1
CPT-46 29 FT, LEFT EL = 86.5
BH-90 16 FT, LEFT EL = 86.8
CPT-135 13 FT, LEFT EL = 86.8
CPT-136 31 FT, LEFT EL = 86.9
CPT-167 11 FT, RIGHT EL = 86.6
BH-105 2 FT, RIGHT EL = 86.9
BH-25 2 FT, RIGHT EL = 87.0
CPT-47 1 FT, RIGHT EL = 87.2
CPT-137 29 FT, LEFT EL = 88.0
BH-66 29 FT, LEFT EL = 88.1
CPT-138 29 FT, LEFT EL = 88.2
CPT-139 31 FT, LEFT EL = 88.2
BH-68 69 FT, RIGHT EL = 87.6
BH-104 78 FT, LEFT EL = 87.6
BH-91 13 FT, LEFT EL = 88.3
CPT-140 31 FT, LEFT EL = 88.4
CPT-141 87 FT, LEFT EL = 88.6
CPT-142



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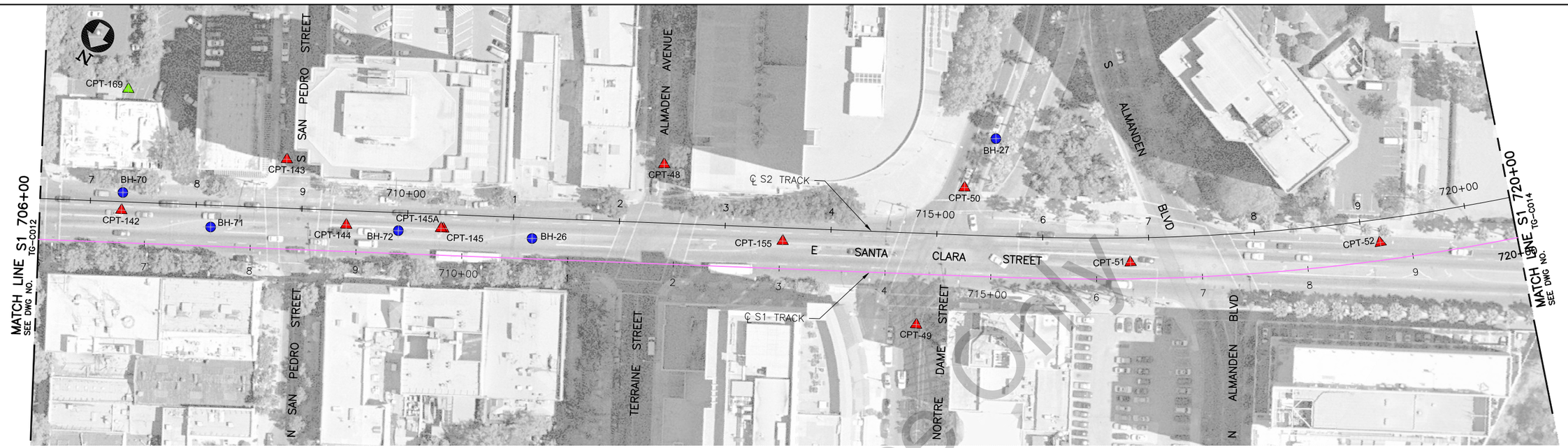
CADD FILENAME D300-S-TG-C012-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-12 | PAGE NO.

Figure 5-13 Geotechnical Plan and Profile with Classification Test Results: STA 706+00 to STA 720+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-142
31 FT, LEFT
EL = 88.4

BH-70
47 FT, LEFT
EL = 87.8
(SEE NOTE 9)

CPT-169
145 FT, LEFT
EL = 89.0

BH-71
18 FT, LEFT
EL = 88.7

CPT-143
85 FT, LEFT
EL = 87.7

CPT-144
25 FT, LEFT
EL = 88.2

BH-72
22 FT, LEFT
EL = 87.7

CPT-145A
25 FT, LEFT
EL = 87.1

CPT-145
25 FT, LEFT
EL = 87.1

BH-26
19 FT, LEFT
EL = 86.7

CPT-48
94 FT, LEFT
EL = 85.1

CPT-155
26 FT, LEFT
EL = 85.0

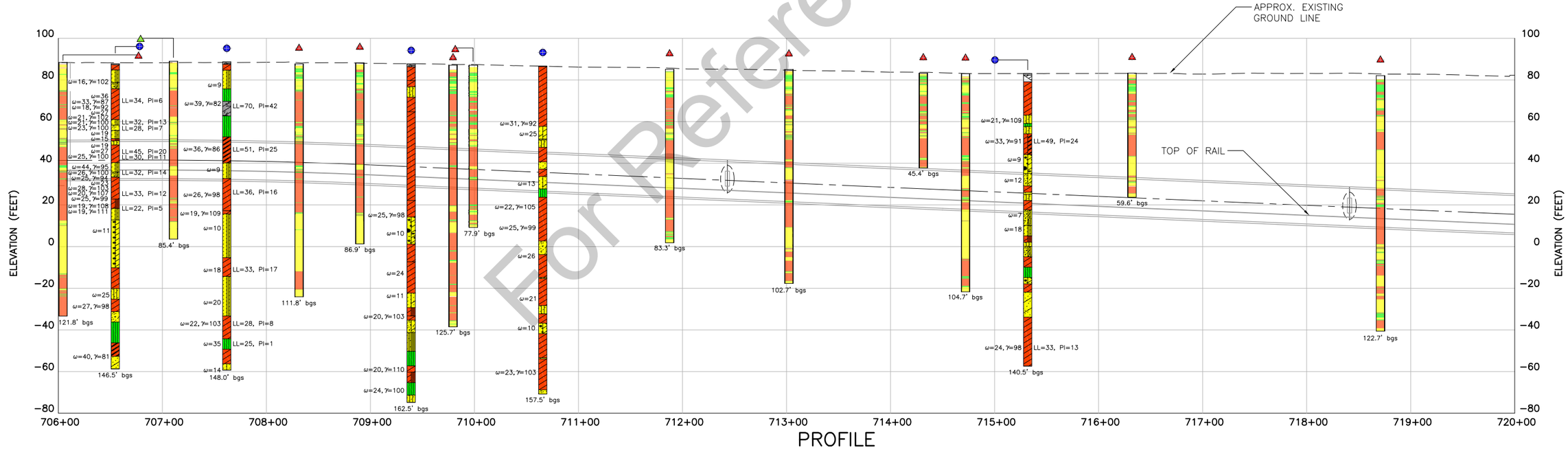
CPT-49
48 FT, RIGHT
EL = 83.2

CPT-50
83 FT, LEFT
EL = 83.0

BH-27
131 FT, LEFT
EL = 83.1

CPT-51
16 FT, LEFT
EL = 83.3

CPT-52
17 FT, LEFT
EL = 82.1



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S1 STA 706+00 TO STA 720+00

CADD FILENAME D300-S-TG-C013-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-13 | PAGE NO.

Figure 5-14 Geotechnical Plan and Profile with Classification Test Results: STA 720+00 to STA 732+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-28
48 FT, RIGHT
EL = 82.7

CPT-53
4 FT, LEFT
EL = 82.5

BH-29
29 FT, RIGHT
EL = 84.9

CPT-55A
34 FT, RIGHT
EL = 86.8

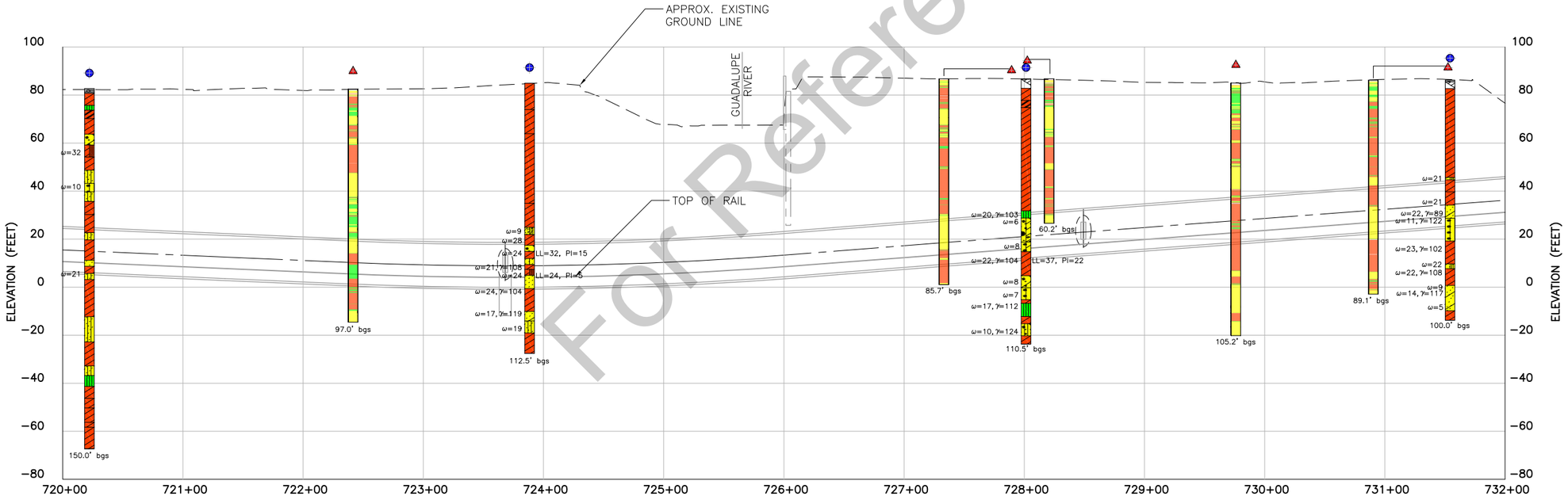
BH-30
32 FT, RIGHT
EL = 86.8

CPT-55
29 FT, RIGHT
EL = 86.8

CPT-56
69 FT, LEFT
EL = 85.0

CPT-57
6 FT, LEFT
EL = 86.2

BH-31
10 FT, LEFT
EL = 86.2



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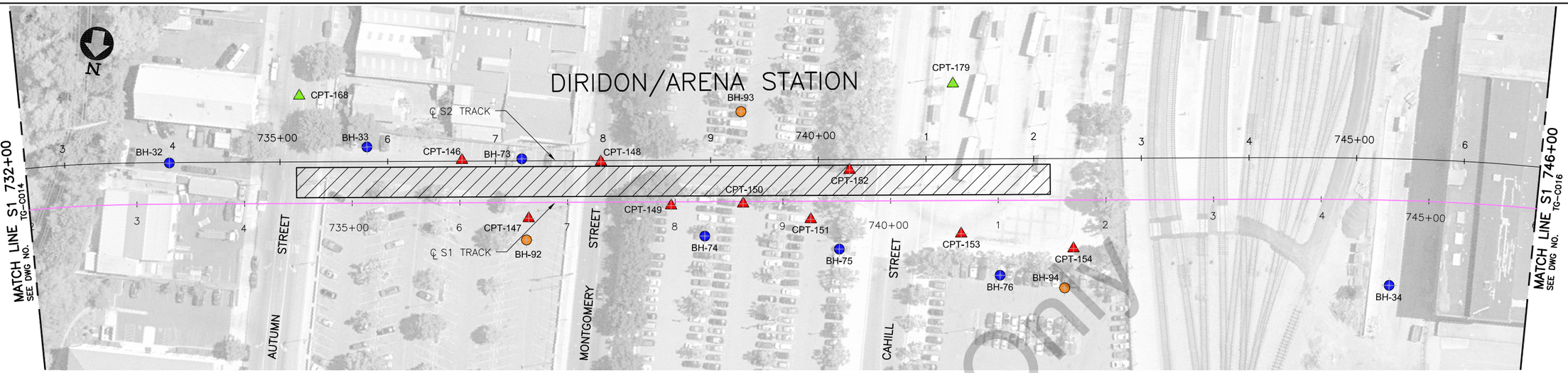
With Classification Test Results
S1 STA 720+00 TO STA 732+00

CADD FILENAME D300-S-TG-C035-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-14 | PAGE NO.

Figure 5-15 Geotechnical Plan and Profile with Classification Test Results: STA 732+00 to STA 746+00

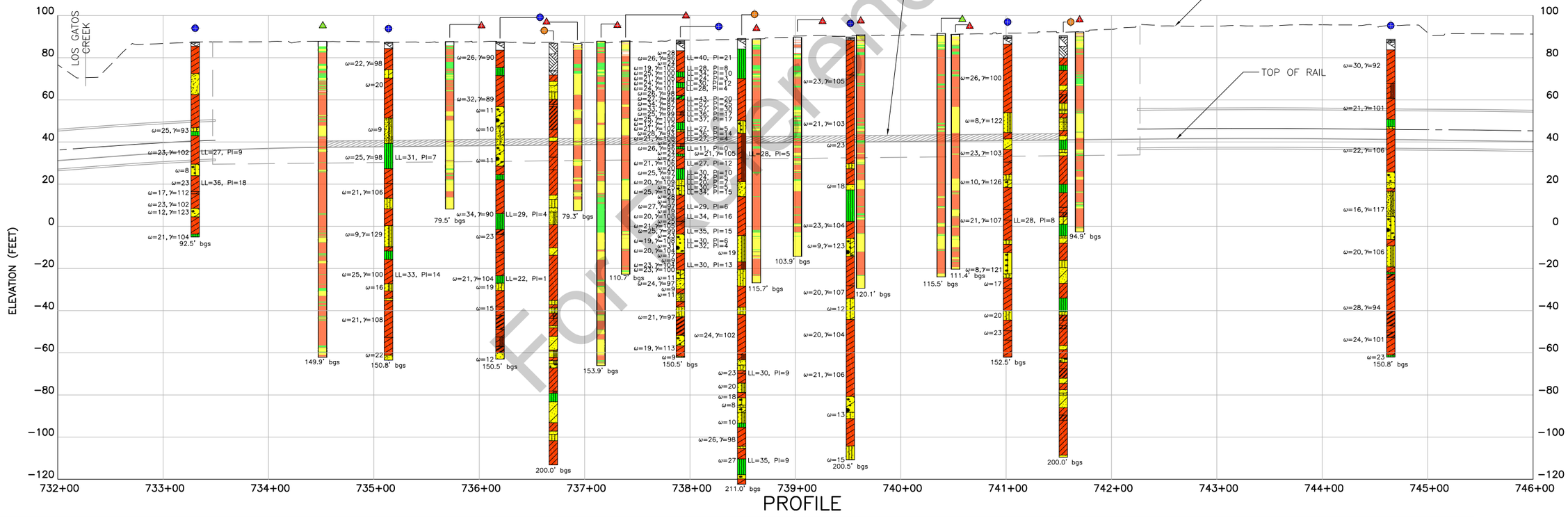


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-32 38 FT, LEFT EL = 87.5
CPT-168 100 FT, LEFT EL = 87.8
BH-33 52 FT, LEFT EL = 87.3
CPT-146 40 FT, LEFT EL = 87.7
BH-73 41 FT, LEFT EL = 87.5
BH-92 35 FT, RIGHT EL = 86.8
CPT-147 15 FT, RIGHT EL = 86.8
CPT-148 37 FT, LEFT EL = 87.8
CPT-149 4 FT, RIGHT EL = 88.0
BH-74 32 FT, RIGHT EL = 88.3 (SEE NOTE 9)
BH-93 83 FT, LEFT EL = 89.1
CPT-150 2 FT, RIGHT EL = 88.9
CPT-151 17 FT, RIGHT EL = 89.7
BH-75 45 FT, RIGHT EL = 89.8
CPT-152 29 FT, LEFT EL = 90.8
CPT-179 109 FT, LEFT EL = 91.5
CPT-153 31 FT, RIGHT EL = 91.0
BH-76 70 FT, RIGHT EL = 90.5
BH-94 82 FT, RIGHT EL = 90.4
CPT-154 45 FT, RIGHT EL = 92.2
BH-34 79 FT, RIGHT EL = 88.7



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CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Classification Test Results
S1 STA 732+00 TO STA 746+00

CADD FILENAME D300-S-TG-C015-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-15 | PAGE NO.

Figure 5-16 Geotechnical Plan and Profile with Classification Test Results: STA 746+00 to STA 759+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-60
4 FT, RIGHT
EL = 90.2

CPT-61
70 FT, RIGHT
EL = 90.4

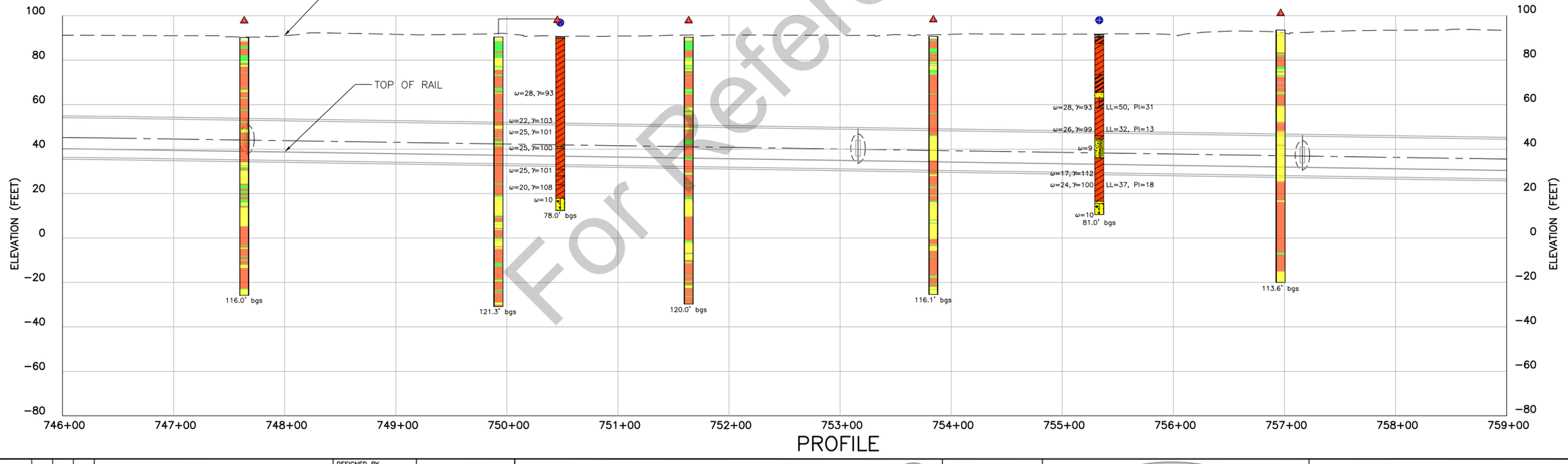
BH-35
77 FT, RIGHT
EL = 90.4

CPT-62
57 FT, RIGHT
EL = 90.3

CPT-63
41 FT, RIGHT
EL = 90.7

BH-36
101 FT, RIGHT
EL = 91.5

CPT-64
55 FT, LEFT
EL = 93.6



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GEOTECHNICAL PLAN AND PROFILE
With Classification Test Results
S1 STA 746+00 TO STA 759+00

CADD FILENAME D300-S-TG-C016-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-16 | PAGE NO.

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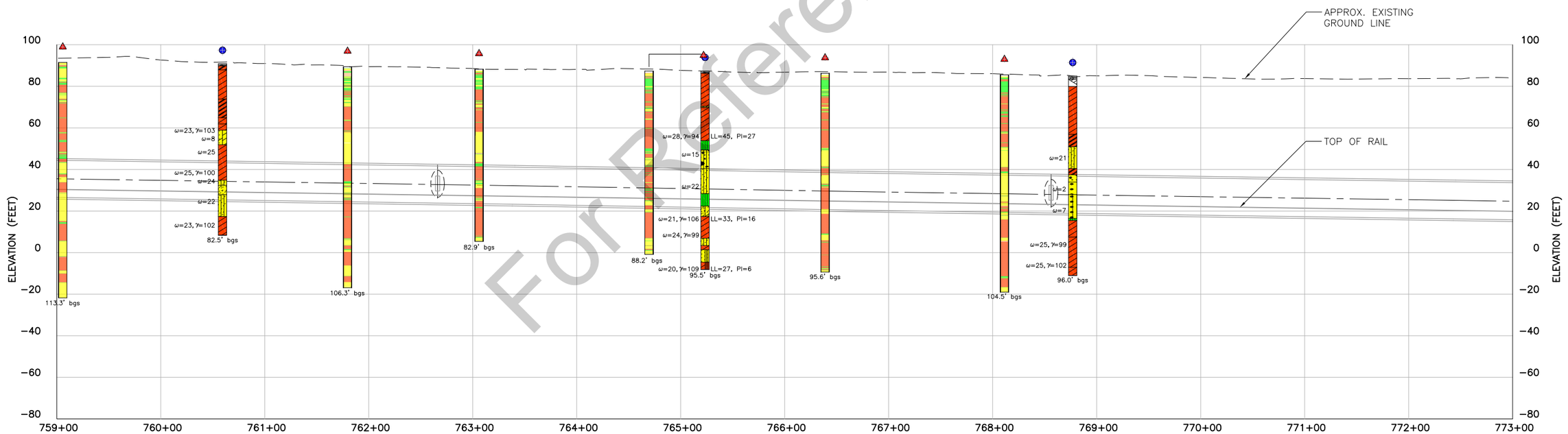
Figure 5-17 Geotechnical Plan and Profile with Classification Test Results: STA 759+00 to STA 773+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE



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With Classification Test Results
S1 STA 759+00 TO STA 773+00

CADD FILENAME D300-S-TG-C017-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-17 | PAGE NO.

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Figure 5-18 Geotechnical Plan and Profile with Classification Test Results: STA 773+00 to STA 787+00

BH–95
49 FT, RIGHT
EL = 83.1

CPT–73
80 FT, LEFT
EL = 82.2

BH–40
76 FT, LEFT
EL = 82.2

CPT–74
16 FT, RIGHT
EL = 81.1

CPT–75
22 FT, RIGHT
EL = 81.4

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

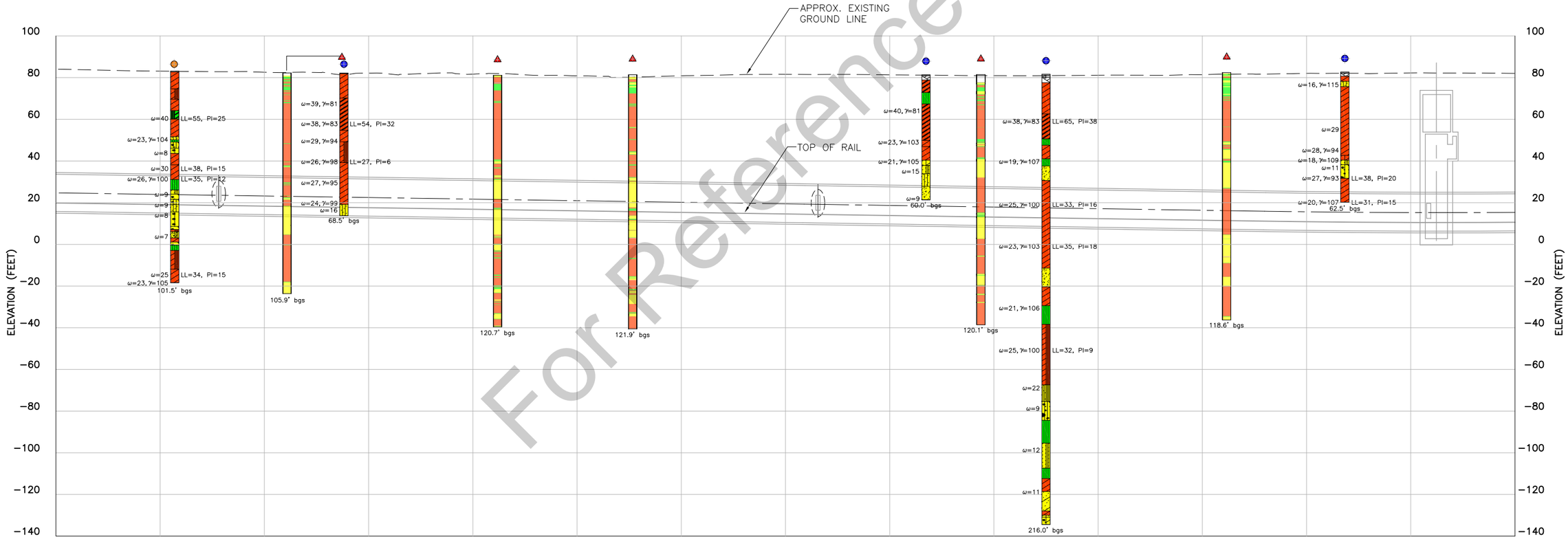
BH–41
12 FT, LEFT
EL = 81.4

CPT–76
15 FT, LEFT
EL = 81.5

BH–79
17 FT, LEFT
EL = 81.6

CPT–77
20 FT, LEFT
EL = 82.4

BH–42
19 FT, LEFT
EL = 82.7



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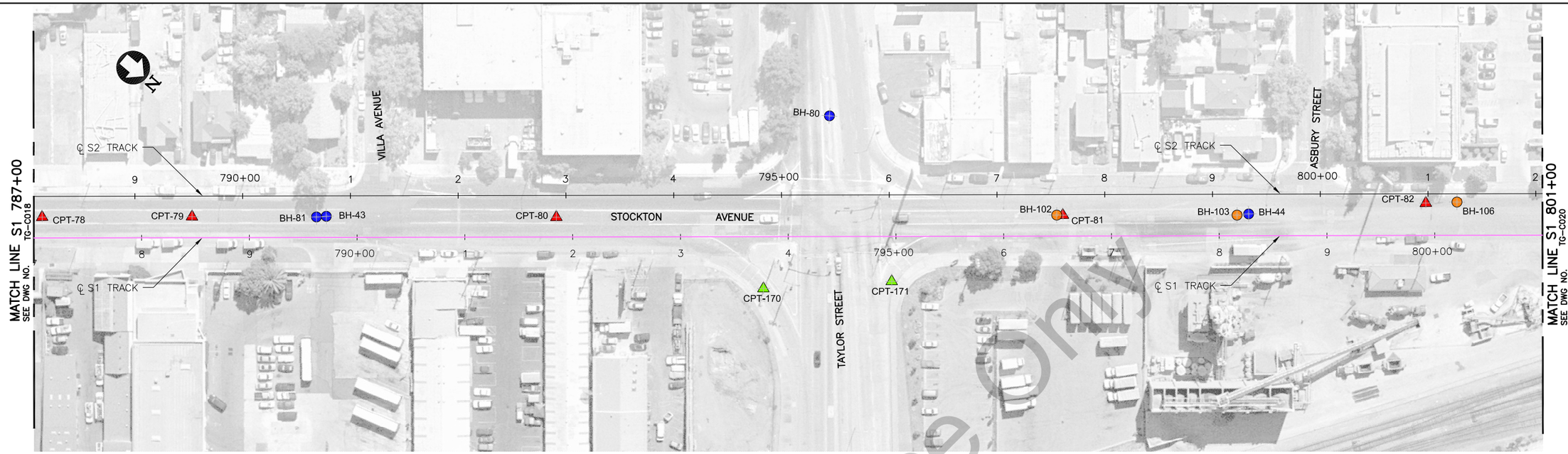
With Classification Test Results
S1 STA 773+00 TO STA 787+00

CADD FILENAME D300-S-TG-C018-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5–18 | PAGE NO.

Figure 5-19 Geotechnical Plan and Profile with Classification Test Results: STA 787+00 to STA 801+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-78
19 FT, LEFT
EL = 82.7

CPT-79
20 FT, LEFT
EL = 82.1

BH-81
19 FT, LEFT
EL = 81.5

BH-43
20 FT, LEFT
EL = 81.5

CPT-80
18 FT, LEFT
EL = 80.8

CPT-170
48 FT, RIGHT
EL = 76.5

BH-80
112 FT, LEFT
EL = 80.2

CPT-171
42 FT, RIGHT
EL = 75.1

BH-102
19 FT, LEFT
EL = 80.4

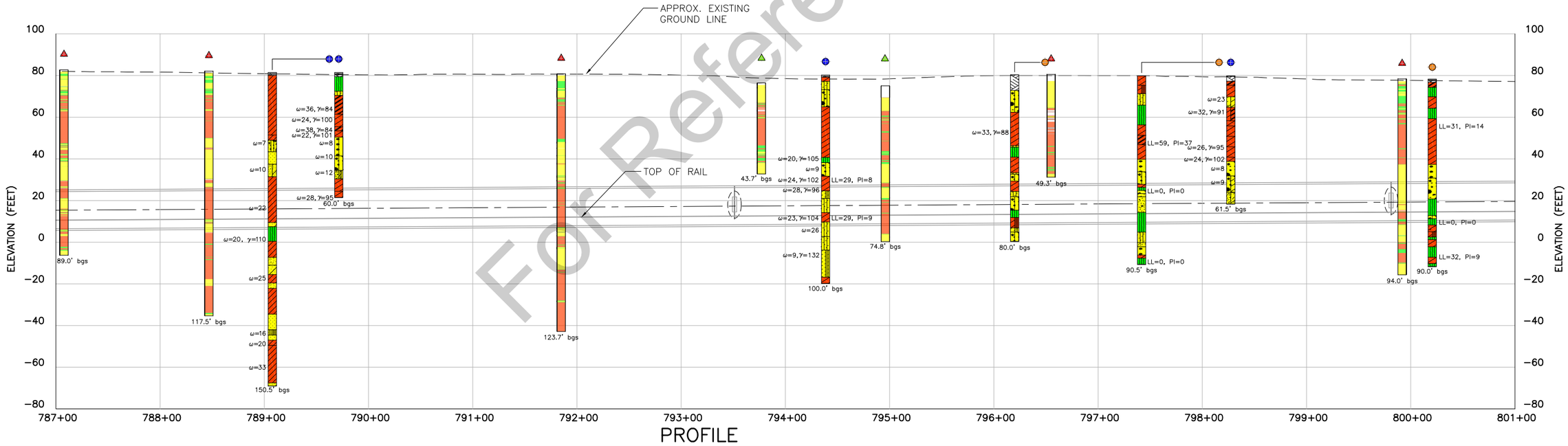
CPT-81
19 FT, LEFT
EL = 80.5

BH-103
19 FT, LEFT
EL = 79.8

BH-44
20 FT, LEFT
EL = 79.8

CPT-82
30 FT, LEFT
EL = 78.4

BH-106
31 FT, LEFT
EL = 78.3



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S1 STA 787+00 TO STA 801+00

CADD FILENAME D300-S-TG-C019-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-19 | PAGE NO.

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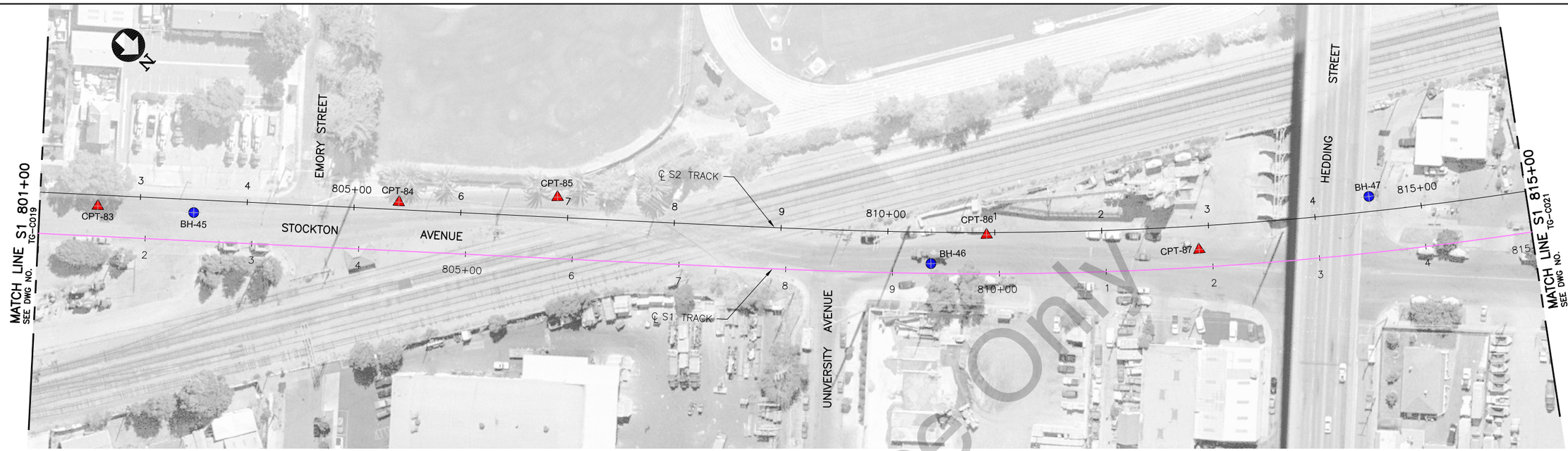
Figure 5-20 Geotechnical Plan and Profile with Classification Test Results: STA 801+00 to STA 815+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-83
28 FT, LEFT
EL = 77.8

BH-45
26 FT, LEFT
EL = 77.5

CPT-84
46 FT, LEFT
EL = 76.4

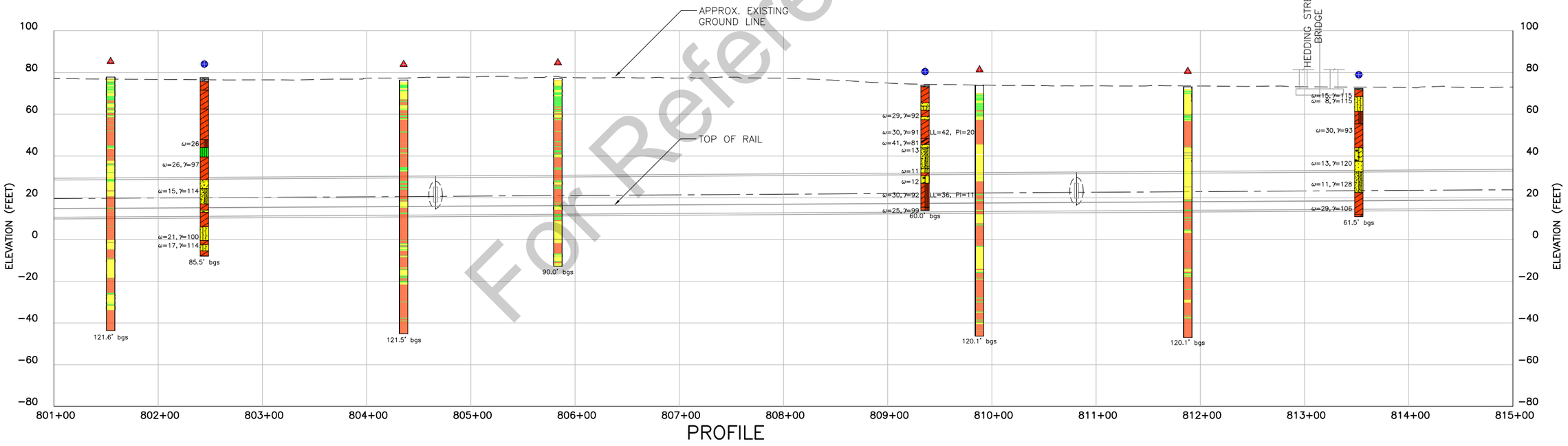
CPT-85
57 FT, LEFT
EL = 77.2

BH-46
9 FT, LEFT
EL = 73.9

CPT-86
36 FT, LEFT
EL = 73.8

CPT-87
17 FT, LEFT
EL = 73.1

BH-47
53 FT, LEFT
EL = 72.4



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S1 STA 801+00 TO STA 815+00

CADD FILENAME D300-S-TG-C020-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-20 | PAGE NO.

Figure 5-21 Geotechnical Plan and Profile with Classification Test Results: STA 815+00 to STA 829+00

PLAN

50' 0' 50' 100'
GRAPHIC SCALE

CPT-88
70 FT, LEFT
EL = 72.8

CPT-89
85 FT, LEFT
EL = 72.8

BH-48
15 FT, RIGHT
EL = 72.6

CPT-90
151 FT, LEFT
EL = 72.2

CPT-91
142 FT, LEFT
EL = 72.3

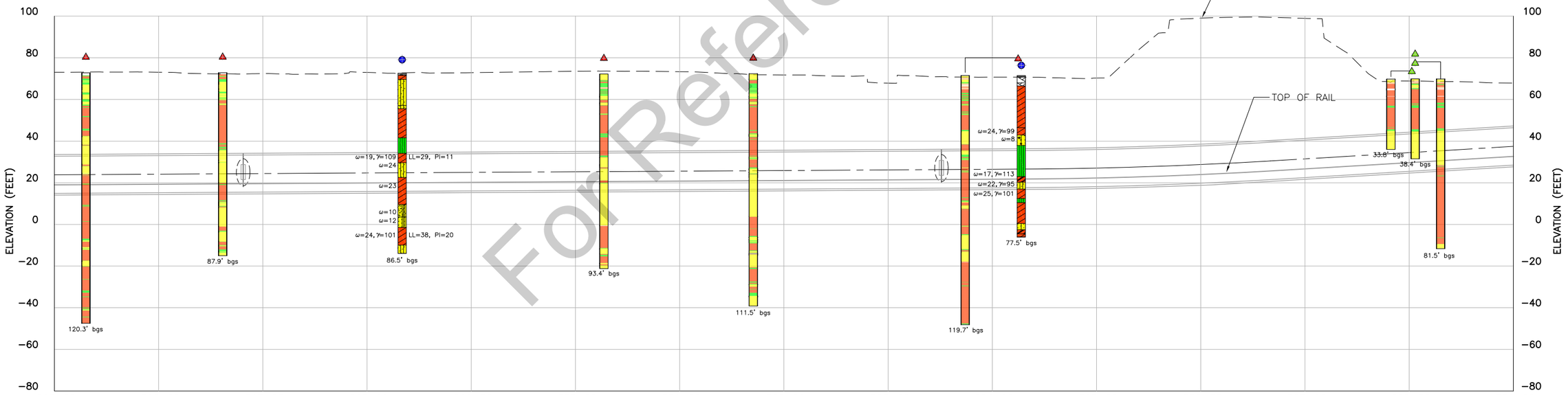
CPT-92
67 FT, LEFT
EL = 71.5

BH-49
66 FT, LEFT
EL = 71.5

CPT-173A
92 FT, LEFT
EL = 69.8

CPT-173
91 FT, LEFT
EL = 69.9

CPT-173B
91 FT, LEFT
EL = 69.8



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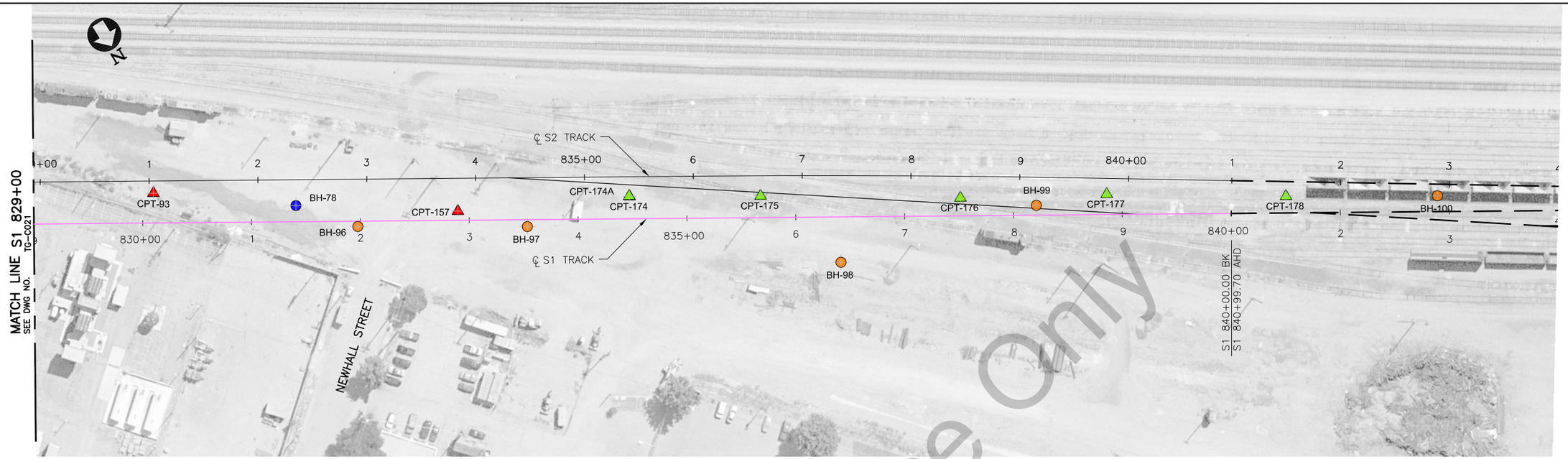
CADD FILENAME D300-S-TG-C021-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-21 | PAGE NO.

Figure 5-22 Geotechnical Plan and Profile with Classification Test Results: STA 829+00 to STA 843+99



CPT-93
27 FT, LEFT
EL = 68.9

BH-78
15 FT, LEFT
EL = 68.0

BH-96
5 FT, RIGHT
EL = 68.2

CPT-157
8 FT, LEFT
EL = 67.7

BH-97
6 FT, RIGHT
EL = 67.5

CPT-174
21 FT, LEFT
EL = 67.4

CPT-174A
21 FT, LEFT
EL = 67.4

CPT-175
20 FT, LEFT
EL = 67.3

BH-98
42 FT, RIGHT
EL = 66.1

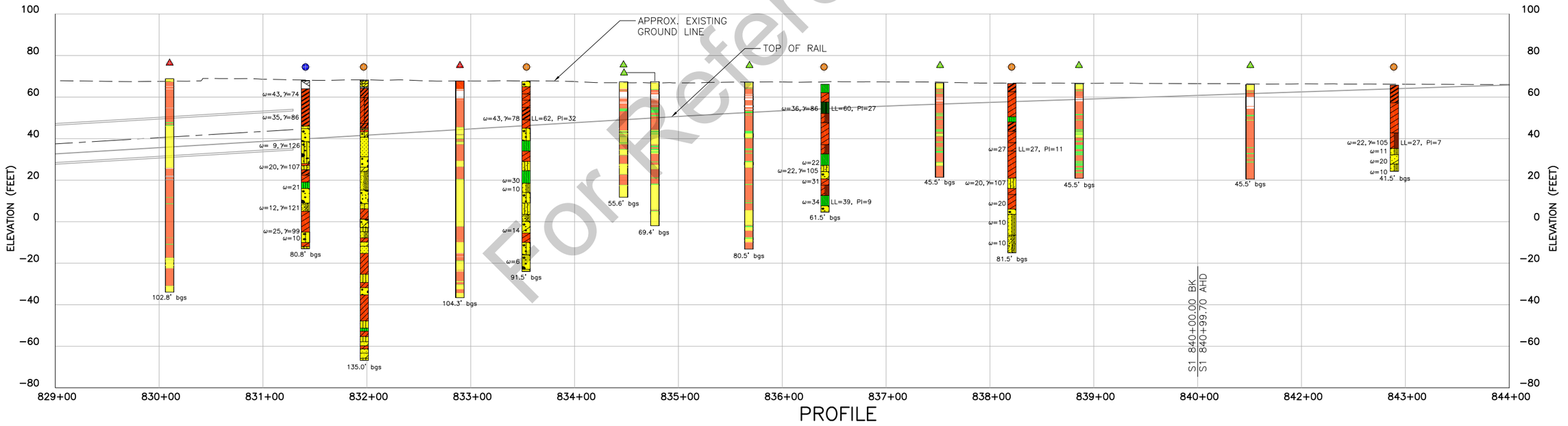
CPT-176
16 FT, LEFT
EL = 66.8

BH-99
9 FT, LEFT
EL = 66.5

CPT-177
19 FT, LEFT
EL = 66.4

CPT-178
15 FT, LEFT
EL = 66.1

BH-100
15 FT, LEFT
EL = 65.8



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GEOTECHNICAL PLAN AND PROFILE
With Classification Test Results
S1 STA 829+00 TO STA 843+00

CADD FILENAME D300-S-TG-C022-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-22 | PAGE NO.

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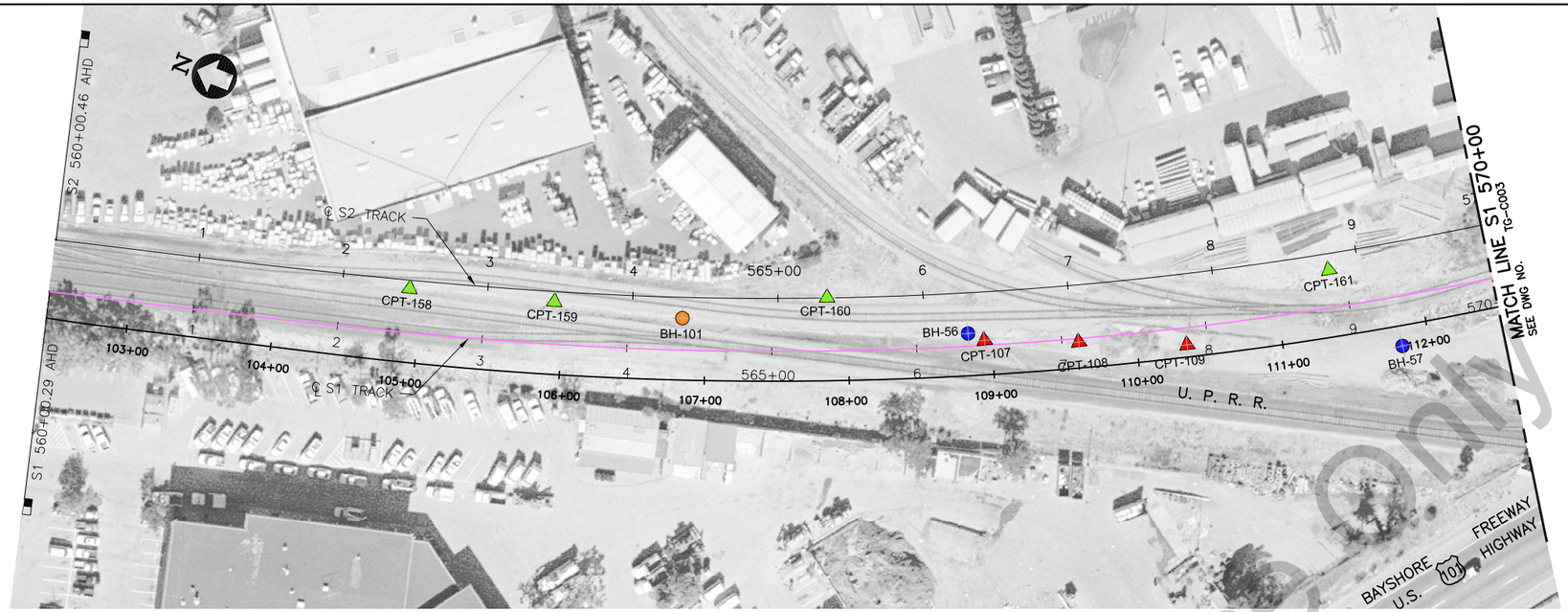
Figure 5-23 Geotechnical Plan and Profile with Strength Parameters: STA 561+00 to STA 570+00

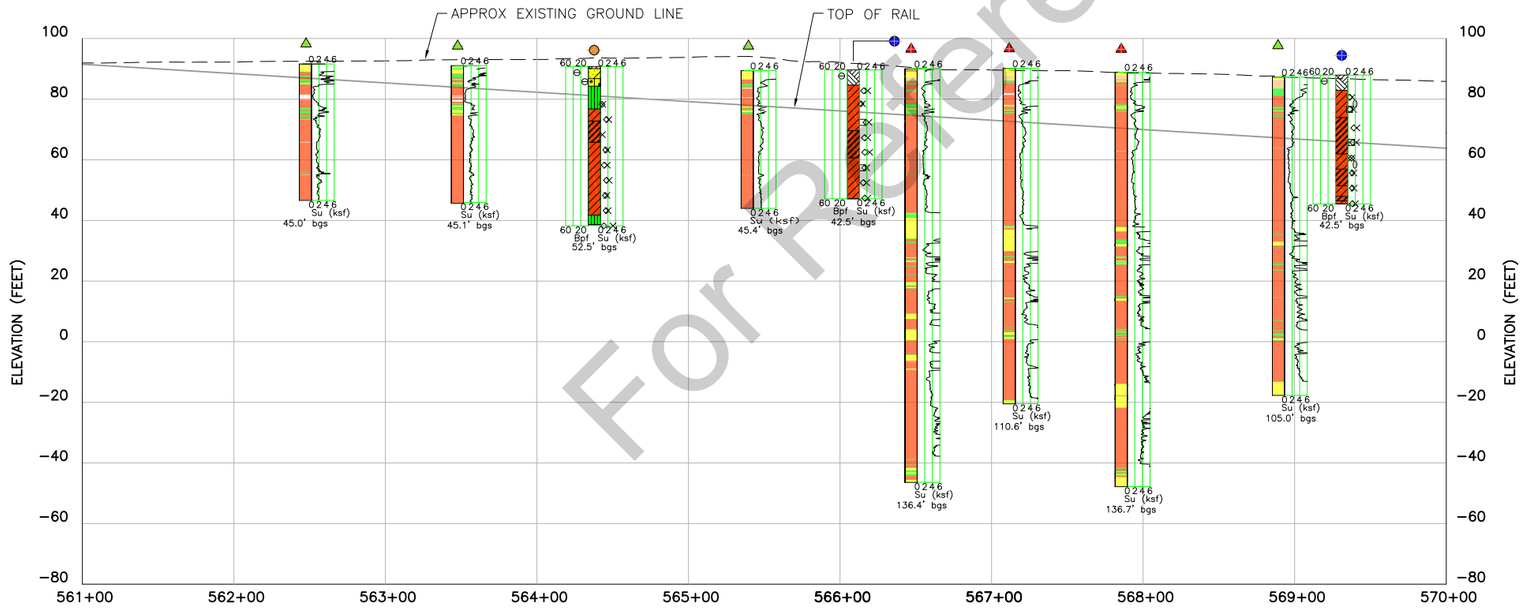


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-158, 30 FT, LEFT, EL = 91.6
CPT-159, 29 FT, LEFT, EL = 91.0
BH-101, 22 FT, LEFT, EL = 90.7
CPT-160, 37 FT, LEFT, EL = 89.4
BH-56, 9 FT, LEFT, EL = 89.7
CPT-107, 3 FT, LEFT, EL = 90.0
CPT-108, 2 FT, RIGHT, EL = 90.1
CPT-109, 12 FT, RIGHT, EL = 88.9
CPT-161, 26 FT, LEFT, EL = 87.3
BH-57, 34 FT, RIGHT, EL = 87.9



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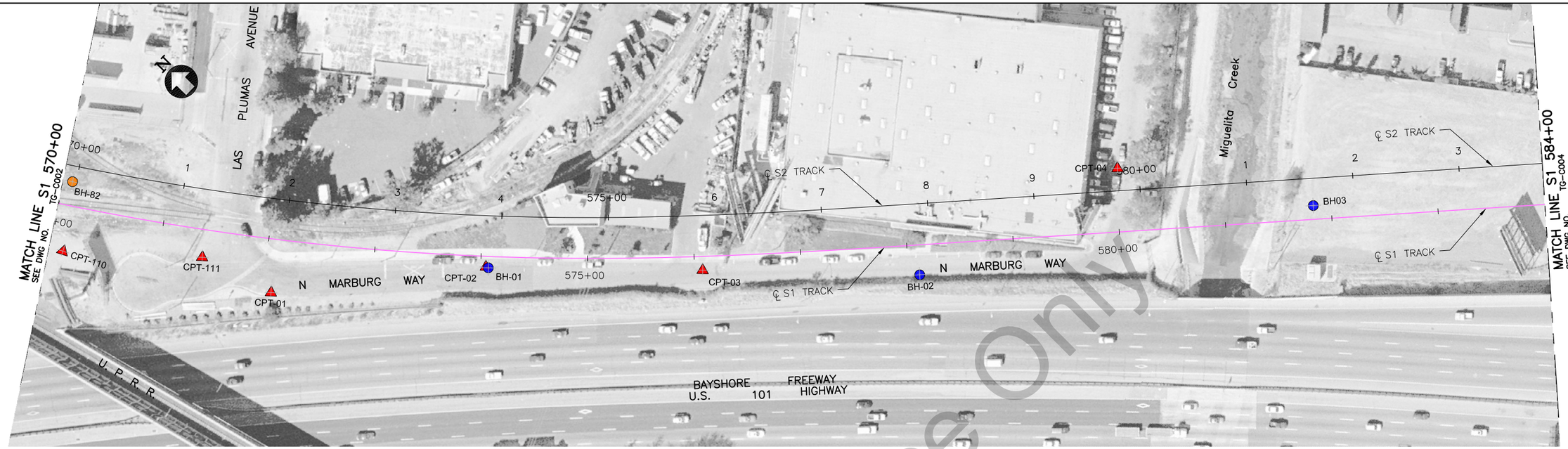
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 561+00 TO STA 570+00

CADD FILENAME D300-S-TG-C023-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-23 | PAGE NO.

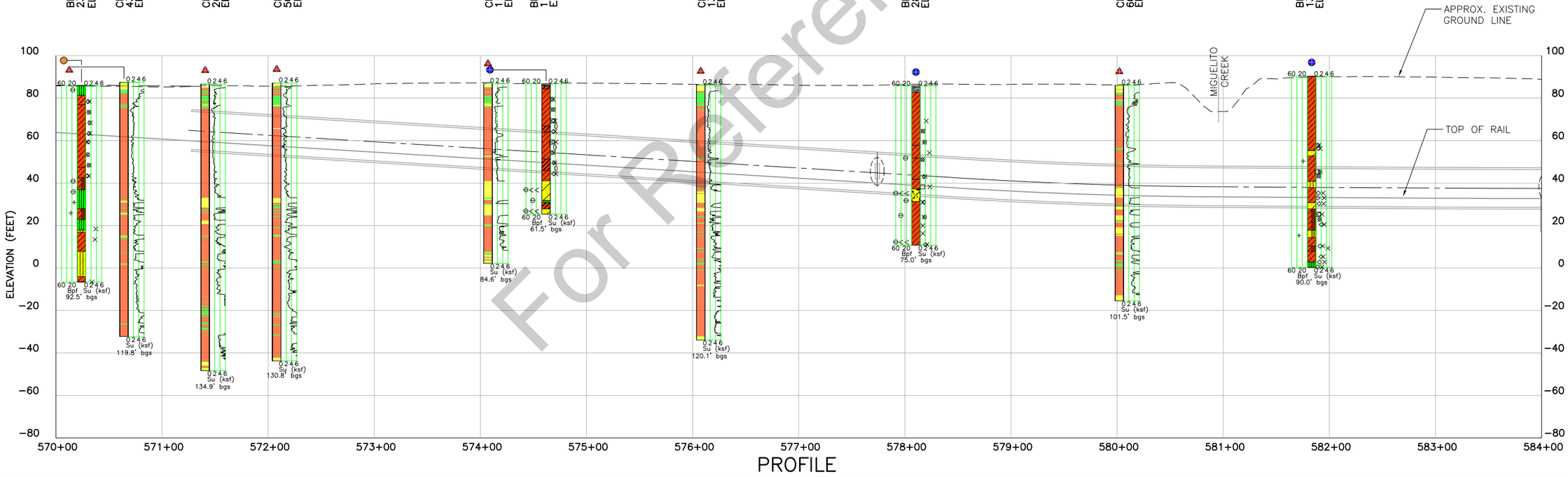
Figure 5-24 Geotechnical Plan and Profile with Strength Parameters: STA 570+00 to STA 584+00



PLAN

GRAPHIC SCALE 50' 0' 50' 100'

BH-82 23 FT, LEFT EL = 85.9
CPT-110 43 FT, RIGHT EL = 87.6
CPT-111 26 FT, RIGHT EL = 86.6
CPT-01 50 FT, RIGHT EL = 87.1
CPT-02 11 FT, RIGHT EL = 86.8
BH-01 11 FT, RIGHT EL = 86. 9
CPT-03 13 FT, RIGHT EL = 86.2
BH-02 28 FT, RIGHT EL = 85.8
CPT-04 60 FT, LEFT EL = 86.0
BH-03 13 FT, LEFT EL = 90.3



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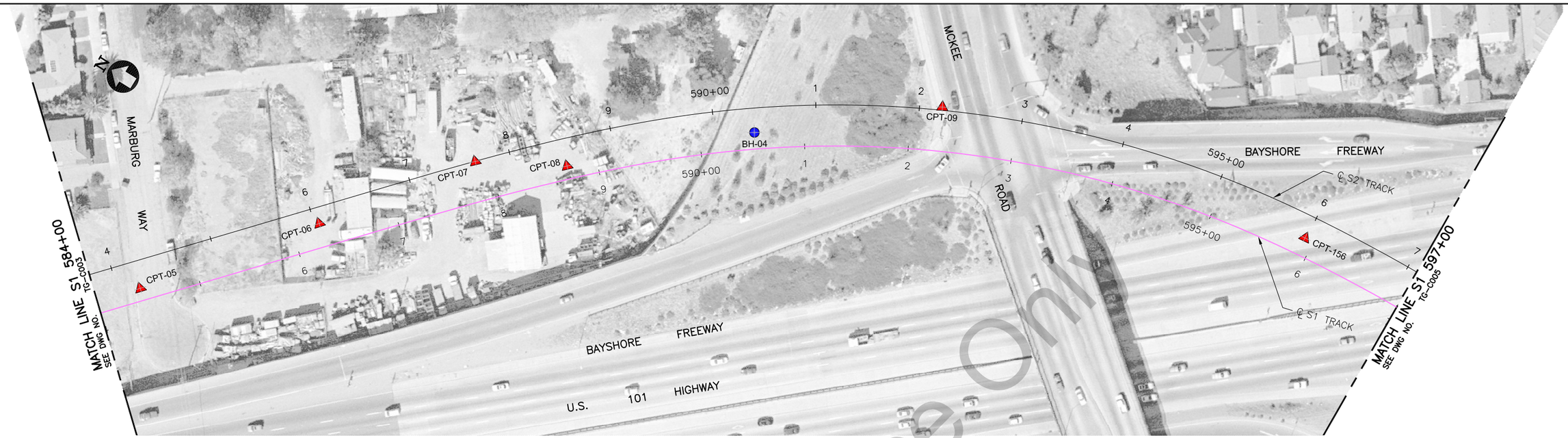
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 570+00 TO STA 584+00

CADD FILENAME D300-S-TG-C024-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-24 | PAGE NO.

Figure 5-25 Geotechnical Plan and Profile with Strength Parameters: STA 584+00 to STA 597+00



PLAN

GRAPHIC SCALE 50' 0' 50' 100'

CPT-05 12 FT, LEFT EL = 87.1

CPT-06 23 FT, LEFT EL = 87.0

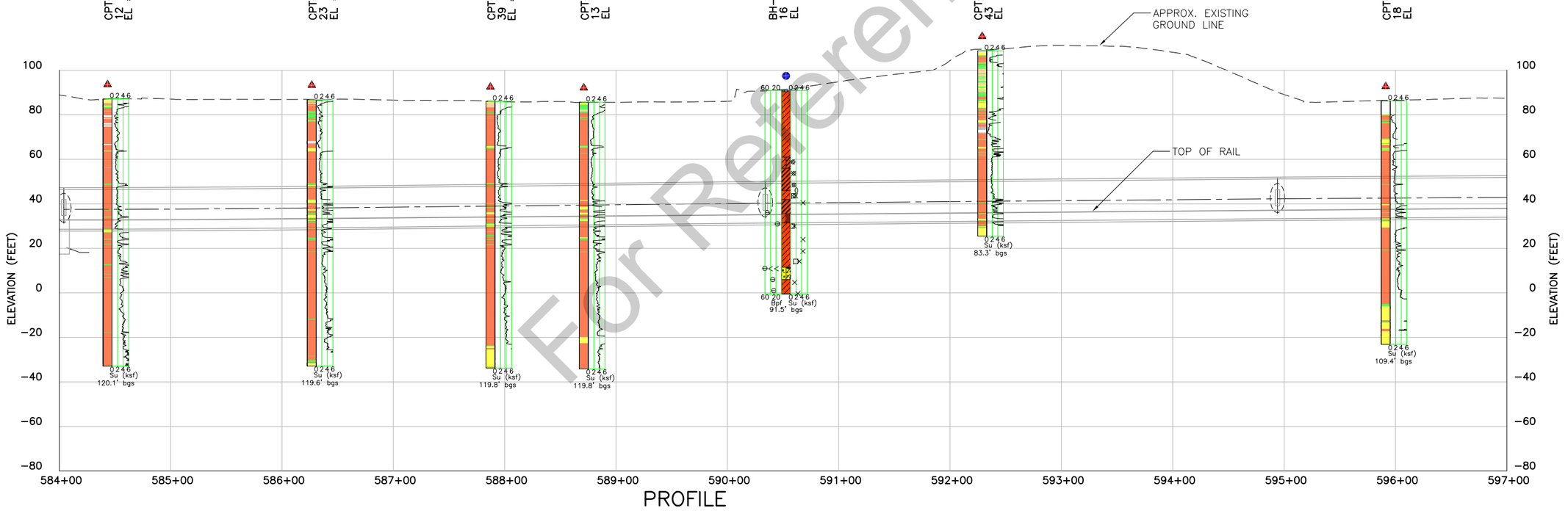
CPT-07 39 FT, LEFT EL = 86.0

CPT-08 13 FT, LEFT EL = 85.6

BH-04 16 FT, LEFT EL = 91.0

CPT-09 43 FT, LEFT EL = 108.8

CPT-156 18 FT, LEFT EL = 86.2



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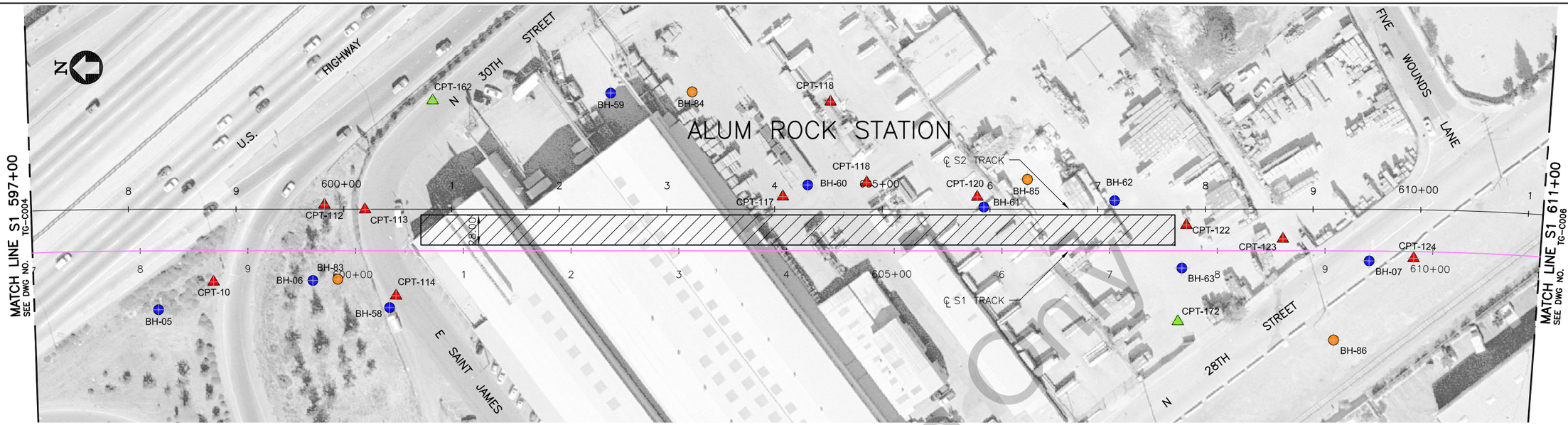
With Strength Parameters
S1 STA 584+00 TO STA 597+00

CADD FILENAME D300-S-TG-C025-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-25 | PAGE NO.

Figure 5-26 Geotechnical Plan and Profile with Strength Parameters: STA 597+00 to STA 611+00



BH-05
55 FT, RIGHT
EL = 85.5

CPT-10
29 FT, RIGHT
EL = 85.5

BH-06
27 FT, RIGHT
EL = 84.1

CPT-112
43 FT, LEFT
EL = 85.6

BH-83
26 FT, RIGHT
EL = 83.9

CPT-113
38 FT, LEFT
EL = 87.2

BH-58
53 FT, RIGHT
EL = 87.5

CPT-114
42 FT, RIGHT
EL = 87.3

CPT-162
139 FT, LEFT
EL = 87.1

BH-59
146 FT, LEFT
EL = 87.7

BH-84
147 FT, LEFT
EL = 87.4

CPT-117
50 FT, LEFT
EL = 87.5

BH-60
61 FT, LEFT
EL = 87.4

CPT-118
63 FT, LEFT
EL = 87.9

CPT-120
50 FT, LEFT
EL = 88.9

BH-61
41 FT, LEFT
EL = 89.1

BH-85
51 FT, LEFT
EL = 89.2

BH-62
47 FT, LEFT
EL = 88.9

CPT-172
65 FT, RIGHT
EL = 88.0

BH-63
16 FT, RIGHT
EL = 88.2

CPT-122
24 FT, LEFT
EL = 88.2

CPT-123
11 FT, LEFT
EL = 87.9

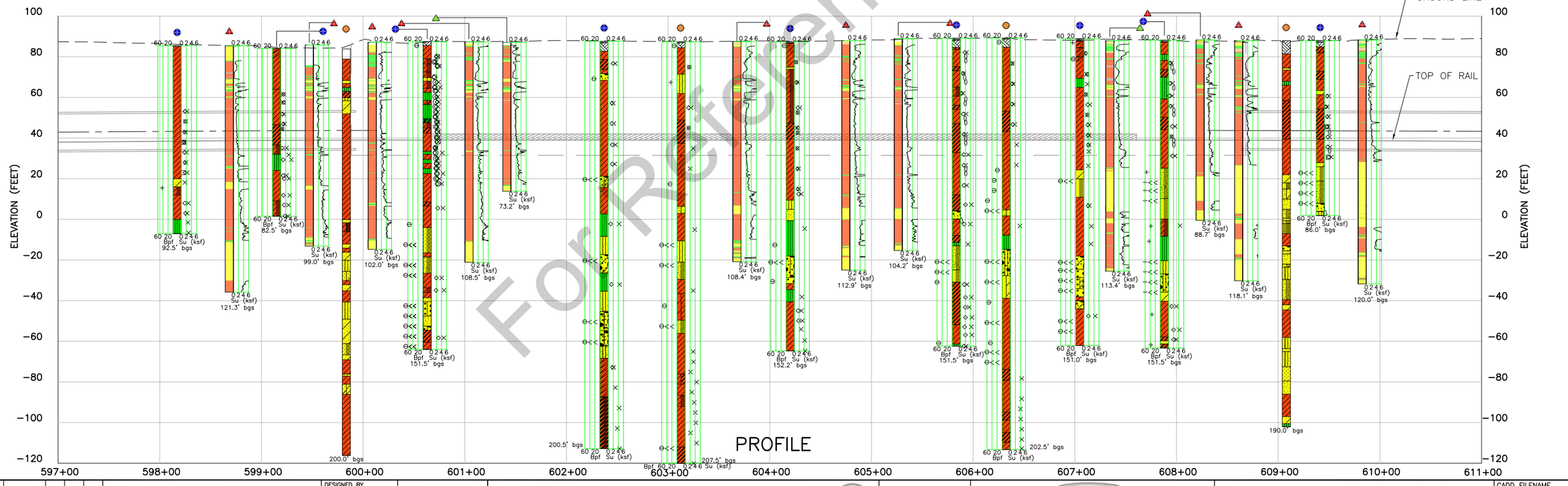
BH-86
83 FT, RIGHT
EL = 88.0

BH-07
9 FT, RIGHT
EL = 87.9

CPT-124
6 FT, RIGHT
EL = 88.3

PLAN

50' 0' 50' 100'
GRAPHIC SCALE



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BART

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CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 597+00 TO STA 611+00

CADD FILENAME D300-S-TG-C026-A.dwg
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AREA CODE | SHEET NO. 5-26 | PAGE NO.

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VILLEGAS,R

Figure 5-27 Geotechnical Plan and Profile with Strength Parameters: STA 611+00 to STA 622+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-11
25 FT, LEFT
EL = 88.8

CPT-12
36 FT, LEFT
EL = 88.9

CPT-13
61 FT, RIGHT
EL = 90.1

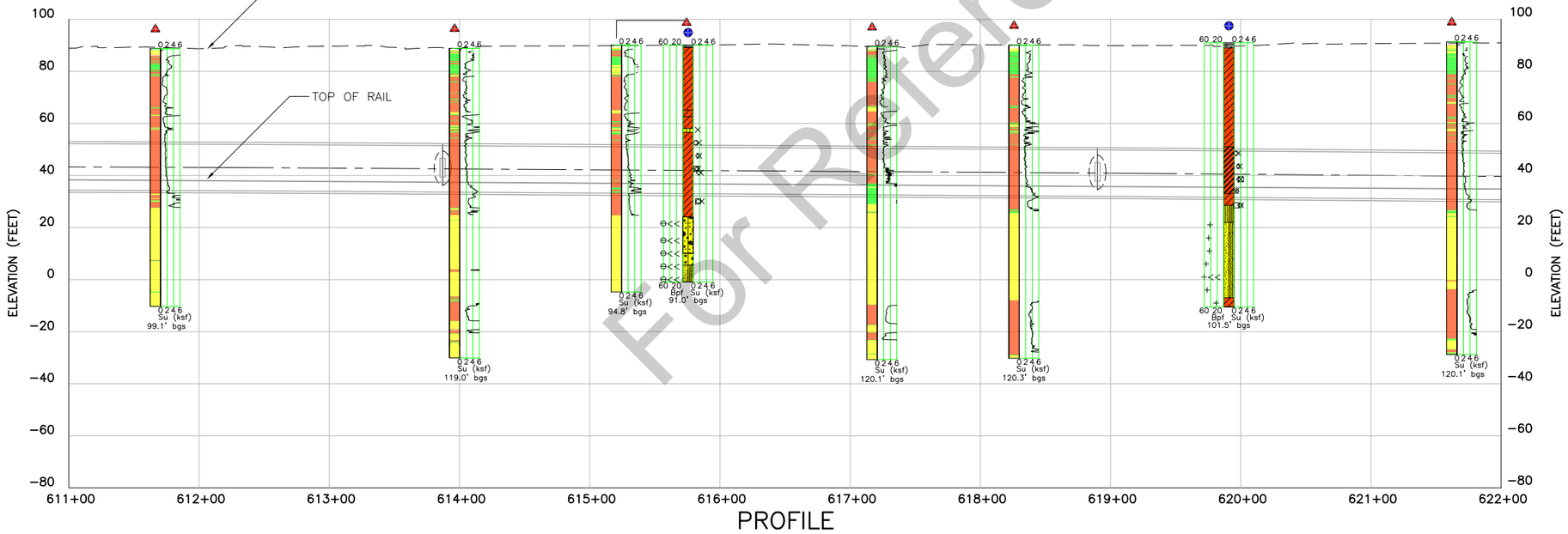
BH-08
64 FT, RIGHT
EL = 90.1

CPT-14
24 FT, LEFT
EL = 89.4

CPT-15
89 FT, LEFT
EL = 90.1

BH-09
26 FT, LEFT
EL = 91.0

CPT-16
13 FT, LEFT
EL = 91.4



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GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 611+00 TO STA 622+00

CADD FILENAME D300-S-TG-C027-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-27 | PAGE NO.

Figure 5-28 Geotechnical Plan and Profile with Strength Parameters: STA 622+00 to STA 636+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-17 86 FT, LEFT EL = 90.9

BH-10 14 FT, LEFT EL = 91.7

CPT-18 12 FT, LEFT EL = 91.7

CPT-19 12 FT, LEFT EL = 91.4

BH-11 14 FT, LEFT EL = 91.5

CPT-20 12 FT, LEFT EL = 91.8

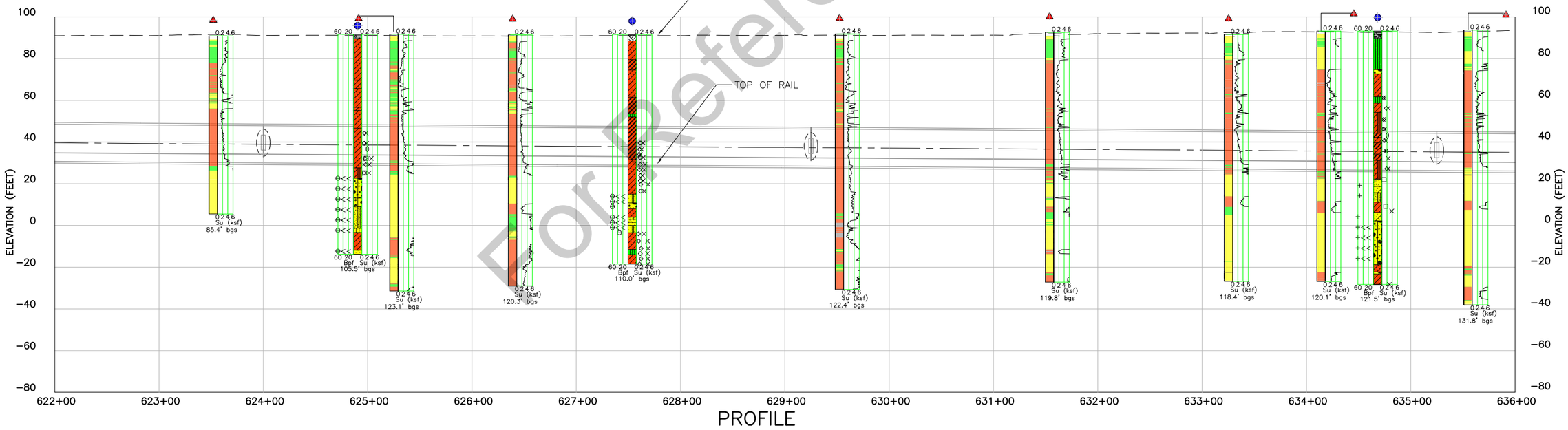
CPT-21 24 FT, LEFT EL = 92.6

CPT-22 113 FT, LEFT EL = 91.6

CPT-23 48 FT, LEFT EL = 93.2

BH-12 51 FT, LEFT EL = 93.2

CPT-24 63 FT, LEFT EL = 93.7



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GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 622+00 TO STA 636+00

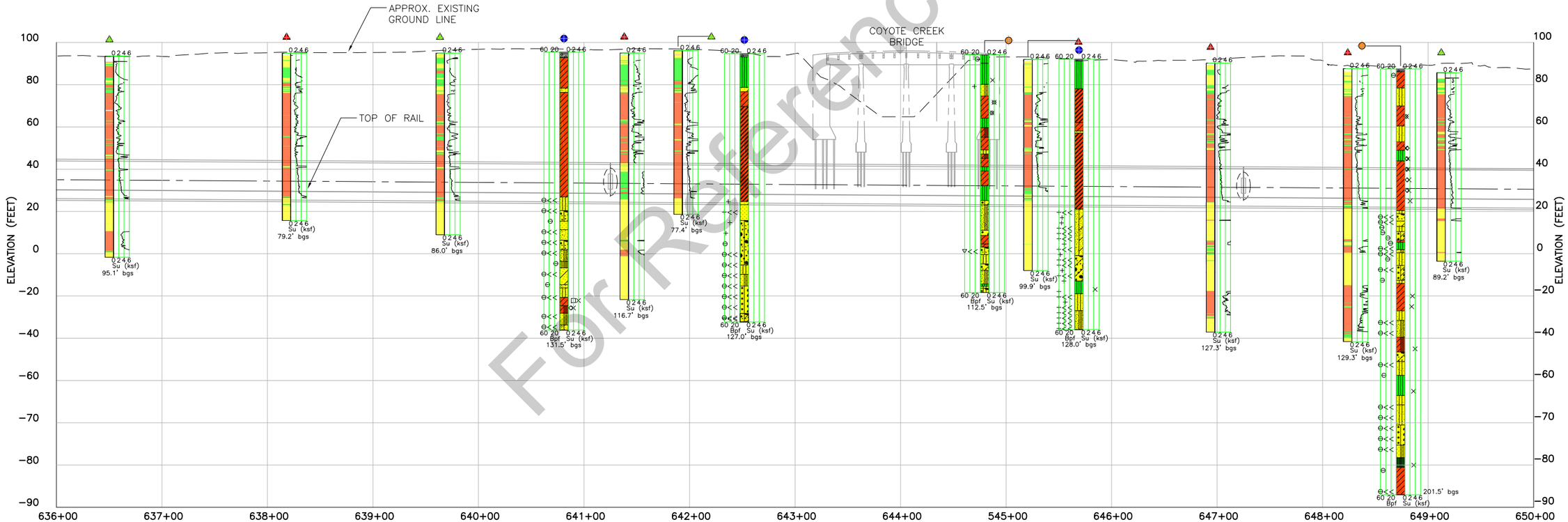
CADD FILENAME D300-S-TG-C028-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-28 | PAGE NO.

Figure 5-29 Geotechnical Plan and Profile with Strength Parameters: STA 636+00 to STA 650+00

PLAN

50' 0' 50' 100'
GRAPHIC SCALE

CPT-163 182 FT, LEFT EL = 93.4
CPT-25 83 FT, LEFT EL = 94.9
CPT-164 203 FT, LEFT EL = 94.9
BH-13 94 FT, LEFT EL = 95.3
CPT-26 95 FT, LEFT EL = 95.1
CPT-165 205 FT, LEFT EL = 96.1
BH-14 98 FT, LEFT EL = 94.6
BH-88 66 FT, LEFT EL = 94.1
CPT-27 178 FT, LEFT EL = 92.0
BH-15 180 FT, LEFT EL = 92.0
CPT-28 98 FT, LEFT EL = 90.2
CPT-29 95 FT, LEFT EL = 87.6
BH-87 49 FT, LEFT EL = 87.4
CPT-166 205 FT, LEFT EL = 85.6



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With Strength Parameters
S1 STA 636+00 TO STA 650+00

CADD FILENAME D300-S-TG-C029-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-29 | PAGE NO.

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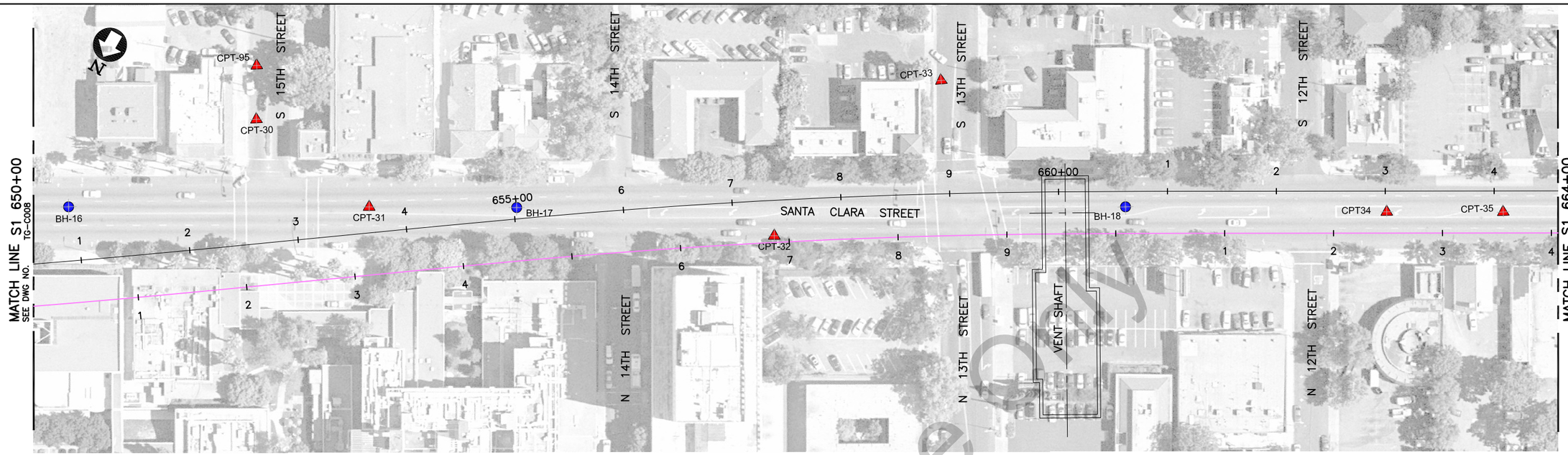
Figure 5-30 Geotechnical Plan and Profile with Strength Parameters: STA 650+00 to STA 664+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-16 88 FT, LEFT EL = 85.3

CPT-30 152 FT, LEFT EL = 83.2

CPT-95 201 FT, LEFT EL = 83.5

CPT-31 62 FT, LEFT EL = 83.1

BH-17 49 FT, RIGHT EL = 82.5

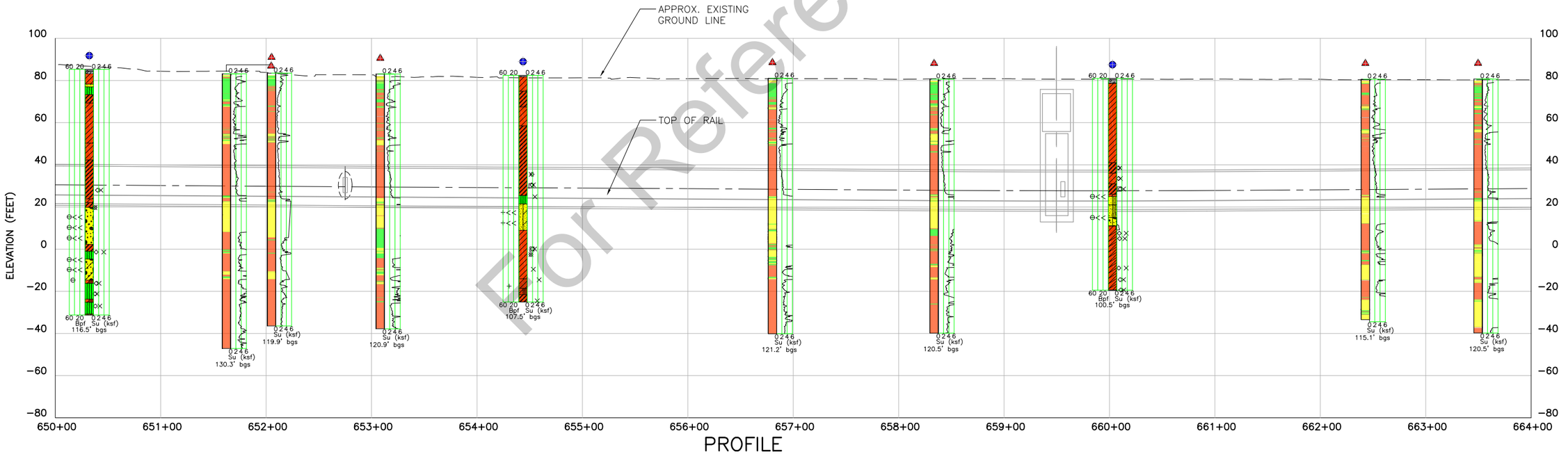
CPT-32 6 FT, LEFT EL = 81.1

CPT-33 143 FT, LEFT EL = 80.6

BH-18 24 FT, LEFT EL = 81.0

CPT-34 20 FT, LEFT EL = 80.6

CPT-35 19 FT, LEFT EL = 80.7



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With Strength Parameters
S1 STA 650+00 TO STA 664+00

CADD FILENAME D300-S-TG-C030-A.dwg
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CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-30 | PAGE NO.

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VILLEGAS_R

Figure 5-31 Geotechnical Plan and Profile with Strength Parameters: STA 664+00 to STA 678+00

PLAN

50' 0' 50' 100'
GRAPHIC SCALE

CPT-36
22 FT, LEFT
EL = 80.8

BH-19
23 FT, LEFT
EL = 80.8

CPT-37
81 FT, RIGHT
EL = 80.0

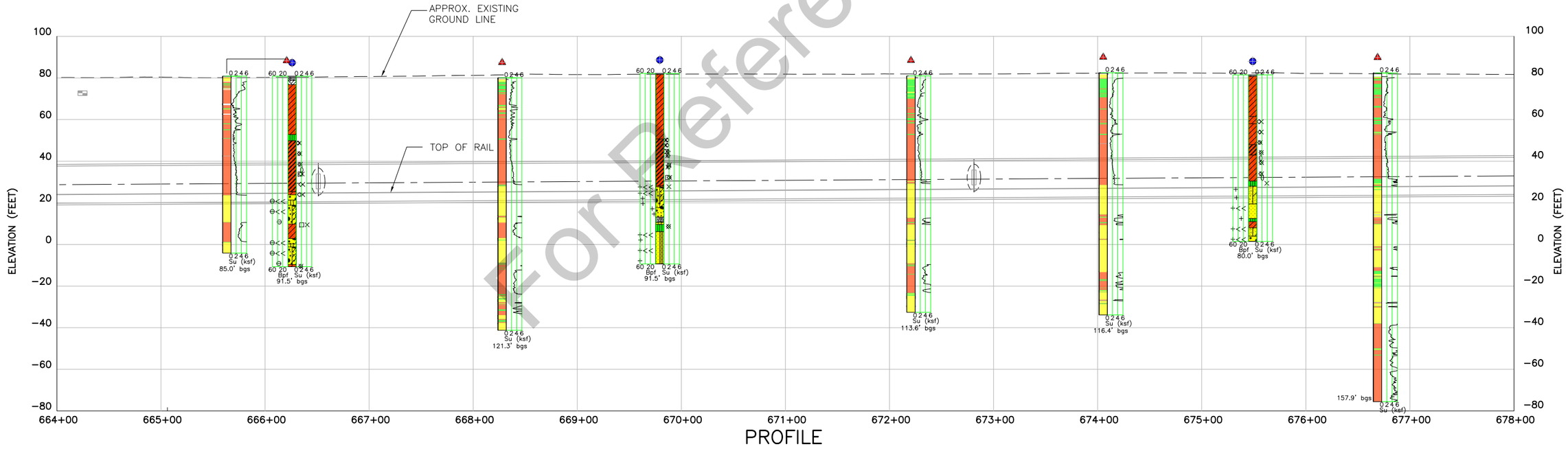
BH-20
24 FT, LEFT
EL = 82.2

CPT-38
115 FT, LEFT
EL = 81.0

CPT-39
29 FT, LEFT
EL = 82.5

BH-21
86 FT, LEFT
EL = 81.5

CPT-40
19 FT, LEFT
EL = 82.4



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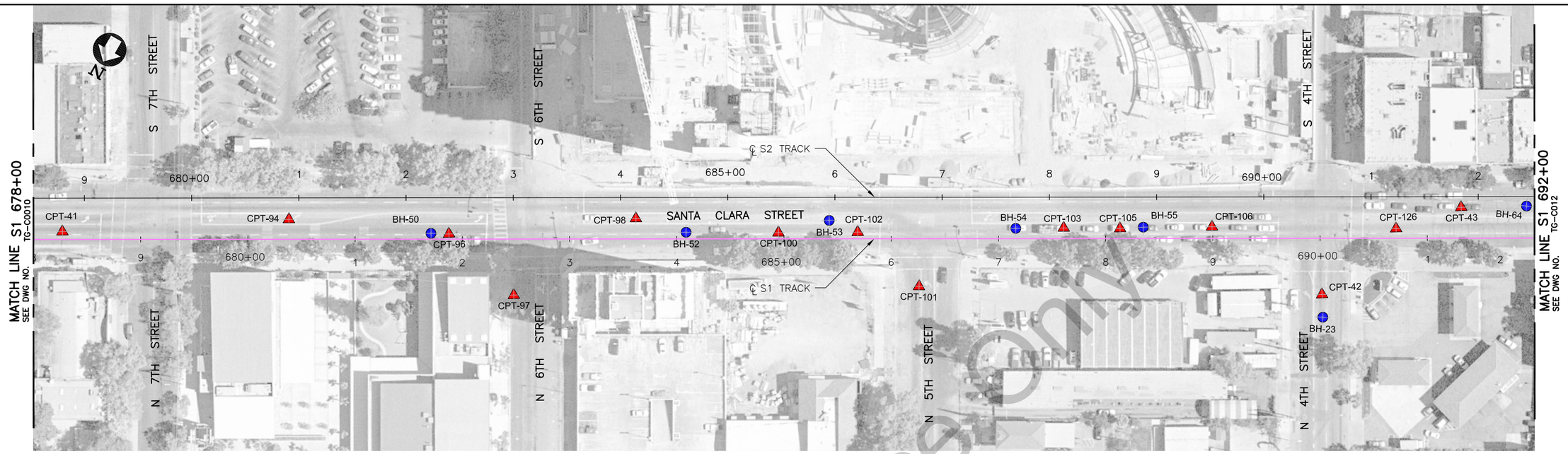
With Strength Parameters
S1 STA 664+00 TO STA 678+00

CADD FILENAME D300-S-TG-C031-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-31 | PAGE NO.

Figure 5-32 Geotechnical Plan and Profile with Strength Parameters: STA 678+00 to STA 692+00

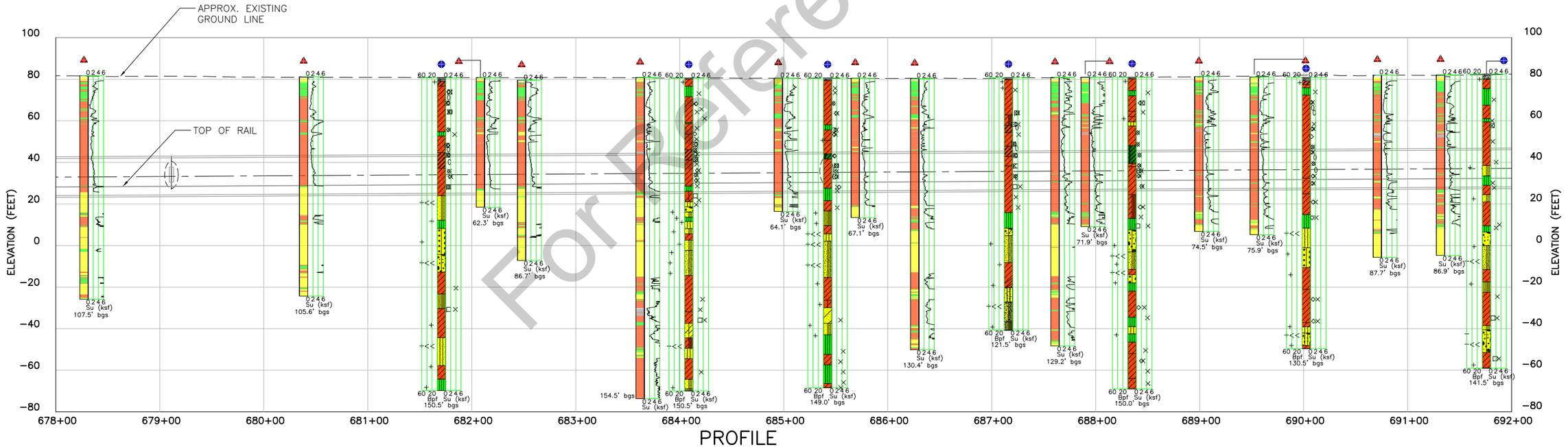


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-41 7 FT, LEFT EL = 81.7
CPT-94 19 FT, LEFT EL = 81.2
BH-50 5 FT, LEFT EL = 80.7
CPT-96 5 FT, LEFT EL = 80.7
CPT-97 52 FT, RIGHT EL = 79.5
CPT-98 19 FT, LEFT EL = 80.8
BH-52 6 FT, LEFT EL = 80.6
CPT-100 6 FT, LEFT EL = 80.5
BH-53 17 FT, LEFT EL = 80.6
CPT-102 6 FT, LEFT EL = 80.5
CPT-101 44 FT, RIGHT EL = 80.3
BH-54 10 FT, LEFT EL = 80.8
CPT-103 10 FT, LEFT EL = 80.9
CPT-105 9 FT, LEFT EL = 81.0
BH-55 11 FT, LEFT EL = 81.0
CPT-106 11 FT, LEFT EL = 81.3
CPT-42 52 FT, RIGHT EL = 81.1
BH-23 74 FT, RIGHT EL = 80.9
CPT-126 9 FT, LEFT EL = 82.0
CPT-43 29 FT, LEFT EL = 82.1
BH-64 30 FT, LEFT EL = 82.5



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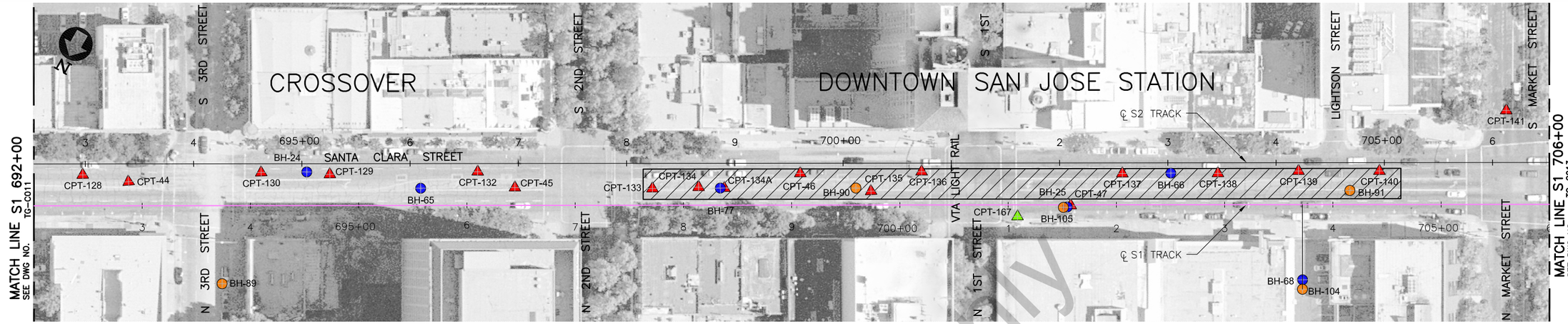
With Strength Parameters
S1 STA 678+00 TO STA 692+00

CADD FILENAME D300-S-TG-C032-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-32 | PAGE NO.

Figure 5-33 Geotechnical Plan and Profile with Strength Parameters: STA 692+00 to STA 706+00

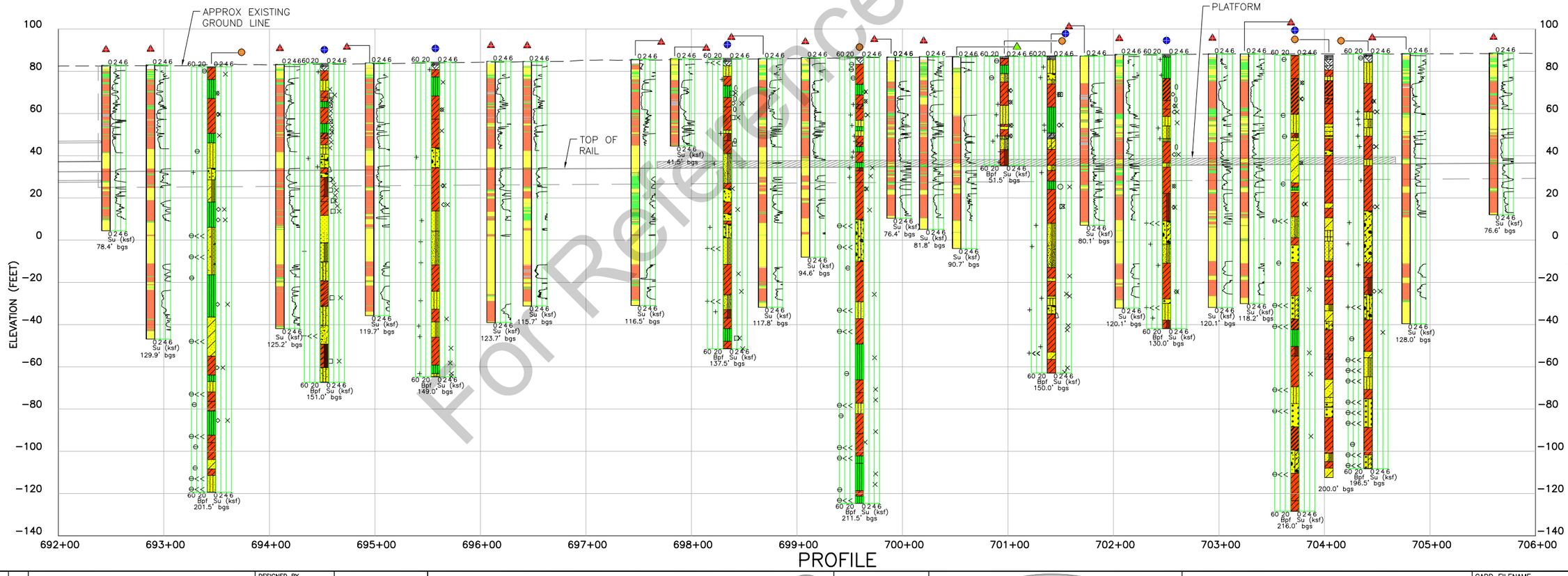


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-128 28 FT, LEFT EL = 82.8
CPT-44 22 FT, LEFT EL = 83.0
BH-89 72 FT, RIGHT EL = 82.1
CPT-130 31 FT, LEFT EL = 83.3
BH-24 31 FT, LEFT EL = 83.7
CPT-129 29 FT, LEFT EL = 83.9
BH-65 16 FT, LEFT EL = 84.3
CPT-132 31 FT, LEFT EL = 84.7
CPT-45 16 FT, LEFT EL = 84.6
CPT-133 15 FT, LEFT EL = 85.6
CPT-134 17 FT, LEFT EL = 86.0
BH-77 16 FT, LEFT EL = 86.1
CPT-134A 16 FT, LEFT EL = 86.1
CPT-46 29 FT, LEFT EL = 86.5
BH-90 16 FT, LEFT EL = 86.8
CPT-135 13 FT, LEFT EL = 86.8
CPT-136 31 FT, LEFT EL = 86.9
CPT-167 11 FT, RIGHT EL = 86.6
BH-105 2 FT, RIGHT EL = 86.9
BH-25 2 FT, RIGHT EL = 87.0
CPT-47 1 FT, RIGHT EL = 87.2
CPT-137 29 FT, LEFT EL = 88.0
BH-66 29 FT, LEFT EL = 88.1
CPT-138 29 FT, LEFT EL = 88.2
CPT-139 31 FT, LEFT EL = 88.2
BH-68 69 FT, RIGHT EL = 87.6
BH-104 78 FT, LEFT EL = 87.6
BH-91 13 FT, LEFT EL = 88.3
CPT-140 31 FT, LEFT EL = 88.4
CPT-141 87 FT, LEFT EL = 88.6



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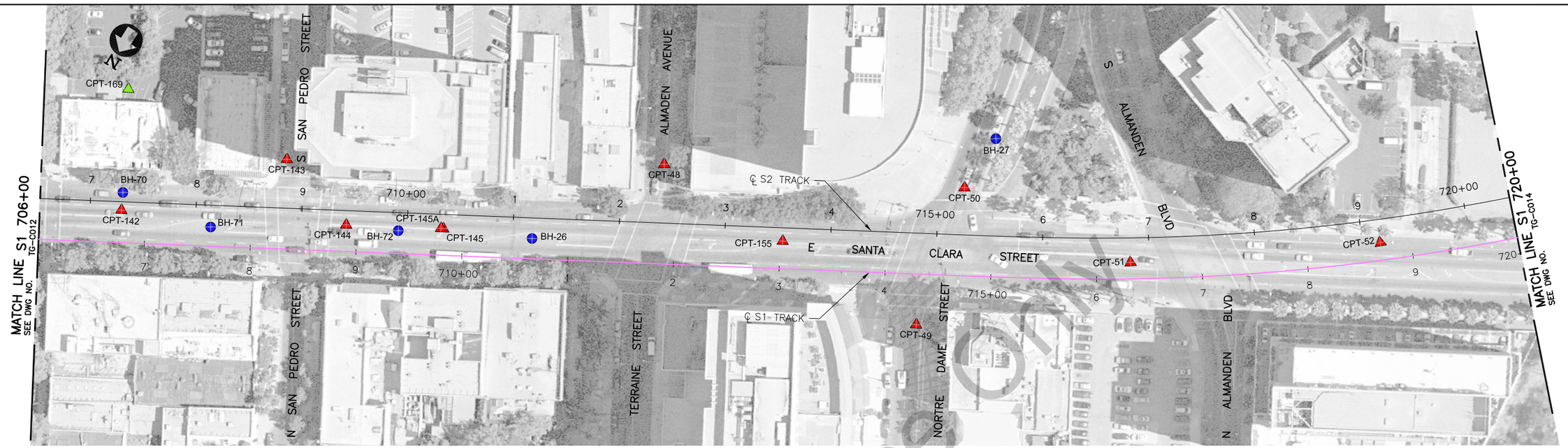
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-33 | PAGE NO.

Figure 5-34 Geotechnical Plan and Profile with Strength Parameters: STA 706+00 to STA 720+00



CPT-142
31 FT, LEFT
EL = 88.4

BH-70
47 FT, LEFT
EL = 87.8

CPT-169
145 FT, LEFT
EL = 89.0

BH-71
18 FT, LEFT
EL = 88.7

CPT-143
85 FT, LEFT
EL = 87.7

CPT-144
25 FT, LEFT
EL = 88.2

BH-72
22 FT, LEFT
EL = 87.7

CPT-145A
25 FT, LEFT
EL = 87.1

CPT-145
25 FT, LEFT
EL = 87.1

BH-26
19 FT, LEFT
EL = 86.7

CPT-48
94 FT, LEFT
EL = 85.1

CPT-155
26 FT, LEFT
EL = 85.0

CPT-49
48 FT, RIGHT
EL = 83.2

CPT-50
83 FT, LEFT
EL = 83.0

BH-27
131 FT, LEFT
EL = 83.1

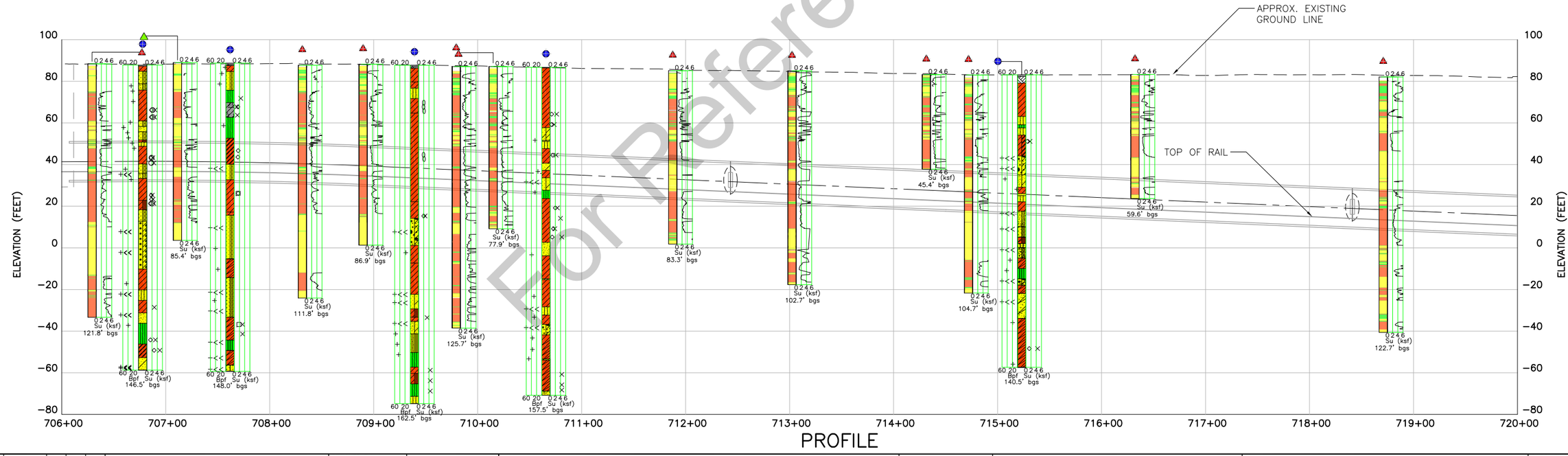
CPT-51
16 FT, LEFT
EL = 83.3

CPT-52
17 FT, LEFT
EL = 82.1

PLAN

50' 0' 50' 100'

GRAPHIC SCALE



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With Strength Parameters
S1 STA 706+00 TO STA 720+00

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SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-34 | PAGE NO.

Figure 5-35 Geotechnical Plan and Profile with Strength Parameters: STA 720+00 to STA 732+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-28
48 FT, RIGHT
EL = 82.7

CPT-53
4 FT, LEFT
EL = 82.5

BH-29
29 FT, RIGHT
EL = 84.9

CPT-55A
34 FT, RIGHT
EL = 86.8

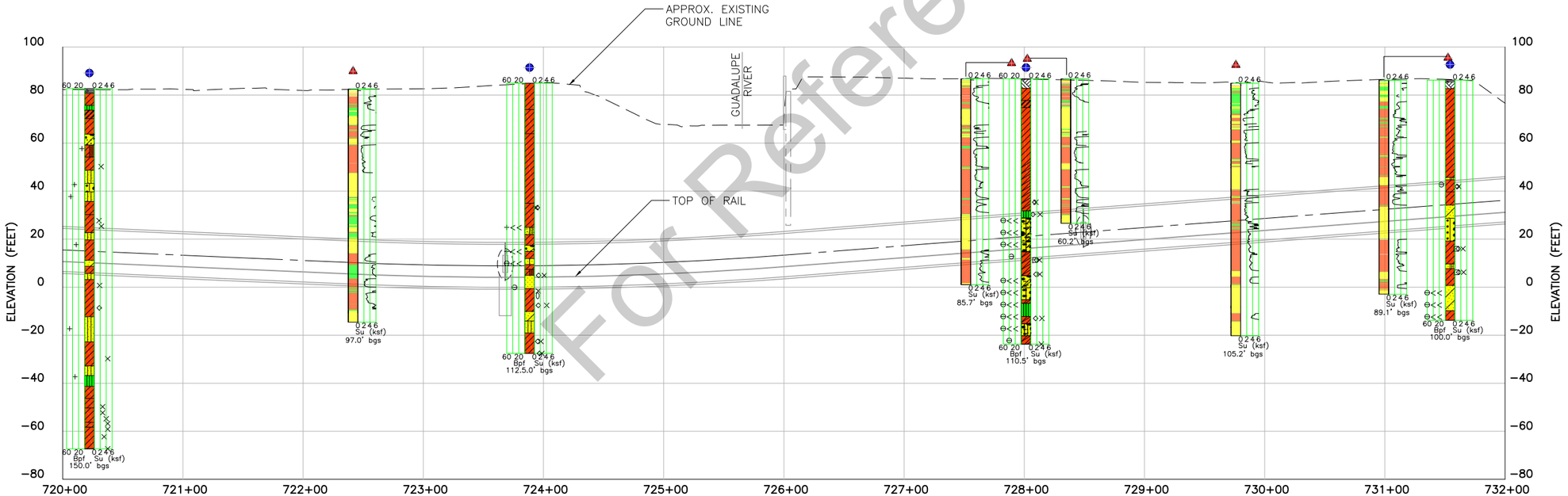
BH-30
32 FT, RIGHT
EL = 86.8

CPT-55
29 FT, RIGHT
EL = 86.8

CPT-56
69 FT, LEFT
EL = 85.0

CPT-57
6 FT, LEFT
EL = 86.2

BH-31
10 FT, LEFT
EL = 86.2



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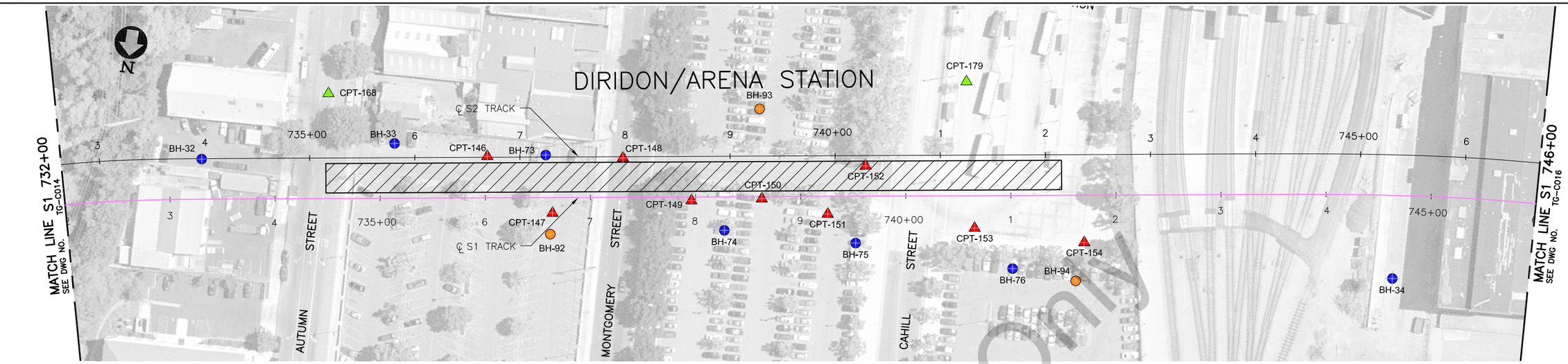
S1 STA 720+00 TO STA 732+00

CADD FILENAME D300-S-TG-C035-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-35 | PAGE NO.

Figure 5-36 Geotechnical Plan and Profile with Strength Parameters: STA 732+00 to STA 746+00

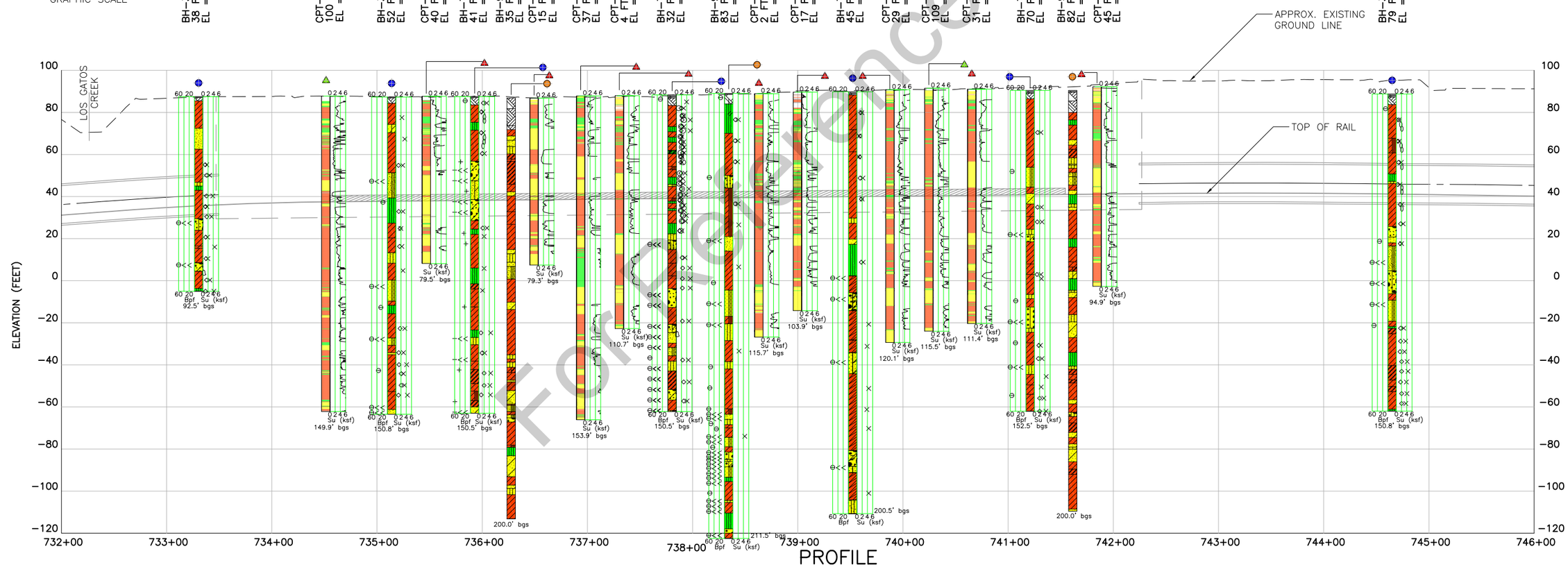


PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-32 38 FT, LEFT EL = 87.5
CPT-168 100 FT, LEFT EL = 87.8
BH-33 52 FT, LEFT EL = 87.3
CPT-146 40 FT, LEFT EL = 87.7
BH-73 41 FT, LEFT EL = 87.5
BH-92 35 FT, RIGHT EL = 86.8
CPT-147 15 FT, RIGHT EL = 86.8
CPT-148 37 FT, LEFT EL = 87.8
CPT-149 4 FT, RIGHT EL = 88.0
BH-74 32 FT, RIGHT EL = 88.3
BH-93 83 FT, LEFT EL = 89.1
CPT-150 2 FT, RIGHT EL = 88.9
CPT-151 17 FT, RIGHT EL = 89.7
BH-75 45 FT, RIGHT EL = 89.8
CPT-152 29 FT, LEFT EL = 90.8
CPT-179 109 FT, LEFT EL = 91.5
CPT-153 31 FT, RIGHT EL = 91.0
BH-76 70 FT, RIGHT EL = 90.5
BH-94 82 FT, RIGHT EL = 90.4
CPT-154 45 FT, RIGHT EL = 92.2
BH-34 79 FT, RIGHT EL = 88.7



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With Strength Parameters
S1 STA 732+00 TO STA 746+00

CADD FILENAME D300-S-TG-C036-A.dwg
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CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-36 | PAGE NO.

Oct 22, 2008 - 10:15am W:\TUCADD\35% PE\D300\STUDIES\TG-GEOTECH\GDR1_REV1_DRAWINGS\D300-S-TG-C036-A.dwg VILLEGAS_R

Figure 5-37 Geotechnical Plan and Profile with Strength Parameters: STA 746+00 to STA 759+00

PLAN

50' 0' 50' 100'
GRAPHIC SCALE

CPT-60
4 FT, RIGHT
EL = 90.2

CPT-61
70 FT, RIGHT
EL = 90.4

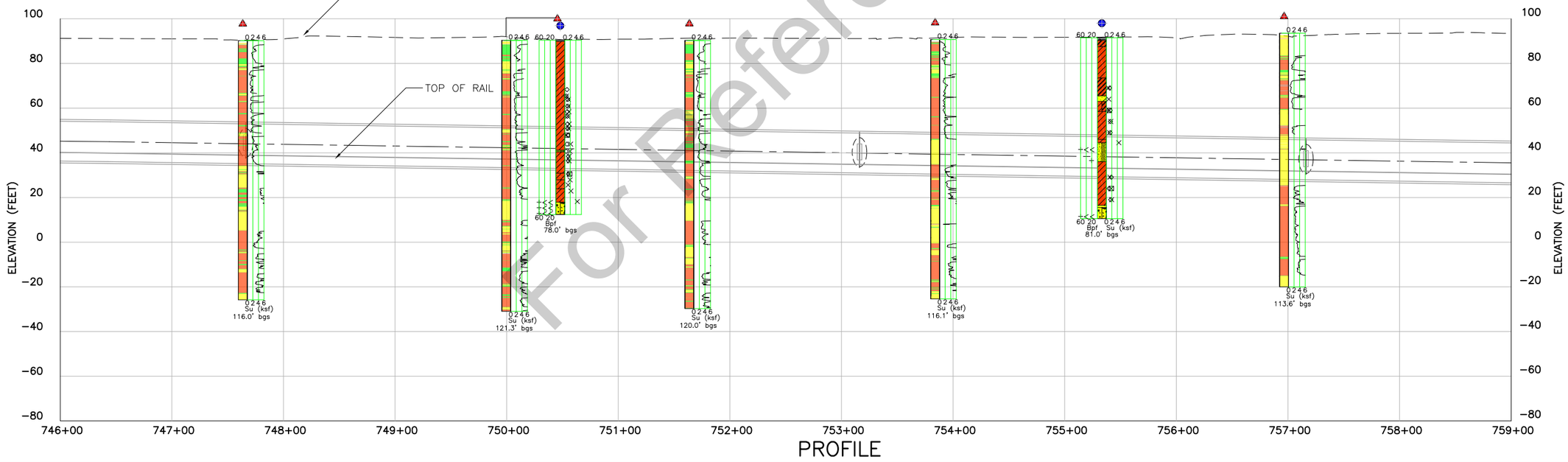
BH-35
77 FT, RIGHT
EL = 90.4

CPT-62
57 FT, RIGHT
EL = 90.3

CPT-63
41 FT, RIGHT
EL = 90.7

BH-36
101 FT, RIGHT
EL = 91.5

CPT-64
55 FT, LEFT
EL = 93.6



PROFILE

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CHECKED BY A. LIU
IN CHARGE A. LIU
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VTA Silicon Valley Rapid Transit Corridor

SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 746+00 TO STA 759+00

CADD FILENAME D300-S-TG-C037-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-37 | PAGE NO.

Figure 5-38 Geotechnical Plan and Profile with Strength Parameters: STA 759+00 to STA 773+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-65
25 FT, LEFT
EL = 91.5

BH-37
53 FT, LEFT
EL = 90.9

CPT-66
4 FT, LEFT
EL = 89.4

CPT-67
31 FT, RIGHT
EL = 88.3

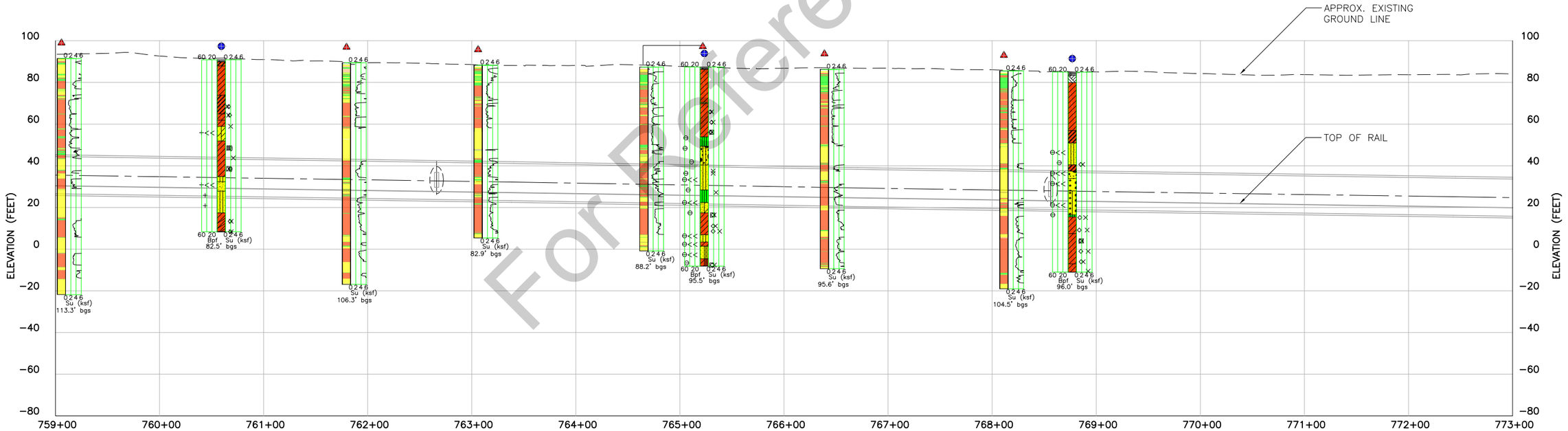
CPT-68
20 FT, LEFT
EL = 87.4

BH-38
5 FT, LEFT
EL = 87.4

CPT-69
63 FT, LEFT
EL = 86.3

CPT-70
64 FT, LEFT
EL = 85.5

BH-39
17 FT, RIGHT
EL = 84.9



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GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 759+00 TO STA 773+00

CADD FILENAME D300-S-TG-C038-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-38 | PAGE NO.

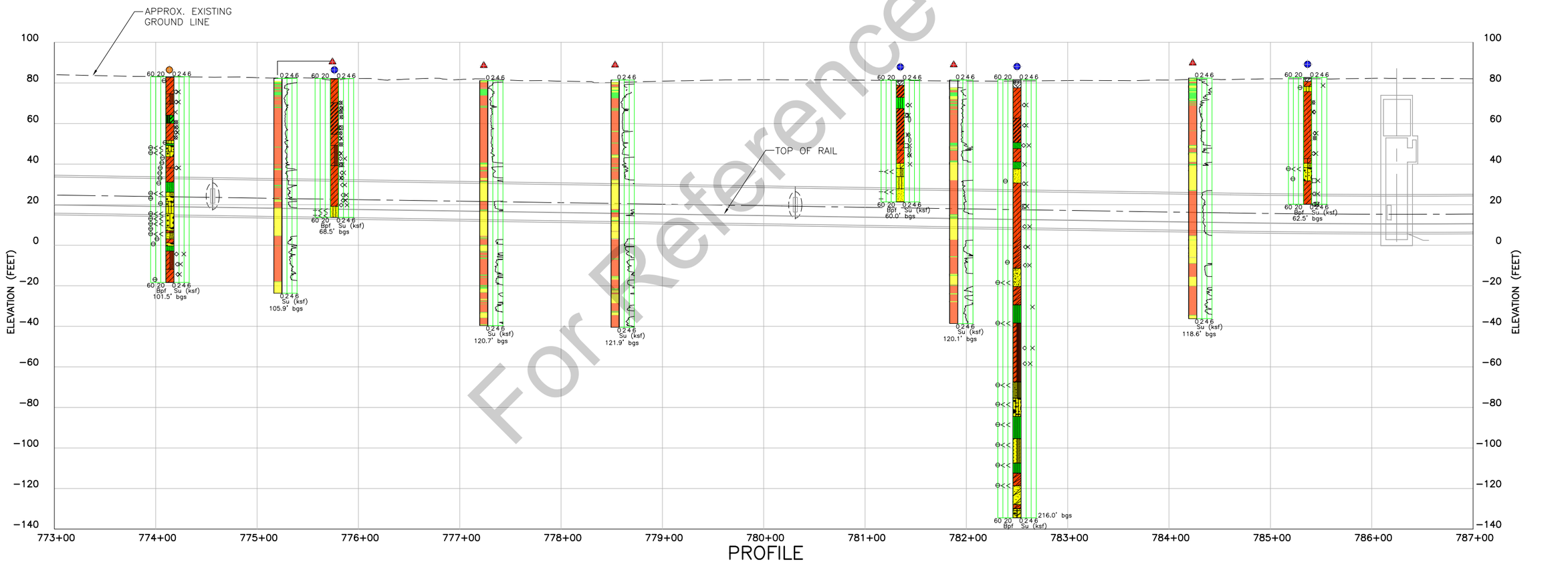
Figure 5-39 Geotechnical Plan and Profile with Strength Parameters: STA 773+00 to STA 787+00

PLAN

50' 0' 50' 100'

GRAPHIC SCALE

BH-95 49 FT, RIGHT EL = 83.1
CPT-73 80 FT, LEFT EL = 82.2
BH-40 76 FT, LEFT EL = 82.2
CPT-74 16 FT, RIGHT EL = 81.1
CPT-75 22 FT, RIGHT EL = 81.4
BH-41 12 FT, LEFT EL = 81.4
CPT-76 15 FT, LEFT EL = 81.5
BH-79 17 FT, LEFT EL = 81.6
CPT-77 20 FT, LEFT EL = 82.4
BH-42 19 FT, LEFT EL = 82.7



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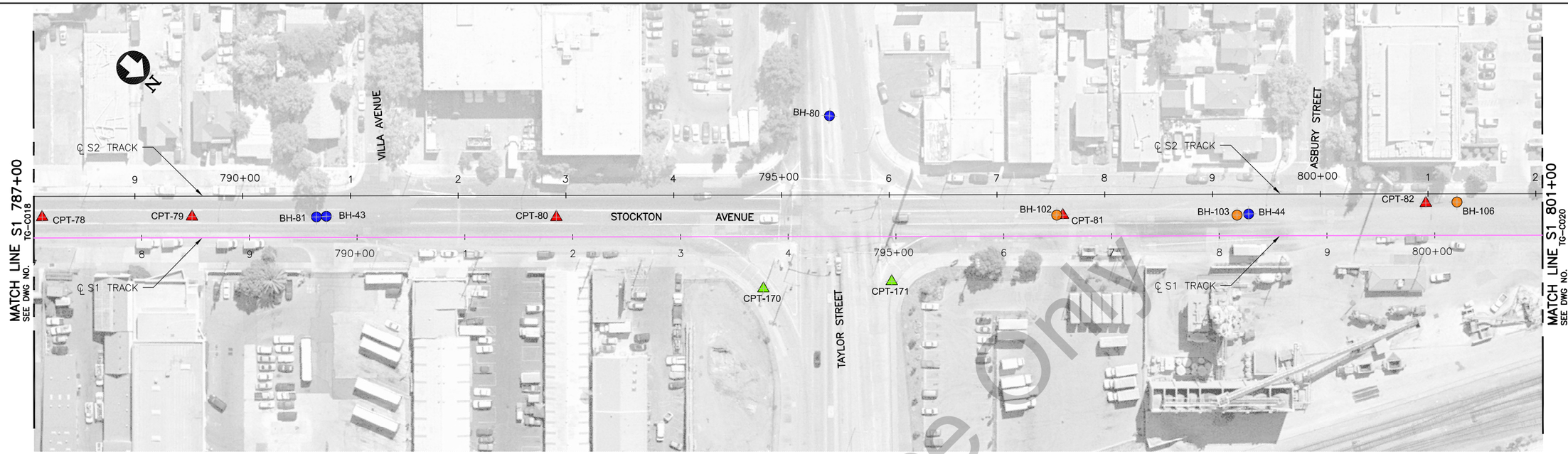
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 773+00 TO STA 787+00

CADD FILENAME D300-S-TG-C039-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-39 | PAGE NO.

Figure 5-40 Geotechnical Plan and Profile with Strength Parameters: STA 787+00 to STA 801+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-78
19 FT, LEFT
EL = 82.7

CPT-79
20 FT, LEFT
EL = 82.1

BH-81
19 FT, LEFT
EL = 81.5

BH-43
20 FT, LEFT
EL = 81.5

CPT-80
18 FT, LEFT
EL = 80.8

CPT-170
48 FT, RIGHT
EL = 76.5

BH-80
112 FT, LEFT
EL = 80.2

CPT-171
42 FT, RIGHT
EL = 75.1

BH-102
19 FT, LEFT
EL = 80.4

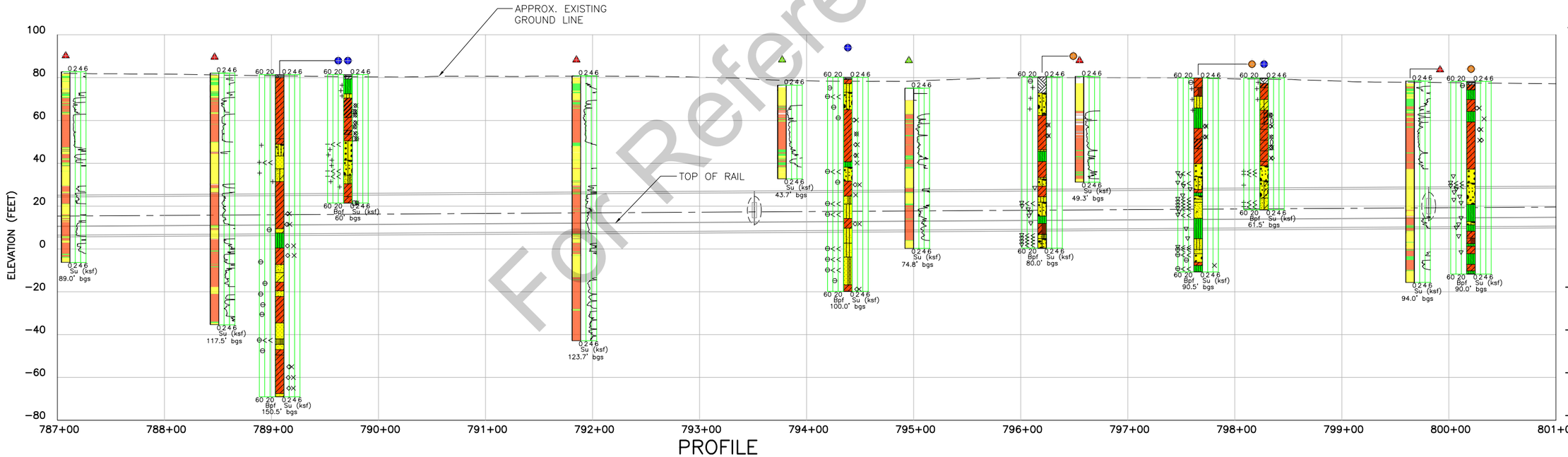
CPT-81
19 FT, LEFT
EL = 80.5

BH-103
19 FT, LEFT
EL = 79.8

BH-44
20 FT, LEFT
EL = 79.8

CPT-82
30 FT, LEFT
EL = 78.4

BH-106
31 FT, LEFT
EL = 78.3



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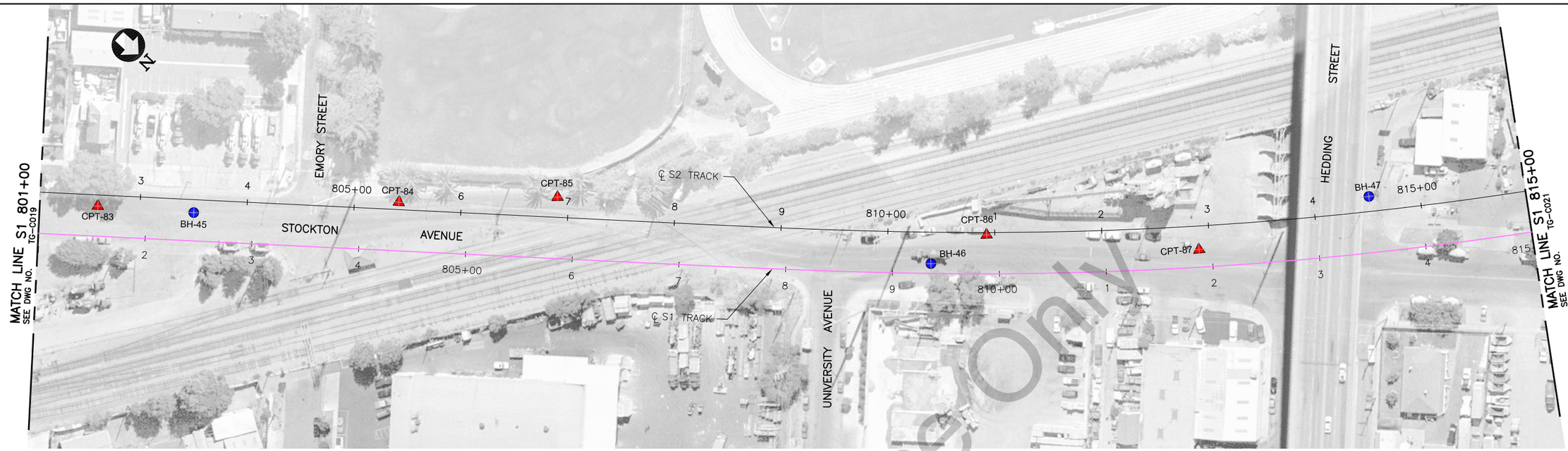
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 787+00 TO STA 801+00

CADD FILENAME D300-S-TG-C040-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-40 | PAGE NO.

Figure 5-41 Geotechnical Plan and Profile with Strength Parameters: STA 801+00 to STA 815+00



PLAN

50' 0' 50' 100'

GRAPHIC SCALE

CPT-83
28 FT, LEFT
EL = 77.8

BH-45
26 FT, LEFT
EL = 77.5

CPT-84
46 FT, LEFT
EL = 76.4

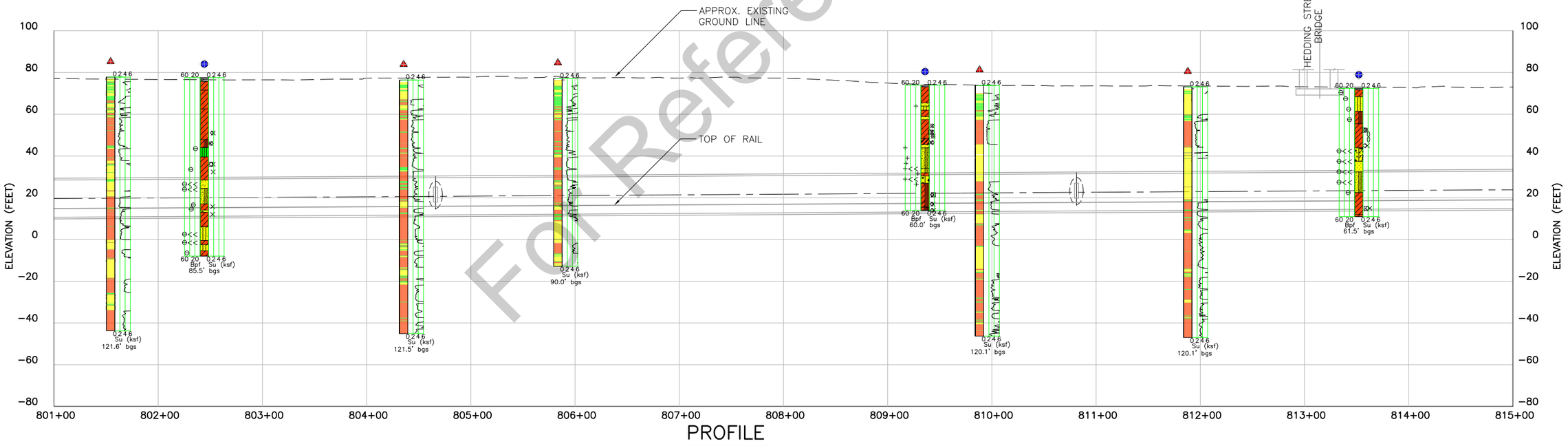
CPT-85
57 FT, LEFT
EL = 77.2

BH-46
9 FT, LEFT
EL = 73.9

CPT-86
36 FT, LEFT
EL = 73.8

CPT-87
17 FT, LEFT
EL = 73.1

BH-47
53 FT, LEFT
EL = 72.4



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SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 801+00 TO STA 815+00

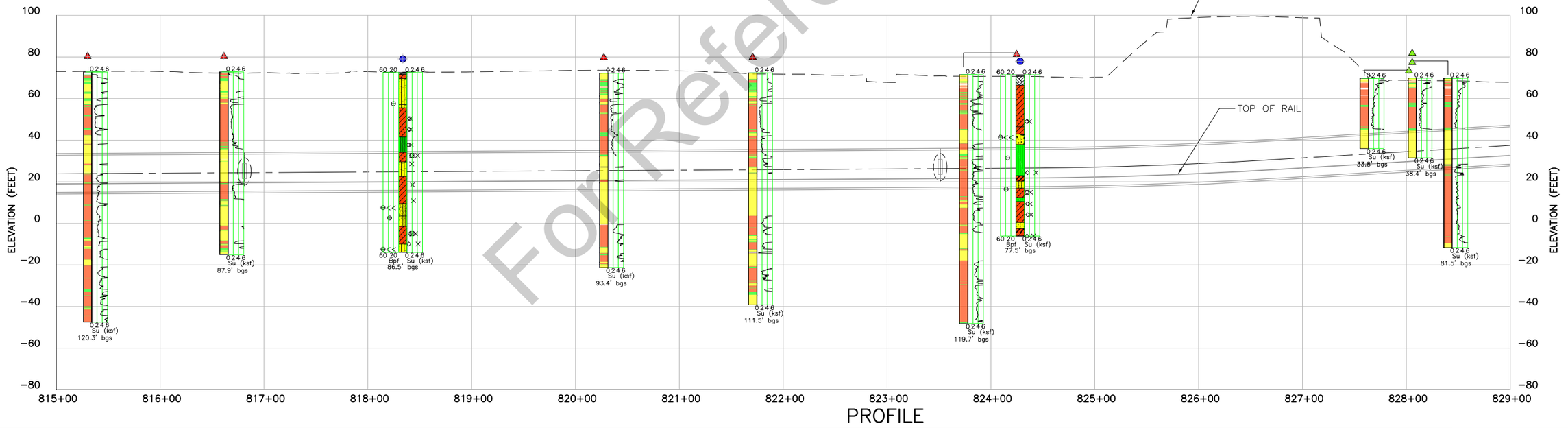
CADD FILENAME D300-S-TG-C041-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-41 | PAGE NO.

Figure 5-42 Geotechnical Plan and Profile with Strength Parameters: STA 815+00 to STA 829+00

PLAN

50' 0' 50' 100'
GRAPHIC SCALE

CPT-88 70 FT, LEFT EL = 72.8
CPT-89 85 FT, LEFT EL = 72.8
BH-48 15 FT, RIGHT EL = 72.6
CPT-90 151 FT, LEFT EL = 72.2
CPT-91 142 FT, LEFT EL = 72.3
CPT-92 67 FT, LEFT EL = 71.5
BH-49 66 FT, LEFT EL = 71.5
CPT-173A 92 FT, LEFT EL = 69.8
CPT-173 91 FT, LEFT EL = 69.9
CPT-173B 91 FT, LEFT EL = 69.8



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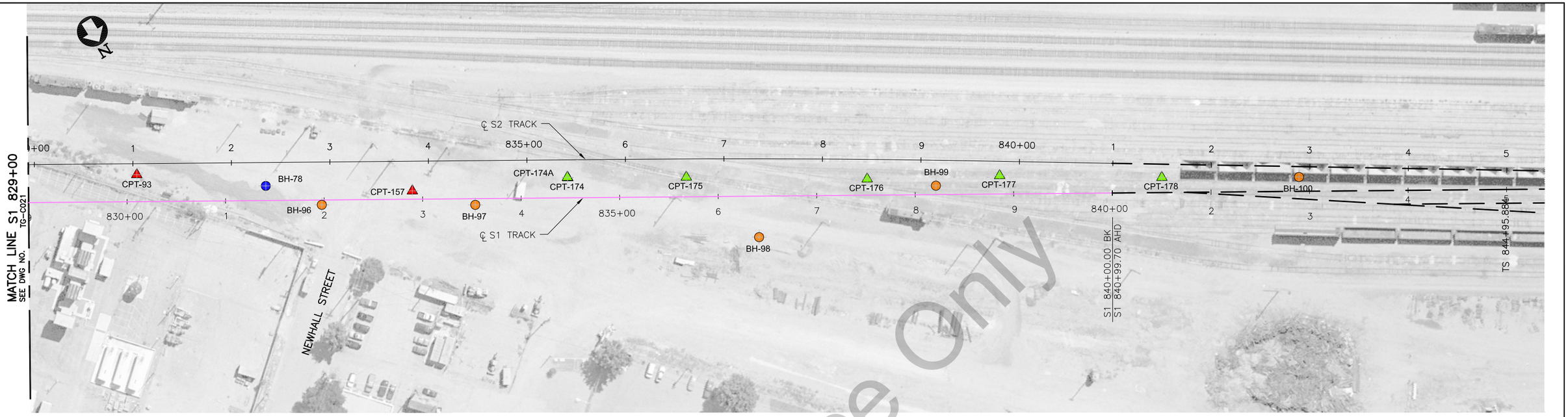
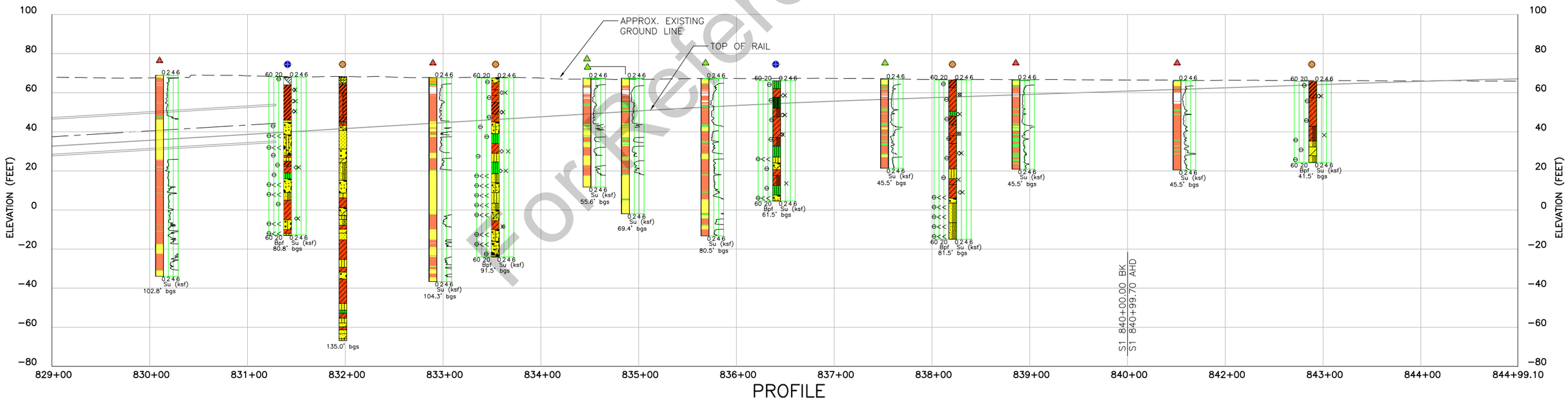
VTA Silicon Valley Rapid Transit Corridor — BART to Milpitas, San Jose, Santa Clara

SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 815+00 TO STA 829+00

CADD FILENAME D300-S-TG-C042-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-42 | PAGE NO.

Figure 5-43 Geotechnical Plan and Profile with Strength Parameters: STA 829+00 to STA 843+99





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SILICON VALLEY RAPID TRANSIT PROJECT
CENTRAL AREA GUIDEWAY
GEOTECHNICAL PLAN AND PROFILE
With Strength Parameters
S1 STA 829+00 TO STA 843+00

CADD FILENAME D300-S-TG-C043-A.dwg
SIZE B | SCALE 1"=100'H; 1"=50'V
CONTRACT NO. D300 | REV. A
AREA CODE | SHEET NO. 5-43 | PAGE NO.

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APPENDICES

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Appendix 1: Logs of Borings

INTRODUCTION

Parikh Consultants, Inc. (PCI), was retained to perform subsurface exploration for 65 % Engineering Design phase of Silicon Valley Rapid Transit (SVRT) project. They performed the exploration from June 4, 2007 through August 1, 2007. The work was performed in general accordance with the project scope and technical specifications prepared by us.

PURPOSE AND SCOPE

The purpose of this exploration was to obtain and provide subsurface data along the proposed tunnel alignment for the project. The scope included performing 19 rotary wash borings to different depths. The depths of borings ranged from 40 feet to 210.5 feet. The summary of exploration program is provided in Table A1-1. Pitcher Drilling Company (Pitcher) was retained as the driller. One to two drilling crews were utilized. A similar methodology used during 35 % Preliminary Engineering phase was employed for rotary wash drilling, sampling and logging, as described in Appendix 1 of '*Tunnel Segment Geotechnical Data Report, Vol. II of VI, P0503-D300-RPT-GEO-002, Rev. 0 (HMM/Bechtel, September 2005).* In addition to the samplers used during 35% phase, a geo-barrel and California samplers were also used to obtain disturbed samples during this phase of investigations. Specifications of these samplers are noted on Figure A1-1. The boring logs were presented to us in gINT database software format. The gINT database software acts as a repository of the borings data. We provided the gINT templates. The gINT produced boring logs are provided in Figures A1-2 through A1-21. The boring log for BH-81, which was performed near the end of 35% engineering design phase, is also included.

Table A1-1 Summary of Exploratory Borehole Program - Phase 2 65% Engineering Design Investigation Silicon Valley Rapid Transit Project - Central Area Guideway

Exploration	Boring Depth (ft)	Surface Elevation (ft)	Station (ft)	Offset		Structure Type	Driling Type
				(ft)	R / L		
East Portal							
BH-101	52.5	90.8	564+38	22	L	Portal	RW
BH-082	92.5	85.9	570+08	22	L	Portal	RW
Alum Rock Station							
BH-083#	200.0	83.9	599+84	26	R	Station	S
BH-084	207.5	87.4	603+12	148	L	Station	RW
BH-085	202.5	89.2	606+32	51	L	Station	RW
BH-086#	190.0	88.0	609+08	83	R	Station	S
Tunnel from Alum Rock Station to Crossover/Downtown Station							
BH-087	201.5	87.4	648+42	103	L	Tunnel	RW
BH-088	112.5	94.1	645+03	66	R	Tunnel	RW
Crossover/Downtown Station							
BH-089	201.5	82.1	693+74	72	R	Station	RW
BH-090	211.5	86.8	699+59	16	L	Station	RW
BH-105	51.5	86.9	701+51	2	R	Station	RW
BH-104#	200.0	87.6	703+72	78	R	Station	S
BH-091	196.5	88.3	704+16	13	L	Station	RW
Diridon/Arena Station							
BH-092#	200.0	86.8	736+62	35	R	Station	S
BH-093	211.5	89.1	738+61	84	L	Station	RW
BH-094#	200.0	90.4	741+61	82	R	Station	S
Tunnel from Crossover/Downtown Station to West Portal							
BH-081*	150.5	81.5	789+62	19	L	Tunnel	RW
BH-095	101.5	83.1	774+14	49	R	Tunnel	RW
BH-102	80.0	80.4	796+49	19	L	Tunnel	RW
BH-103	90.5	79.8	798+17	19	L	Tunnel	RW
BH-106	90.0	78.3	800+21	31	L	Tunnel	RW
West Portal							
BH-096#	135.0	68.2	831+98	5	R	Portal	S
BH-097	91.5	67.5	833+53	6	R	Portal	RW
BH-098	61.5	66.1	836+41	42	R	Portal	RW
BH-099	81.5	66.5	838+21	9	L	Portal	RW
BH-100**	41.5	65.8	842+89	15	L	Portal	RW

Notes

A. Stations and offsets are based on the April 25, 2008 S1 track alignment.

B. RW = Rotary Wash, S = Sonic, R/L = Right/Left of S1 track alignment.

C. * BH-81 was completed near the end of 35% engineeting design phase, and therefore could not be included in the 'Tunnel Segment Geotechnical Data Report (HMM/Bechtel, 2005a)'. Information from BH-81 is included in this Phase Two - 65% Engineering Design Report.

D. ** Stationing for BH-100 shown is based on Western Area Guideway alignment stationing (outside of tunnel alignment stationing).

E. # Part of pumping test program, and included in 'Pumping Test Data Report (HMM/Bechtel, Feb 2008)'.

MAJOR DIVISIONS			GROUP NAMES		
COARSE-GRAINED SOILS More than 50% retained on the No. 200 sieve	GRAVELS MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	Clean gravels less than 5% fines	GW		Well-Graded Gravel
			GP		Poorly Graded Gravel
		Gravels with 5-12% fines	GW-GM		Well-Graded Gravel with Silt
			GW-GC		Well-Graded Gravel with Clay (or Silty Clay)
			GP-GM		Poorly Graded Gravel with Silt
			GP-GC		Poorly Graded Gravel with Clay (or Silty Clay)
		Gravels with more than 12% fines	GM		Silty Gravel
			GC		Clayey Gravel
			GC-GM		Silty, Clayey Gravel
	SANDS MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	Clean sand less than 5% fines	SW		Well-Graded Sand
			SP		Poorly Graded Sand
		Sands with 5-12% fines	SW-SM		Well-Graded Sand with Silt
			SW-SC		Well-Graded Sand with Clay (or Silty Clay)
			SP-SM		Poorly Graded Sand with Silt
			SP-SC		Poorly Graded Sand with Clay (or Silty Clay)
		Sands with more than 12% fines	SM		Silty Sand
			SC		Clayey Sand
			SC-SM		Silty, Clayey Sand
FINE-GRAINED SOILS 50% or more passes the No. 200 sieve	SILTS AND CLAYS Liquid Limit Less than 50%		ML		Silt
			CL		Lean Clay
			CL-ML		Silty Clay
			OL		Organic Silt
	SILTS AND CLAYS Liquid Limit Greater than 50%		MH		Elastic Silt
			CH		Fat Clay
			OH		Organic Clay
HIGHLY ORGANIC SOILS			PT		Peat or Highly Organic Soils
			FILL		Debris or Mixed Fill
			AC		Asphalt Concrete Pavement with Aggregate Base
			BASE		Aggregate Base
			CONCRETE		Cement Concrete

GENERAL NOTES

Classification of Soils per ASTM D2487 or D2488

Geologic Formation noted in bold font at the top of interpreted interval

Uncorrected Blowcounts for Modified California Liner Sampler shown in ( ) "

Length of sample symbol approximates recovery length

"X" in Sample No. column indicates that there was no recovery during sampling.

SAMPLER DRIVING RESISTANCE

Number of blows with 140 lb. hammer, falling 30-in. to drive sampler 1-ft. after seating sampler 6-in.; for example,

Blows/ft	Description
25	25 blows drove sampler 12" after initial 6" of seating
50/7"	50 blows drove sampler 7" after initial 6" of seating
Ref/3"	50 blows drove sampler 3" during initial 6" seating interval (Ref=Refusal)

STRENGTH TEST METHOD

U = Unconfined Compression
Q = Unconsolidated Undrained Triaxial
T = Pocket Torvane (tv)
P = Pocket Penetrometer (pp)
M = Miniature Vane Shear Test
V = Field Vane Shear Test (vs)

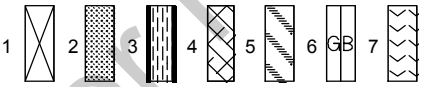
OTHER TESTS

k = Permeability
Consol = Consolidation
Gs = Specific Gravity
MA = Particle Size Analysis
PM = Pressuremeter
LEL = Lower Explosive Limit
EI = Expansion Index
OVM = Organic Vapor Measurement
OXY = Oxygen Level Reading (%)
CO2 = Carbon dioxide Level Reading (ppm)
CH4 = Methane Level Reading (ppm)
H2S = Hydrogen Sulphide Level Reading (ppm)

WATER LEVEL SYMBOLS

▽ Measured Depth to Water
∿ Seepages encountered

SAMPLER TYPE



Samplers and sampler dimensions (unless otherwise noted in report text) are as follows:

1 SPT Sampler, driven (SPT)
1 3/8" ID, 2" OD

2 MOD CA Liner Sampler (MC)
2.416" ID, 3" OD

3 Thin-walled Tube, pushed (SH)
2 7/8" ID, 3" OD

4 Bulk Bag Sample (from cuttings (BB))

5 Pitcher Sampler (PS)
2 7/8" ID, 3" OD

6 Geo-Barrel Sampler (GB)
2 2/5" ID, 4 3/4" OD

7 California Sampler (CS)
1.975 " ID, 2.5" OD

SOIL STRUCTURE

Fissured: Containing shrinkage or relief cracks, often filled with fine sand or silt, usually more or less vertical.

Pocket: Inclusion of material of different texture that is smaller than the diameter of the sample.

Parting: Inclusion less than 1/8 inch thick extending through the sample.

Seam: Inclusion 1/8 inch to 3 inches thick extending through the sample.

Layer: Inclusion greater than 3 inches thick extending through the sample.

Laminated: Soil sample composed of alternating partings or seams of different soil types.

Interlayered: Soil sample composed of alternating layers of different soil type.

Intermixed: Soil sample composed of pockets of different soil type, and layered or laminated structure is not evident.

CONSISTENCY

Clays	Blows/Foot SPT	Undrained Shear Strength (ksf)
Very Soft	< 2	0 - 0.25
Soft	2 - 4	0.25 - 0.5
Medium	4 - 8	0.5 - 1
Stiff	8 - 15	1 - 2
Very Stiff	15 - 30	2 - 4
Hard	> 30	Over 4

RELATIVE DENSITY

Sands and Gravels	Blows/Foot SPT
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	Over 50

INCREASING VISUAL MOISTURE CONTENT

Dry
Moist
Wet

Information on each boring log is a compilation of subsurface conditions and soil or rock classifications obtained from the field as well as from laboratory testing of samples. Strata have been interpreted by commonly accepted procedures. The stratum lines on the logs may be transitional and approximate in nature. Water level measurements refer only to those observed at the time and places indicated, and can vary with time, geologic condition, or construction activity.

TERMS AND SYMBOLS USED ON BORING LOGS

FIGURE A1-1

LOCATION: Median of Stockton Ave., between Schiele Ave. and Villa Ave. N 1,949,237 E 6,151,102

SURFACE EL: 81.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80 / 0					5 inches ASPHALT CONCRETE over 12 inches AGGREGATE BASE							
					LEAN CLAY (CL)							
75 / 5												
70 / 10												
65 / 15					▽							
60 / 20												
55 / 25												
50 / 30					SANDY LEAN CLAY (CL)							
		1 / 10"		52	SILTY GRAVEL WITH SAND (GM), very dense, brown, moist, medium grained sand, subangular gravel up to 1 inch		7	12				
45 / 35												
40 / 40		2 / 8"		79	POORLY GRADED SAND WITH GRAVEL (SP), very dense, brown, moist, medium grained sand, subangular gravel up to 1 inch (LEL=0.0, OVM=0.0, OXY=19.8)							
35 / 45		3 / 6"		59	WELL-GRADED SAND WITH CLAY AND GRAVEL (SW-SC), very dense, brown, moist, medium to coarse grained sand, subrounded gravel up to 1/2 inch		10	11				

Continued

BORING DEPTH: 150.5 ft
DEPTH TO WATER: 14.4 ft., 7/21/05

START DATE: July 20, 2005
COMPLETION DATE: July 22, 2005

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Rope and Cathead
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard
LOGGED BY: F. Li
CHECKED BY: Y. D. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-81

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-2a

LOCATION: Median of Stockton Ave., between Schiele Ave. and Villa Ave. N 1,949,237 E 6,151,102

SURFACE EL: 81.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30 / 55		4 / 0"		10	SANDY LEAN CLAY (CL), stiff, no recovery at 50 ft							Noise and Vibration Test
25 / 60												Noise and Vibration Test
20 / 65		5 / 30"		150 psi	--stiff, gray, moist, low to medium plasticity (pp=1.7/2.2/2.1 tsf, tv=0.65/0.7/0.75 tsf)		22	72			2.0 P 1.4 T	
15 / 70		6 / 30"		150 psi 150 psi 300 psi	-- very stiff, brown, low plasticity (pp=2.5/2.0/2.1 tsf, tv=0.4/0.5/0.6 tsf) (LEL=0.0, OVM=0.0, OXY=19.9) --Ended drilling on 7/20/05 at 70 ft --Began drilling on 7/21/05 at 70 ft						2.2 P 1.0 T	Noise and Vibration Test
10 / 75		7 / 0"		(23)	CLAYEY SAND (SC), medium dense, no recovery in MC sampler at 72.5 ft							
5 / 80		8 / 30"		245 psi 245 psi	SANDY SILT (ML), very stiff, gray, moist, low plasticity --(pp=3.5/3.5/3.7 tsf, tv=0.65/0.62/0.67 tsf)	110	20	72			3.6 P 1.3 T	Noise and Vibration Test
0 / 85		9 / 24"		300 psi 400 psi	SANDY LEAN CLAY (CL), hard, brown, moist, low to medium plasticity, trace fine gravel --(pp=3.7/3.5/4.0 tsf, tv=0.65/0.7/0.75 tsf) refusal after 24 inches			70			3.8 P 1.4 T	
-5 / 90		10 / 12"		(55)	WELL-GRADED SAND WITH GRAVEL (SW), very dense, brown, moist, subrounded gravel up to 1 inch (LEL=0.0, OVM=0.0, OXY=20.0)							Noise and Vibration Test
-10 / 95		11 / 0"			CLAYEY SAND/ CLAYEY GRAVEL (SC/GC), no recovery, interbedded zone of clay and sand/ fine gravel (could not advance the sampler due to gravelly slough)							
-15		12 / 15"		(39)	LEAN CLAY WITH SAND (CL), hard, light brown, moist, medium plasticity		25	82				

Continued

BORING DEPTH: 150.5 ft
DEPTH TO WATER: 14.4 ft., 7/21/05

START DATE: July 20, 2005
COMPLETION DATE: July 22, 2005

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Rope and Cathead
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard
LOGGED BY: F. Li
CHECKED BY: Y. D. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-2b

LOCATION: Median of Stockton Ave., between Schiele Ave. and Villa Ave. N 1,949,237 E 6,151,102

SURFACE EL: 81.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-20					WELL-GRADED SAND (SW), dense, brown, moist,							Noise and Vibration Test
		13 / 13"		(55)								
105					LEAN CLAY (CL), hard, brown to gray, moist, medium plasticity, trace fine gravel							
-25		14 / 14"		(47)	--light brown (LEL=0.0, OVM=0.0, OXY=21.0)							
110					--Ended drilling on 7/21/05 at 109 ft --Began drilling on 7/22/05 at 109 ft							Noise and Vibration Test
-30		15 / 16"		(50)	--brown, trace coarse grained sand							
115												
-35		16 / 5"		(50/6")	POORLY GRADED SAND WITH GRAVEL (SP), very dense, brown, moist, subrounded gravel up to 1 inch			3				
120												Noise and Vibration Test
-40												
125		17 / 14"		(68)	SANDY SILT TO SILTY SAND (ML/SM), hard, gray, moist, low plasticity (LEL=0.0, OVM=0.0, OXY=20.9)		16	45				
-45					POORLY GRADED SAND WITH GRAVEL (SP), sand and gravel from cuttings							
130		18 / 15"		(48)	SANDY LEAN CLAY (CL), hard, gray, moist, medium plasticity		20	69				
-50					LEAN CLAY (CL), very stiff, gray, moist, medium plasticity							
135		19 / 30"		300 psi								
-55				400 psi	--(pp=3.0/2.7/3.0 tsf, tv=0.9/0.9/0.95 tsf)						2.9 P 1.8 T	
140		20 / 30"		300 psi								
-60				400 psi	--light brown (pp=3.5/3.5/3.0 tsf, tv=0.7/0.8/0.9 tsf)		33	98			3.5 P 1.6 T	
145		21 / 30"		300 psi								
-65				350 psi	--low to medium plasticity (pp=3.5/3.0/3.5 tsf, tv=0.8/0.9/0.9 tsf) (LEL=0.0, OVM=0.0, OXY=20.8)						3.5 P 1.8 T	
		22		400 psi								

Continued

BORING DEPTH: 150.5 ft
DEPTH TO WATER: 14.4 ft., 7/21/05

START DATE: July 20, 2005
COMPLETION DATE: July 22, 2005

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Rope and Cathead
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard
LOGGED BY: F. Li
CHECKED BY: Y. D. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

LOCATION: Median of Stockton Ave., between Schiele Ave. and Villa Ave. N 1,949,237 E 6,151,102

SURFACE EL: 81.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70 / 155		15"		400 psi	CLAYEY SAND WITH GRAVEL (SC), dense, brown, moist, fine to medium grained sand, subrounded gravel up to 1/2 inch							
-75												
160 / -80												
165 / -85												
170 / -90												
175 / -95												
180 / -100												
185 / -105												
190 / -110												
195 / -115												

BORING DEPTH: 150.5 ft
DEPTH TO WATER: 14.4 ft., 7/21/05

START DATE: July 20, 2005
COMPLETION DATE: July 22, 2005

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Rope and Cathead
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard
LOGGED BY: F. Li
CHECKED BY: Y. D. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-2d

LOCATION: Approx. 150 feet NW of Las Plumas Ave., 30 feet NE of UPRR tracks N 1,956,149 E 6,163,187

SURFACE EL: 85.9 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
85 / 0	1 / 10"		(17)	SILT (ML), stiff, light brown, moist, low plasticity							
80 / 5	2 / 24"		180 psi	LEAN CLAY (CL), stiff, gray, moist, low plasticity (pp=1/1.5/1.25 tsf, tv=0.4,0.5,0.45 tsf)						1.3 P 0.9 T	
				--Began rotary wash, set casing to 8 1/2 ft							
75 / 10	3 / 32"		150 psi	LEAN CLAY (CL), stiff, brown, moist, medium plasticity (pp=1.25/1.5/1.25 tsf, tv=0.6/0.65/0.6 tsf) (OVM=0 ppm, OXY=20.9%, CH4=2 ppm)						1.3 P 1.2 T	
70 / 15	4 / 32"		250 psi	--yellowish brown (pp=1.75/1.5/1.75 tsf, tv=0.75/0.8/0.75 tsf)						1.7 P 1.5 T	
65 / 20	5 / 28"		180 psi	--brown (pp=1.5/1.75/1.5 tsf, tv=0.65/0.7/0.65 tsf)	96	28	98	42	18	1.6 P 1.3 T	Hydrometer test
60 / 25	6 / 33"		125 psi	--medium (pp=0.5/0.75/0.5 tsf, tv=0.35/0.45/0.4 tsf)						0.6 P 0.9 T	
55 / 30	7 / 33"		100 psi	--(pp=0.5/0.75/0.5 tsf, tv=0.35/0.4/0.35 tsf)		27				0.6 P 0.7 T	
50 / 35	8 / 33"		180 psi	--stiff, dark brown (pp=1.5/1.5/1.0 tsf, tv=0.55/0.7/0.6 tsf)						1.3 P 1.2 T	
45 / 40	9 / 30"		180 psi	LEAN CLAY WITH SAND (CL), stiff, light brown, moist to wet, low plasticity (pp=1.5/1.0/0.75 tsf, tv=0.25/0.3/0.33 tsf) (OVM=0 ppm, OXY=20.9%, CH4=2 ppm)		26	72	35	18	1.1 P 0.6 T	Hydrometer test
40 / 45	10 / 16"		(16)	SILTY CLAY (CL-ML), stiff, grayish brown, moist							
				SANDY SILT (ML), stiff, light gray, moist, low							

Continued

BORING DEPTH: 92.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 18, 2007
COMPLETION DATE: June 18, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-3a

LOCATION: Approx. 150 feet NW of Las Plumas Ave., 30 feet NE of UPRR tracks N 1,956,149 E 6,163,187

SURFACE EL: 85.9 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35 / 55		11 16"		(15)	plasticity		24					
30		12 16"		12								
60 / 25		13 18"		24	SILTY CLAY (CL-ML), very stiff, brown, moist, low plasticity							
65 / 20		14 36"		200 psi	SILT (ML), very stiff, gray, moist							
					--(pp=3.5/4.0/3.75 tsf)	94	27	96	38	9	3.8 P	Hydrometer test
					SILTY SAND (SM)							
70 / 15		15 33"		200 psi	LEAN CLAY (CL), very stiff, gray, moist, low plasticity							
					--(pp=3.75/3.5/3.25 tsf)						3.5 P	
75 / 10												
					SILTY SAND (SM), dark brown, wet, fine to medium grained							
80 / 5		16 16"		225 psi								
85 / 0												
90 / -5		17 33"		250 psi	LEAN CLAY WITH SAND (CL), very stiff, yellowish brown, moist, low plasticity (pp=2.5/2.25/2.0 tsf)							
					(OVM=0 ppm, OXY=20.9%, CH4=1 ppm)	110	21				2.3 P	
95 / -10												

BORING DEPTH: 92.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 18, 2007
COMPLETION DATE: June 18, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

LOCATION: Approx. 100 feet SW of 30th St., Approx. 300 ft. SE of St. James St. N 1,953,475 E 6,164,953

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
87.4 / 0					1/2 inches of ASPHALT CONCRETE							
85 / 2.5		1 / 15"		(11)	SILTY SAND WITH GRAVEL (SM), brown, dry to moist (FILL) (OXY=20.9%, CH4=0 ppm, PID=0 ppm)							
80 / 7.5					LEAN CLAY (CL), medium, brown, moist, low plasticity --driller noticed silty materials at 6 ft --Began rotary wash, set casing to 8 1/2 ft.							
75 / 12.5		2 / 26"		220 psi	--gray, low plasticity, (pp=1.75/1.50/1.75 tsf, tv=0.8 tsf)						1.7 P 1.6 T	
70 / 17.5		3 / 9"		24	SILTY SAND WITH GRAVEL (SM), medium dense, brown, moist, coarse grained --gravelly drilling and lost drilling fluid at 17 1/2 feet (20 gallons) --lost drilling fluid at 23 feet (20 gallons)							
65 / 22.5					LEAN CLAY (CL), very stiff, brown, moist, low plasticity							
60 / 27.5		4 / 28"		190 psi	--(pp=1.75/2.5/2.75 tsf, tv=0.63 tsf) --driller noticed silty material from 36 to 38 1/2 ft						2.3 P 1.3 T	
55 / 32.5					FAT CLAY (CH), stiff, brown, moist, medium to high plasticity (pp=1.25/1.5/1.5 tsf, tv=0.75 tsf)							
50 / 37.5		5 / 27"		125 psi		90	33		58	31	1.4 P 1.5 T	
45 / 42.5					--lost drilling fluid at 44 feet (10 gallons)							
40 / 47.5												

Continued

BORING DEPTH: 207.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 14, 2007
COMPLETION DATE: July 16, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, W. Baker/L. Willard/J. Musich
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-4a

LOCATION: Approx. 100 feet SW of 30th St., Approx. 300 ft. SE of St. James St. N 1,953,475 E 6,164,953

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35 / 55	6 / 30"		250 psi	LEAN CLAY WITH SAND (CL), very stiff, gray, moist, low to medium plasticity (pp=3.5/2.75/3.0/3.5 tsf)						3.2 P	
30 / 60	7 / 30"		100 psi	LEAN CLAY (CL), stiff, brown, moist, low to medium plasticity --(pp=1.75/2.25/2.0 tsf) --lost drilling fluid at 62 1/2 feet (15 gallons)						2.0 P	
25 / 65											
20 / 70	8 / 18"		(27)	--very stiff							
15 / 75											
10 / 80	9 / 30"		150 psi	WELL-GRADED SAND WITH CLAY AND GRAVEL (SW-SC), yellowish brown, moist, subangular gravel up to 3/4 inch		16	10				
5 / 85				LEAN CLAY (CL), very stiff, brownish gray, moist, low to medium plasticity							
0 / 90	10 / 26"		125 psi								
-5 / 95				--(pp=3.75/3.5/4.0 tsf)						3.8 P	
-10				--encountered gravel at 98 ft SILTY SAND WITH GRAVEL (SM), very dense,							

Continued

BORING DEPTH: 207.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 14, 2007
COMPLETION DATE: July 16, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, W. Baker/L. Willard/J. Musich
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-84

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-4b

LOCATION: Approx. 100 feet SW of 30th St., Approx. 300 ft. SE of St. James St. N 1,953,475 E 6,164,953

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-15 / 105		11 / 15"		(91)	brown, moist, medium grained sand							
-20					--lost drilling fluid at 104 feet (5 gallons)							
110		12 / 12"		(92)	--encountered clay lens, approximately 1 foot thick at 108 feet WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), very dense, brown, moist, medium grained, subangular gravel up to 1 inch		8	6				
-25 / 115					--lost of drilling fluid at 116 feet (20 gallons)							
-30					LEAN CLAY (CL), very stiff, gray, moist, low plasticity							
120		13 / 30"		125 psi								
-35					--(pp=3.25/3.0/3.25 tsf) --driller noticed sandy material at 124 ft						3.2 P	
125					SANDY LEAN CLAY (CL)/CLAYEY SAND (SC), hard, gray, moist, medium grained sand							
-40												
130		14 / 12"		(49)								
-45					--(OXY=20.9%, CH4=0 ppm, PID=0 ppm) --Ended drilling on 7/14/07 at 131 1/2 ft --Began drilling on 7/15/07 at 131 1/2 ft.		21	56				Hydrometer Test
135												
-50					WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), very dense, dark brown, moist, medium grained, subangular gravel up to 1 inch							
140		15 / 8"		(77/6")			16	12				
-55					LEAN CLAY WITH SAND (CL), light brown, moist							
145					--trace organic materials from circulation at 147 ft							
-60												

Continued

BORING DEPTH: 207.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 14, 2007
COMPLETION DATE: July 16, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, W. Baker/L. Willard/J. Musich
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-4c

LOCATION: Approx. 100 feet SW of 30th St., Approx. 300 ft. SE of St. James St. N 1,953,475 E 6,164,953

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-65	16 30"		125 psi	--very stiff, light brown, moist, low plasticity (pp=3.0/3.25/3.0/3.5 tsf)						3.2 P	
155	17 30"		100 psi	--brown (pp=3.25/3.5/3.25 tsf)	112	19		29	12	3.3 P	
-70											
160	18 21"		100 psi	--(pp=2.0/2.0/2.25/2.0 tsf)						2.1 P	
-75											
165	19 30"		150 psi	LEAN CLAY (CL)/FAT CLAY (CH), hard, brownish gray, moist							
-80				--(pp=>4.5/>4.5/>4.5 tsf)		29		49	22	>4.5 P	
170	20 30"		160 psi	LEAN CLAY (CL), very stiff, yellowish brown, moist							
-85				--(pp=2.5/2.5/2.75 tsf)						2.6 P	
175	21 30"		125 psi	LEAN CLAY (CL)/SILT (ML), very stiff, gray, moist, low plasticity (pp=3.5/3.75/3.5/3.75 tsf)							
-90					101	26		36	12	3.6 P	
180	22 30"		120 psi	LEAN CLAY (CL), very stiff, brown, moist, medium plasticity (pp=3.5/4.0/4.0/4.5 tsf)							
-95										4.0 P	
185	23 30"		120 psi	--hard (pp=4.0/4.25/4.25/4.0 tsf)							
-100				--Ended drilling on 7/15/07 at 187 1/2 ft. --Began drilling on 7/16/07 at 187 1/2 ft.						4.2 P	
190	24 30"		150 psi								
-105				--very stiff, brown, low plasticity (pp=2.0/2.25/2.0 tsf) (OXY=20.9%, CH4=0 ppm, PID=0 ppm)		21		30	12	2.1 P	
195	25 30"		290 psi	--hard, brown, some coarse grained sand and fine gravel (pp=>4.5/>4.5/>4.5 tsf)							
-110										>4.5 P	

Continued

BORING DEPTH: 207.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 14, 2007
COMPLETION DATE: July 16, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, W. Baker/L. Willard/J. Musich
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-4d

LOCATION: Approx. 100 feet SW of 30th St., Approx. 300 ft. SE of St. James St. N 1,953,475 E 6,164,953

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-115		26 15"		(87)	FAT CLAY (CH), hard, brown, moist, medium to high plasticity							
205		27 31"		190 psi	--very stiff, trace gravel (pp=3.5/3.25/3.5/3.5 tsf)							
-120							22		57	32	3.4 P	
210												
-125												
215												
-130												
220												
-135												
225												
-140												
230												
-145												
235												
-150												
240												
-155												
245												
-160												

BORING DEPTH: 207.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 14, 2007
COMPLETION DATE: July 16, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, W. Baker/L. Willard/J. Musich
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-4e

LOCATION: Approx. 550 ft. SE of St. James St. and approx. 300 ft. SW of 30th St. N 1,953,155 E 6,164,854

SURFACE EL: 89.2 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
90	0					4 1/2 to 6 inches of ASPHALT CONCRETE							
			1 15"		(12)	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), loose, gray, dry, coarse grained sand (FILL)							
85	5					LEAN CLAY (CL), medium, yellowish brown, moist, low plasticity							
						--Began rotary wash, set casing to 8 1/2 ft.							
80	10		2 30"		50 psi								
						--(pp=0.5/0.75/1.0 tsf, tv=0.35/0.3/0.4 tsf)						0.8 P 0.7 T	
75	15												
70	20		3 32"		100 psi	--stiff, yellowish brown, moist, medium plasticity (pp=1.5/1.0/1.0 tsf, tv=0.35/0.4/0.4 tsf)						1.2 P 0.8 T	
65	25					--(OVM=0 ppm, OXY=20.9%, CH4=0 ppm)							
						--Per driller, the hole had taken approximately 30 more gallons than normal with one sack of drilling mud. Polymer was added at 30 ft.							
60	30		4 32"		150 psi	--grayish brown (pp=1.5/1.25/1.0 tsf, tv=0.35/0.35/0.4 tsf)						1.3 P 0.7 T	
55	35												
						FAT CLAY (CH), stiff, dark gray, moist, medium to high plasticity							
50	40		5 26"		180 psi								
						--(pp=1.75/2.0/1.5 tsf, tv=0.4/0.5/0.55 tsf)						1.8 P 1.0 T	
45	45												
						LEAN CLAY (CL), very stiff, gray, moist							
40													

Continued

BORING DEPTH: 202.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 8, 2007
COMPLETION DATE: July 10, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-5a

LOCATION: Approx. 550 ft. SE of St. James St. and approx. 300 ft. SW of 30th St. N 1,953,155 E 6,164,854

SURFACE EL: 89.2 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35	55	6 28"		200 psi	--(pp=2.5/2.75/2.25 tsf)	103	24		43	24	2.5 P	
30	60	7 33"		200 psi	--brown, low plasticity (pp=2.25/2.5/2.5 tsf)						2.4 P	
25	65	8 18"		(19)	--stiff, gray, moist, low plasticity							
20	70	9 18"		(32)	--very stiff, grayish brown, medium plasticity							
15	75	10 16"		(32)								
10	80	11 16"		(58)	--hard							
5	85	12 12"		(91)	WELL-GRADED SAND WITH CLAY AND GRAVEL (SW-SC), very dense, light brown, wet, coarse grained gravel up to 2 inches		10	8				
0	90	13 28"			LEAN CLAY (CL), very stiff, brownish gray, moist, medium plasticity --(pp=4.0/3.5/4.0 tsf)						3.8 P	
-5	95											
-10					SANDY SILT (ML), gray, moist, fine to medium grained sand							

Continued

BORING DEPTH: 202.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 8, 2007
COMPLETION DATE: July 10, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-5b

LOCATION: Approx. 550 ft. SE of St. James St. and approx. 300 ft. SW of 30th St. N 1,953,155 E 6,164,854

SURFACE EL: 89.2 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		14 33"			--(OVM=1.2 ppm, OXY=20.9%, CH4=0 ppm)	104	20	59				Hydrometer Test
-15 / 105					SILTY GRAVEL WITH SAND (GM), very dense, brown, wet, coarse grained gravel up to 1 1/2 inches							
-20 / 110		15 15"		(109)	--Ended drilling on 7/8/07 at 111 1/2 ft. --Began drilling on 7/9/07 at 109 ft (Hole caved in about 2 1/2 feet) Additional drilling mud (1/4 sack) and 10 gallons of water was added.							
-25 / 115												
-30 / 120		16 15"		(81)	POORLY-GRADED SAND WITH CLAY AND GRAVEL (SP-SC), very dense, brown, wet, dense, coarse grained		11	8				
-35 / 125												
-40 / 130		17 18"		(53)	SANDY LEAN CLAY (CL), hard, gray, moist, medium plasticity							
-45 / 135												
-50 / 140		18 18"		(74)								
-55 / 145												
-60												

Continued

BORING DEPTH: 202.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 8, 2007
COMPLETION DATE: July 10, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-5c

LOCATION: Approx. 550 ft. SE of St. James St. and approx. 300 ft. SW of 30th St. N 1,953,155 E 6,164,854

SURFACE EL: 89.2 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
	19 / 18"		(46)	--brown, moist, low plasticity		23		29	9		
-65 / 155	20 / 15"		(76/9")	--medium plasticity							
-70 / 160	21 / 18"		(73)								
-75 / 165	22 / 33"			FAT CLAY (CH), hard, brown, moist, medium to high plasticity --(pp=>4.5/>4.5/>4.5 tsf) (OVM=0 ppm, OXY=20.9%, CH4=0 ppm)	99	26		53	26	>4.5 P	
-80 / 170	23 / 4.5"			LEAN CLAY (CL), yellowish brown --(poor recovery, slough)							
-85 / 175	24 / 33"			--hard, low plasticity (pp=>4.5/>4.5/>4.5 tsf) --Ended drilling on 7/9/07 at 177 1/2 ft. --Began drilling on 7/10/07 at 177 1/2 ft.						>4.5 P	
-90 / 180	25 / 32"			--very stiff, brown (pp=3.75/4.0/4.25 tsf)						4.0 P	
-95 / 185	26 / 28"			FAT CLAY (CH), hard, brown, moist, medium to high plasticity (pp=4.25/4.25/3.75 tsf)						4.1 P	
-100 / 190	27 / 26"			SANDY LEAN CLAY (CL), hard, gray, moist, fine to medium grained sand (pp=>4.5/>4.5/>4.5 tsf)	113	17	60	27	9	>4.5 P	Hydrometer Test
-105 / 195	28 / 27"			FAT CLAY (CH), hard, gray, moist, medium to high plasticity (pp=>4.5 tsf)						>4.5 P	
-110				LEAN CLAY WITH SAND (CL), hard, yellowish							

Continued

BORING DEPTH: 202.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 8, 2007
COMPLETION DATE: July 10, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-5d

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		29 33"			LOCATION: Approx. 550 ft. SE of St. James St. and approx. 300 ft. SW of 30th St. N 1,953,155 E 6,164,854 SURFACE EL: 89.2 ft (1988 NAVD datum) brown, moist, fine to medium grained sand (pp=>4.5 tsf)						>4.5 P	
-115 / 205												
-120 / 210												
-125 / 215												
-130 / 220												
-135 / 225												
-140 / 230												
-145 / 235												
-150 / 240												
-155 / 245												
-160												

BORING DEPTH: 202.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 8, 2007
COMPLETION DATE: July 10, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-5e

LOCATION: Median of Santa Clara St., approx. 50 ft. E of 16th St. N 1,950,479 E 6,161,946

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
87.4 / 0					8 inches of ASPHALT CONCRETE over 8 inches of CONCRETE							
85 / 5		1 / 18"		(11)	LEAN CLAY (CL), medium, brown, dry, low plasticity, trace fine-grained sand (OXY=20.9%, CH4=0 ppm, PID=0 ppm)							
80					--Began rotary wash, set casing to 8 1/2 ft							
10 / 75		2 / 19"		50 psi 100 psi	SILTY SAND (SM), brown, moist, poorly-graded, fine grained sand --lost drilling fluid at 10 1/2 feet (20 gallons)							
15 / 70												
20 / 65		3 / 30"			LEAN CLAY (CL), medium, brown, moist, low plasticity (pushing pressure was not recorded) --(pp=0.5/0.75/0.5 tsf, tv=0.25 tsf)						0.6 P 0.5 T	
25 / 60					SILTY SAND (SM), dark brown, moist, fine grained							
30 / 55		4 / 14"		100 psi								
35 / 50		5 / 30"		75 psi	LEAN CLAY (CL), soft, gray, moist, low plasticity (pp=0.25/0.5/0.5 tsf, tv=1.9 tsf)						0.4 P 0.9 T	
40 / 45		6 / 30"		75 psi	SANDY SILT (ML), stiff, dark brown, moist (pp=1.5/0.75/1.0/1.5 tsf, tv=0.38 tsf)						1.2 P 0.8 T	
45 / 40		7 / 25"		125 psi	LEAN CLAY (CL), stiff, gray, moist (pp=1.25/1.0/1.25 tsf, tv=0.38 tsf)						1.2 P 0.8 T	

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 17, 2007
COMPLETION DATE: July 20, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: F. Wang/G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-6a

LOCATION: Median of Santa Clara St., approx. 50 ft. E of 16th St. N 1,950,479 E 6,161,946

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35 / 55	8 / 28"		160 psi	--gray, medium plasticity (pp=1.75/1.5/1.5 tsf, tv=0.44 tsf)		29		46	22	1.6 P 0.9 T	
30	9 / 30"		200 psi	--(pp=1.25/1.75/1.50 tsf, tv=0.44 tsf)						1.5 P 0.9 T	
25 / 60	10 / 27"		200 psi	--(pp=1.75/2.5/1.75/2.0 tsf)		28		46	22	2.0 P	
65	11 / 24"		350 psi								
20				SILTY SAND (SM), brown, moist							
70	12 / 15"		(62)	WELL-GRADED GRAVEL WITH SAND (GW), dense, brown, moist, subrounded gravel up to 1 1/2 inches, medium grained --lost drilling fluid at 72 feet (40 to 50 gallons)		8	4				
15	13 / 15"		(74)	CLAYEY SAND WITH GRAVEL (SC), dense, yellowish brown, moist, fine-grained, subrounded gravel up to 1 inch							
75	14 / 12"		(55)	SILTY SAND WITH GRAVEL (SM), dense, brown, moist							
10	15 / 6"		(52)	POORLY-GRADED GRAVEL WITH CLAY AND SAND (GP-GC), dense, brown, moist, medium grained gravel		11	7				
80	16 / 12"		(32)	LEAN CLAY (CL), stiff, brown, moist, low plasticity --Ended drilling on 7/17/07 at 81 1/2 ft. --Began drilling on 7/18/07 at 81 1/2 ft.							
5	17 / 15"		(22)	SILT (ML), stiff, gray, moist (OXY=20.9%, CH4=0 ppm, PID=0 ppm)		14	8				Hydrometer Test
85	18 / 18"		(87)	POORLY-GRADED SAND WITH SILT (SP-SM), very dense, yellowish brown, moist, medium grained, some gravel up to 1/2 inch							
0	19 / 15"		(84)	SILTY SAND (SM), very dense, brown, moist, some gravel up to 3/4 inch --medium dense, fine-grained, no gravel --lost drilling fluid at 93 feet (10 gallons)							
90	20 / 15"		(33)	POORLY-GRADED GRAVEL WITH CLAY AND SAND (GP-GC), very dense, yellowish brown, moist, subrounded gravel up to 3/4 inch --rig chatter and lost drilling fluid at 99 feet (15							
-5											
95	21 / 12"		(61/6")								
-10											

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 17, 2007
COMPLETION DATE: July 20, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: F. Wang/G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-6b

LOCATION: Median of Santa Clara St., approx. 50 ft. E of 16th St. N 1,950,479 E 6,161,946

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		22 / 11.25		(53)	gallons)							
-15					SILTY SAND WITH GRAVEL (SM), dense, yellowish brown, moist							
105		23 / 30"		240 psi	LEAN CLAY (CL), very stiff, yellowish brown, moist, low plasticity							
-20					--(pp=2.5/3.0/3.25/3.0 tsf)						2.9 P	
110		24 / 30"		200 psi	--(pp=2.5/2.75/2.5 tsf)							
-25											2.6 P	
115		25 / 30"		350 psi	SILTY SAND (SM), brownish gray, moist							
-30					--lost drilling fluid at 119 feet (10 gallons)							
120		26 / 15"		(108)	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), very dense, yellowish brown, moist, subangular gravel up to 1 inch, medium grained		8	6				
-35					--lost drilling fluid at 121 feet (10 gallons)							
125		27 / 15"		(102)	--coarse grained							
-40					SILTY CLAY (CL-ML), hard, brown, moist, low plasticity							
130		28 / 30"		250 psi								
-45					--(pp=3.5/4.0/4.0/4.25 tsf)						3.9 P	
					--Ended drilling on 7/18/07 at 132 1/2 ft.							
					--Began drilling on 7/19/07 at 132 1/2 ft.							
135		29 / 19"		450 psi	CLAYEY GRAVEL WITH SAND (GC), light gray, moist, gravel up to 3/4 inch		9	13				Hydrometer Test
-50												
140		30 / 15"		(98)	SILTY SAND (SM), very dense, brown, moist, fine-grained sand, subrounded gravel up to 1 inch, lost drilling fluid at 141 ft. (15 gallons) (OXY=20.9%, CH4=0 ppm, PID=0 ppm)							
-55												
145		31 / 18"		(47)	SILT (ML), hard, light brown, moist, low plasticity							
-60												

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 17, 2007
COMPLETION DATE: July 20, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: F. Wang/G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-6c

LOCATION: Median of Santa Clara St., approx. 50 ft. E of 16th St. N 1,950,479 E 6,161,946

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-65	32 / 30"		375 psi	--very stiff, brown (pp=3.25/3.0/3.25/3.5 tsf)						3.3 P	
155 / -70	33 / 12"		250 psi	SILTY SAND (SM), dense, yellowish brown, moist, fine-grained	92	16	24				Hydrometer Test
160 / -75	34 / 12"		(REF/5")	SILTY SAND WITH GRAVEL (SM), very dense, yellowish brown, moist, medium-grained, subrounded gravel up to 2 inches --lost drilling fluid at 163 feet (15 gallons)							
165 / -80	35 / 13"		(REF/6")	--coarse-grained, subrounded gravel up to 1 inch							
170 / -85	36 / 12"		(62/6")	POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), very dense, yellowish brown, moist, gravel up to 1 inch (OXY=20.9%, CH4=0 ppm, PID=0 ppm) --Ended drilling on 7/19/07 at 171 ft. --Began drilling on 7/20/07 at 171 ft.							
175 / -90	37 / 12"		(108/11")	--fine-grained, some subrounded gravel --added cement (Type II-V)							
180 / -95	38 / 12"		(56/6")	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), yellowish brown, moist, coarse-grained, subrounded and subangular gravel up to 1 inch		9	6				Hydrometer Test
185 / -100	39 / 16"		400 psi	ELASTIC SILT (MH)/FAT CLAY (CH), very stiff, brown, moist, high plasticity (pp=3.5/3.25/3.5 tsf)		35		56	25	3.4 P	
190 / -105	40 / 0"		(50)	LEAN CLAY (CL), very stiff (No Recovery, Classification per driller)							
195 / -110											

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 17, 2007
COMPLETION DATE: July 20, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: F. Wang/G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-6d

LOCATION: Median of Santa Clara St., approx. 50 ft. E of 16th St. N 1,950,479 E 6,161,946

SURFACE EL: 87.4 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-115		41 / 18"		(77)	--hard. yellowish brown, moist							
205												
-120												
210												
-125												
215												
-130												
220												
-135												
225												
-140												
230												
-145												
235												
-150												
240												
-155												
245												
-160												

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 17, 2007
COMPLETION DATE: July 20, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: F. Wang/G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-6e

LOCATION: Approx. 170 ft NW of Santa Clara St, 65 ft NE of N. 17th St (within SJ Water lot) N 1,950,798 E 6,162,147

SURFACE EL: 94.1 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO.	RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			1	15"		(12)	SILT (ML), medium, brown, moist, low plasticity, trace fine grained gravel and sand							
90	5		2	29"		800 psi	SANDY SILT (ML), brown, moist, low plasticity							
85	10		3	20"		1500 psi	--stiff, increasing sand at the bottom of the sample (pp=1.25/1.75/1.25 tsf)						1.4 P	
80	15		4	4"		23	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), medium dense, brown, subangular gravel up to 1 inch (from the slough)							
75	20		5	22"		1000 psi	LEAN CLAY (CL), very stiff, yellowish brown, moist, low plasticity (pp=2.25/1.75/2.0 tsf, tv=1.0 tsf)						2.0 P 2.0 T	
70	25		6	30"		300 psi	--stiff, yellowish brown, wet (pp=1.5/1.25/1.25 tsf, tv=0.6 tsf) (OVM=0.001 ppm, OXY=20.9%, CH4=0 ppm)						1.3 P 1.2 T	
65	30		7	9"	GB		SILT (ML), yellowish brown, moist			90	29	5		Hydrometer Test
60	35		8	22"	GB		SILTY CLAY (CL-ML), brown, moist, low plasticity, subangular gravel up to 1 inch							
			9	16"	GB									
55	40		10	17"	GB		LEAN CLAY (CL), yellowish brown, moist, low plasticity		25		34	16		
			11	16"	GB									
			12	20"	GB		--gray							
50	45		13	0"			SILTY SAND (SM), no recovery from Geo-Barrel (classification per drilling and soil cuttings)							
			14	24"	GB		SILTY CLAY (CL-ML), dark brown, wet, low plasticity							
45			15		GB									

Continued

BORING DEPTH: 112.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 18, 2007
COMPLETION DATE: June 18, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-7a

LOCATION: Approx. 170 ft NW of Santa Clara St, 65 ft NE of N. 17th St (within SJ Water lot) N 1,950,798 E 6,162,147

SURFACE EL: 94.1 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO.	RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
40	55	17	24"	GB		LEAN CLAY (CL), gray, moist, medium plasticity							
		18	22"	GB		SILT (ML), gray, moist							
		19	24"	GB		LEAN CLAY (CL), gray, moist							
35	60	20	30"	GB									
		21	30"	GB		SILT (ML), gray, moist, low plasticity --stiff, gray							
30	65	22	35"	GB		--yellowish brown --Ended drilling on 6/18/07 at 68 ft --Began drilling on 6/19/07 at 68 ft			100	40	13		Hydrometer test
		23	12"	GB		--dark brown (OVM=0 ppm, OXY=20.9%, CH4=0 ppm)							
25	70	24	14"	GB									
		25	17"	GB		POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), brown			11	NP	NP		Hydrometer test
		26	0"			WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), brown, medium grained, subrounded gravel up to 1 inch --no recovery from Geo-Barrel							
20	75	27	24"	GB									
		28	0"			--no recovery from Geo-Barrel							
15	80	29	13"	GB		--subangular and subrounded gravel up to 1 inch			7				
		30	18"	GB		--gravel up to 3 inches							
		31	8"	GB		POORLY-GRADED GRAVEL WITH SAND (GP), gray, moist, angular gravel up to 2 inches --lost drilling fluid at 85.0 feet							
10	85	32	15"	GB									
		33	24"	GB		LEAN CLAY WITH GRAVEL (CL), yellowish brown, low plasticity, trace fine gravels --greenish brown, increasing plasticity (OVM=0.1 ppm, OXY=20.8%, CH4=0 ppm)							
5	90	34	27"	GB									
		35	7"	GB		--increasing sand							
		36	18"		(80)	SANDY LEAN CLAY (CL), stiff, yellowish brown, moist, fine to medium grained sand							
0	95	37	6"	GB		WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), gray, subangular gravel up to 2 inches --very dense, medium grained, trace medium angular gravel			5				Hydrometer test
		38	17"	GB									
		39	9"	GB									
-5		40	11"			SILTY SAND WITH GRAVEL (SM), brown, moist,							

Continued

BORING DEPTH: 112.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 18, 2007
COMPLETION DATE: June 18, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-7b

LOCATION: Approx. 170 ft NW of Santa Clara St, 65 ft NE of N. 17th St (within SJ Water lot) N 1,950,798 E 6,162,147

SURFACE EL: 94.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		41 11"	GB		medium grained, gravel up to 2 inches --angular gravel up to 2 inches, lost drilling fluid at 97 feet							
		42 7"	GB		CLAYEY GRAVEL WITH SAND (GC), brown, moist, lost drilling fluid at 100 feet			7				
-10 / 105		43 6"	GB		WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), grayish brown, lost drilling fluid at 102 1/2 feet							
		44 9"	GB		--gravel up to 3 inches --lost drilling fluid at 104 1/2 feet							
		45 20"	GB		SILT (ML), yellowish brown							
-15 / 110		46 18"	GB		SILTY SAND (SM), brown, wet, medium grained							
					SILTY GRAVEL (GM), brown, wet, trace sand (OVM=1.2 ppm, OXY=16.7%, CH4=0 ppm)							
-20 / 115												
-25 / 120												
-30 / 125												
-35 / 130												
-40 / 135												
-45 / 140												
-50 / 145												
-55												

BORING DEPTH: 112.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 18, 2007
COMPLETION DATE: June 18, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-7c

LOCATION: SW side of N 3rd Street. Approx. 40 ft NW of Santa Clara St N 1,948,303 E 6,157,960

SURFACE EL: 82.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80 / 0		1 / 14"		(11)	5 inches of ASPHALT CONCRETE (core) (OXY=21.2%, CH4=2 ppm, PID=0.0005 ppm)							
					SANDY LEAN CLAY (CL), very stiff, brown, moist, some sand (pp=4.0/3.5/3.5 tsf)						3.7 P	
75 / 5					SILT (ML), medium, brown, very moist, low plasticity							
					--Began rotary wash, set casing to 8 1/2 ft							
70 / 10		2 / 27"		100 psi								
					--(pp=0.5/0.5/0.5 tsf, tv=0.3/0.3/0.35 tsf)						0.5 P 0.6 T	
65 / 15					LEAN CLAY (CL), stiff, brown, wet							
60 / 20		3 / 27"		50 psi								
					--(pp=1.5/1.0/1.5 tsf, tv=0.5/0.45/0.4 tsf) (OXY=21.2%, PID=0.0005 ppm)		32		37	16	1.3 P 0.9 T	
55 / 25					--color change from brown to gray at approximately 25 feet							
50 / 30		4 / 27"		50 psi								
					SILT (ML), stiff, dark brown, moist, low plasticity (pp=1.5/1.5/1.25 tsf)						1.4 P	
45 / 35					SILTY SAND (SM), medium dense, yellowish brown, wet, fine to medium grained, large gravel at the bottom of the sampler							
40 / 40		5 / 16"		(38)		106	23	47				Direct Shear
35 / 45					--lost drilling fluid at 47 1/2 feet --gravelly drilling							
					WELL-GRADED GRAVEL WITH SILT AND SAND							

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 5, 2007
COMPLETION DATE: June 8, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-8a

LOCATION: SW side of N 3rd Street. Approx. 40 ft NW of Santa Clara St N 1,948,303 E 6,157,960

SURFACE EL: 82.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30 / 55		6 / 10"		53	(GW-GM), very dense, brown, wet, fine to coarse grained sand			9				
25 / 60					SILTY CLAYEY SAND (SC-SM), gray (no sample was taken at 60 feet due to caving from 57 feet to 65 feet)							
20 / 65		7 / 22"		180 psi	SILT (ML), very stiff, dark brown, moist (sample obtained from second attempt) (pp=3.25/3.25/3.5 tsf, tv=0.5/0.5/0.5 tsf)						3.3 P 1.0 T	
15 / 70		8 / 28"		225 psi	--light brown/yellowish brown, wet (pp=3.5/3.75/3.5 tsf, tv=0.5/0.45/0.45 tsf)						3.6 P 0.9 T	
10 / 75					POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, yellowish brown, wet, some subangular gravel up to 1 1/2 inches (OXY=21.2%, PID=0.0005 ppm)							
5 / 80		9 / 10"		(100)			11	7				Hydrometer Test
0 / 85												
-5 / 90		10 / 10"		(91)	--gravel up to 1 inch --Ended drilling on 6/15/07 at 91 1/2 ft. --Began drilling on 6/16/07 at 91 1/2 ft.							
-10 / 95												
-15					SANDY SILT (ML), hard, gray, wet (OXY=20.9%,							

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 5, 2007
COMPLETION DATE: June 8, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-8b

LOCATION: SW side of N 3rd Street. Approx. 40 ft NW of Santa Clara St N 1,948,303 E 6,157,960

SURFACE EL: 82.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-20 / 105		11 / 10"		(59)	LEL=0%, PID=0 ppm)							
-25												
-30 / 110		12 / 27"			--(pp=>4.5/>4.5/>4.5 tsf, tv=0.45/0.45/0.40 tsf)						>4.5 P 0.7 T	
-35 / 115					--some gravel							
-40 / 120		13 / 22"			CLAYEY SAND WITH GRAVEL (SC), brown, moist, some subrounded gravel up to 1 inch (OXY=20.9%, LEL=0%, PID=0 ppm)							
-45 / 125												
-50 / 130		14 / 1"		(62)	--dense, gray (mostly slough in sampler)							
-55 / 135					SANDY LEAN CLAY (CL), very stiff, yellowish brown, wet							
-60 / 140		15 / 26"			--(pp=2.5/3.0/2.5 tsf, tv=0.25/0.30/0.25 tsf) (OXY=20.9%, LEL=0%, PID=0 ppm)						2.7 P 0.5 T	
-65 / 145		16 / 28"			SILT WITH SAND (ML), yellowish brown, wet, fine grained sand		20	79				Hydrometer Test
					SILTY SAND (SM), yellowish brown, fine to medium							

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 5, 2007
COMPLETION DATE: June 8, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-8c

LOCATION: SW side of N 3rd Street. Approx. 40 ft NW of Santa Clara St N 1,948,303 E 6,157,960

SURFACE EL: 82.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70		17 12"			grained sand							
					--Ended drilling on 6/6/07 at 152 1/2 ft.							
155					--Began drilling on 6/7/07 at 152 1/2 ft.							
-75		18 16"		(83)	LEAN CLAY (CL), very stiff, light gray, wet, low plasticity							
160		19 18"		(49)	SANDY LEAN CLAY (CL), hard, gray (OXY=20.9%, LEL=0%, PID=0 ppm)		19	67				Hydrometer Test
-80												
165		20 16"			SANDY SILT (ML), hard, gray, wet (pp=>4.5/>4.5/>4.5 tsf, tv=0.45/0.40/0.40 tsf)						>4.5 P 0.8 T	
-85												
170		21 28"			--subrounded gravel up to 1/2 inch	108	21	53				
-90												
175		22 16"		(67)	LEAN CLAY (CL), hard, gray, wet, low plasticity							
-95												
180		23 16"		(44)	SANDY LEAN CLAY (CL), very stiff, light brown, wet (OXY=20.9%, LEL=0%, PID=0 ppm)							
-100												
185		24 2"			--yellowish brown, moist							
-105					CLAYEY SAND (SC), gravel up to 3/4 inch in cuttings, lost drilling fluid at 186 feet							
190		25 14"		(46)								
-110					LEAN CLAY (CL), very stiff, gray, wet, medium plasticity		25	98	49	24		Hydrometer Test
					--Ended drilling on 6/7/07 at 191 1/2 ft.							
195					--Began drilling on 6/8/07 at 191 1/2 ft.							
		26 14"		(62)	SILTY SAND (SM), dense, gray, wet							
-115												

Continued

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 5, 2007
COMPLETION DATE: June 8, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-8d

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
					LOCATION: SW side of N 3rd Street. Approx. 40 ft NW of Santa Clara St N 1,948,303 E 6,157,960 SURFACE EL: 82.1 ft (1988 NAVD datum)							
-120		27 16"		(64)	--dense							
205												
-125												
210												
-130												
215												
-135												
220												
-140												
225												
-145												
230												
-150												
235												
-155												
240												
-160												
245												
-165												

BORING DEPTH: 201.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 5, 2007
COMPLETION DATE: June 8, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-8e

LOCATION: At the median of Santa Clara St., approximately 80 feet E of 1st St. N 1,947,935 E 6,157,496

SURFACE EL: 86.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
85 / 0				6 inches of ASPHALT CONCRETE							
				old concrete and wood pieces (FILL)							
	1 / 15"		(14)	SANDY LEAN CLAY (CL), stiff, yellowish brown, moist, low plasticity							
80 / 5	2 / 15"		(15)	--(OXY=20.9%, CH4=2 ppm, OVM=0 ppm)							
	3 / 15"		(8)	--medium							
75 / 10				SANDY SILT (ML), medium, brown, moist							
	4 / 25"		300 psi	--(pp=0.75/0.5/0.75 tsf, tv=0.15/0.15 tsf)						0.7 P 0.3 T	
70 / 15				LEAN CLAY (CL), medium, gray, moist, medium plasticity (pp=0.5/0.75/0.5 tsf, tv=0.25/0.23/0.25 tsf)							
	5 / 26"		50 psi							0.6 P 0.5 T	
65 / 20	6 / 16"		8	FAT CLAY (CH), medium, dark gray, moist, medium plasticity							
	7 / 24"		200 psi	LEAN CLAY (CL), stiff, light grayish brown, moist (pp=1.5/1.5/1.5 tsf, tv=0.35/0.4/0.35 tsf)							
60 / 25	8 / 17"		18	--very stiff, brown		23	89	36	14	1.5 P 0.7 T	
	9 / 28.5"		150 psi	SILTY SAND (SM), yellowish brown, moist, fine-grained							
55 / 30	10 / 16"		13	SANDY SILT (ML), stiff, brown, moist		28	70	NP	NP		
	11 / 9"		125 psi	SILTY SAND (SM), brown, moist, fine to medium grained							
50 / 35	12 / 18"		4	LEAN CLAY (CL), soft, dark gray, moist, low plasticity		28	81	30	8		
	13 / 18"		0	FAT CLAY (CH), very soft, dark gray, moist, high plasticity, some organics							
45 / 40	14 / 30"		100 psi	SANDY SILT (ML), gray, moist							
	15 / 18"		8	LEAN CLAY WITH SAND (CL), medium, gray, moist, some organics		22 24	70	26	8		
40 / 45	16 / 18"		12	--stiff, brown							

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 12, 2007
COMPLETION DATE: June 15, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-9a

LOCATION: At the median of Santa Clara St., approximately 80 feet E of 1st St. N 1,947,935 E 6,157,496

SURFACE EL: 86.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35 / 55	17 / 30"		250 psi	SANDY SILT (ML), very stiff, brown, moist, low plasticity (pp=2.75/3.5/3.75 tsf)							
	18 / 18"		22	SILTY CLAY WITH SAND (CL-ML), very stiff, brown, moist, low to medium plasticity						3.3 P	
	19 / 18"		400 psi	--Ended drilling on 6/12/07 at 54 feet --Began drilling on 6/13/07 at 54 feet		29	78	28	6		
30 / 60	20 / 18"		22	SANDY LEAN CLAY (CL), very stiff, gray, wet, medium plasticity (pp=2.5/2.75/2.5 tsf)		22	65	34	19	2.6 P	
	21 / 26.5"		50 psi	LEAN CLAY (CL), medium, grayish brown, wet (pp=0.75/1.0/1.25 tsf, tv=0.35/0.3/0.33 tsf)							
25 / 65				--with sand						1.0 P 0.7 T	
20 / 70	22 / 34"		125 psi	--very stiff (pp=1.75/2.25/2.5 tsf)						2.2 P	
15 / 75				SILTY GRAVEL WITH SAND (GM), dense, brown, wet, gravel up to 2 inches							
10 / 80	23 / 16"		(72)								
5 / 85											
0 / 90	24 / 18"		(89)	--very dense							
-5 / 95											
-10				LEAN CLAY WITH GRAVEL (CL), very stiff, light gray, wet, low plasticity, gravel up to 1 1/2 in.							

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 12, 2007
COMPLETION DATE: June 15, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-9b

LOCATION: At the median of Santa Clara St., approximately 80 feet E of 1st St. N 1,947,935 E 6,157,496

SURFACE EL: 86.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-15 / 105		25 / 16"		(28)								
-20 / 110		26 / 34"		250 psi	--very stiff, brown, moist (pp=3.75/4.0/4.25 tsf)						4.0 P	
-25 / 115												
-30 / 120		27 / 12"		(99)	SILTY SAND WITH GRAVEL (SM), very dense, yellowish brown, wet, coarse grained gravel up to 1 1/4 inches							
-35 / 125												
-40 / 130		28 / 18"		(69)	LEAN CLAY (CL), very stiff, gray, wet, low plasticity							
-45 / 135												
-50 / 140		29 / 30"		375 psi	SILT WITH SAND (ML), hard, gray, wet, fine-grained, low plasticity							
-55 / 145					--(pp=3.75/4.0/4.5 tsf)						4.1 P	
-60												

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 12, 2007
COMPLETION DATE: June 15, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-9c

LOCATION: At the median of Santa Clara St., approximately 80 feet E of 1st St. N 1,947,935 E 6,157,496

SURFACE EL: 86.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-65		30 18"		(33)	--very stiff --Ended drilling on 6/13/07 at 151 1/2 ft. --Began drilling on 6/14/07 at 151 1/2 ft.		21	47				Hydrometer Test
155 -70		31 33"			LEAN CLAY (CL), hard, gray, wet, low plasticity, trace gravel --(pp=>4.5/>4.5/4.0 tsf)						>4.5 P	
160 -75		32 30"			LEAN CLAY WITH SAND (CL), hard, gray, moist, low plasticity --(pp=>4.5/>4.5/>4.5 tsf)	105	22	73			>4.5 P	Hydrometer Test
165 -80		33 18"		(68)	SILTY SAND (SM), dense, gray, moist, fine grained							
170 -85		34 18"		(54)	LEAN CLAY (CL), hard, brown, moist, medium plasticity							
175 -90		35 33"			--hard, light brown (pp=>4.5/>4.5/>4.5 tsf) (OXY=20.9%, CH4=0 ppm, OVM=0 ppm)						>4.5 P	
180 -95		36 14"			SANDY LEAN CLAY WITH GRAVEL (CL), medium, yellowish brown, moist, medium to coarse grained sand, low plasticity (disturbed) (pp=0.5 tsf)		26	63			0.5 P	
185 -100		37 8"		(98/10")	--increasing plasticity (rock at bottom of sample)		28	70				Hydrometer Test
190 -105		38 15"		(101/10")	SILT WITH SAND (ML), hard, brown, moist, fine to medium grained sand							
195 -110		39 33"			SANDY SILT (ML), hard, dark gray, wet, low plasticity --(pp=>4.5/>4.5/>4.5 tsf)	105	21	66			>4.5 P	Hydrometer Test

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 12, 2007
COMPLETION DATE: June 15, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-9d

LOCATION: At the median of Santa Clara St., approximately 80 feet E of 1st St. N 1,947,935 E 6,157,496

SURFACE EL: 86.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-115		40 27"			--hard, gray, medium grained sand (pp=4.0/4.25/>4.5 tsf) (OXY=20.9%, CH4=1 ppm, OVM=0 ppm)						4.3 P	
205		41 18"		(59)								
-120					LEAN CLAY (CL), hard, gray, wet, medium plasticity							
					SILT (ML), hard, brown, wet, low plasticity							
210		42 18"		(87)		110	19					
-125												
215												
-130												
220												
-135												
225												
-140												
230												
-145												
235												
-150												
240												
-155												
245												
-160												

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 12, 2007
COMPLETION DATE: June 15, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-9e

LOCATION: Median of Santa Clara St., approx. 130 ft. NE of Market St. N 1,947,710 E 6,157,099

SURFACE EL: 88.3 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
					8 inches of ASPHALT CONCRETE over 6 inches of CONCRETE							
85 / 5		1 / 16"		(12)	LEAN CLAY WITH GRAVEL (CL), medium, brown, moist, low plasticity, trace broken asphalt concrete pieces (FILL)							
					SILTY SAND (SM), dark brown, moist, fine grained							
80 / 10		2 / 33"		150 psi	--Began rotary wash, set casing to 8 1/2 ft. --(OVM=0 ppm, OXY=20.9%, CH4=1 ppm)							
75 / 15					LEAN CLAY WITH SAND (CL), medium, black, moist, low to medium plasticity							
70 / 20		3 / 32"			--(pp=0.5/0.75/0.5 tsf, tv=0.35/0.35/0.3 tsf) (downward pressure was not recorded)		38		45	20	0.6 P 0.3 T	
65 / 25		4 / 32"		200 psi	--stiff, light brownish gray (pp=2.0/1.5/2.0 tsf, tv=0.45/0.55/0.55 tsf)							
60 / 30		5 / 16"		23	SILTY SAND (SM), medium dense, grayish brown, moist, fine to medium grained sand				NP	NP	1.8 P 1.0 T	
		6 / 12.5"			--wet, medium to coarse grained sand		24	37	NP	NP		
		7 / 16"		23	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), medium dense, greenish black, moist, fine to medium grained sand		24	35	NP	NP		
55 / 35		8 / 9"		20	--wet, coarse grained sand		17	9	NP	NP		
		9 / 12"			SILTY SAND (SM), brown, wet, fine to medium grained, trace organic material							
50 / 40		10 / 29"		100 psi	(Sample No. 9 was advanced only 12 inches by 4 blows with SPT sampler. See bottom of the boring for more detail.)							
		11 / 18"		23	LEAN CLAY (CL), very stiff, gray, wet, medium plasticity, some medium-grained sand			82	33	12		
45 / 45		12 / 29"			--stiff, (pp=1.25/1.5/1.75 tsf, tv=0.3/0.1/0.45 tsf)						1.5 P 0.6 T	
		13 / 18"		16	--very stiff, moist, trace, organic materials			75	32	14		Hydrometer Test
40												

Continued

BORING DEPTH: 196.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 19, 2007
COMPLETION DATE: June 22, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-10a

LOCATION: Median of Santa Clara St., approx. 130 ft. NE of Market St. N 1,947,710 E 6,157,099

SURFACE EL: 88.3 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35 / 55		14 / 7"		350 psi	SILTY SAND (SM), gray, wet, fine to medium grained							
					LEAN CLAY (CL), stiff, light gray, moist, medium plasticity							
30 / 60		15 / 18"		11								
25 / 65												
20 / 70		16 / 34"		225 psi								
					--(pp=1.75/2.0/1.75 tsf, tv=0.4/0.45/0.6 tsf)	104	22				1.8 P 1.0 T	
15 / 75					--increasing gravel at 74 1/2 ft							
					CLAYEY GRAVEL (GC), very dense, brownish gray, moist, coarse-grained sand							
10 / 80		17 / 16"		55								
5 / 85					--lost drilling fluid at 86 feet							
0 / 90		18 / 15"		60								
					--brown, gravel up to 1/2 inch --Ended drilling on 6/19/07 at 91 1/2 ft. --Began drilling on 6/20/07 at 91 1/2 ft.							
-5 / 95												
-10					LEAN CLAY (CL), stiff, light gray, moist, low							

Continued

BORING DEPTH: 196.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 19, 2007
COMPLETION DATE: June 22, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-10b

LOCATION: Median of Santa Clara St., approx. 130 ft. NE of Market St. N 1,947,710 E 6,157,099

SURFACE EL: 88.3 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		19 18"		21	plasticity							
-15 105					--minor gravel lens encountered from 105 feet to 106 feet depth							
					SILTY CLAY (CL-ML), very stiff, yellowish brown, moist, low plasticity							
-20 110		20 14"			--(pp=2.0/3.5/3.5 tsf, tv=0.35 tsf)	101	24				3.0 P 0.7 T	
-25 115					SILTY GRAVEL WITH SAND (GM), very dense, brown, wet, medium to coarse grained sand							
-30 120		21 10"		71								
-35 125					LEAN CLAY (CL), hard, yellowish brown, moist, low plasticity							
-40 130		22 32"		400 psi	--(pp=4.0/3.5/4.5 tsf)						4.0 P	
-45 135		23 16"		(46)	--light brown							
-50 140		24 26"		400 psi	CLAYEY SAND WITH GRAVEL (SC), brown, wet, coarse-grained sand		15	39				Hydrometer Test
-55 145		25 10"		(68/6")	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, brown, wet, gravel up to 1 inch		12	8				
-60												

Continued

BORING DEPTH: 196.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 19, 2007
COMPLETION DATE: June 22, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-10c

LOCATION: Median of Santa Clara St., approx. 130 ft. NE of Market St. N 1,947,710 E 6,157,099

SURFACE EL: 88.3 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-65 / 155		26 / 10"		(74/6")	--Ended drilling on 6/20/07 at 151 1/2 ft. --Began drilling on 6/21/07 at 151 1/2 ft.							
		27 / 12"		(113)	SILTY SAND (SM), very dense, reddish brown, moist, fine to medium grained		19	15				Hydrometer Test
-70 / 160		28 / 5"			LEAN CLAY WITH SAND (CL), yellowish brown, moist --lost drilling fluid at 163 1/2 feet							
-75 / 165		29 / 9"		(62/6")	POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), very dense, brown, wet, coarse grained							
-80 / 170		30 / 10"		(65/6")	--gravel up to 1 inch --lost drilling fluid at 173 feet							
-85 / 175		31 / 12"		(116)	--very dense, gravel up to 1 1/2 inches							
					LEAN CLAY (CL), very stiff, light brownish gray, moist, low plasticity		11	9				
-90 / 180		32 / 20"		400 psi								
-95 / 185		33 / 12"		(43)	--Ended drilling on 6/21/07 at 182 1/2 ft. --Began drilling on 6/22/07 at 182 1/2 ft. --greenish gray		28	99				Hydrometer Test
-100 / 190		34 / 10"		(68/4")	POORLY GRADED GRAVEL WITH CLAY AND SAND (GP-GC), very dense, gray, moist, gravel up to 2 inches							
-105 / 195		35 / 12"		(93/6")								
-110					Note: Sample No. 9 was advanced with SPT sampler for 12 inches. The sampler was then retrieved and Shelby Sampler was used according		9	7				

Continued

BORING DEPTH: 196.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 19, 2007
COMPLETION DATE: June 22, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-10d

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	LOCATION: Median of Santa Clara St., approx. 130 ft. NE of Market St. N 1,947,710 E 6,157,099 SURFACE EL: 88.3 ft (1988 NAVD datum) MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-115 / 205					to the sampling schedule per Kleinfelder.							
-120 / 210												
-125 / 215												
-130 / 220												
-135 / 225												
-140 / 230												
-145 / 235												
-150 / 240												
-155 / 245												
-160												

BORING DEPTH: 196.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 19, 2007
COMPLETION DATE: June 22, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-10e

LOCATION: Approx. 370 ft. S of Santa Clara St. and approx. 100 ft. W of Montgomery St. N 1,945,972 E 6,154,178

SURFACE EL: 81.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80 / 0					6 inches of ASPHALT CONCRETE							
		1 / 15"		(15)	LEAN CLAY WITH GRAVEL (CL), stiff, dark brown, moist, low plasticity (FILL)							
75 / 5					SILT (ML), very stiff, brown, moist, low plasticity							
					--Began rotary wash, set casing to 8 1/2 ft							
70 / 10		2 / 33"		200 psi	--(pp=2.0/2.5/2.0 tsf, tv=0.4/0.45/0.375 tsf) (OVM=0 ppm, OXY=21%, CH4=2 ppm)						2.1 P 0.9 T	
65 / 15												
60 / 20		3 / 32"		125 psi	LEAN CLAY (CL), stiff, brown, moist, low plasticity (pp=2.0/1.75/2.0 tsf, tv=0.35/0.4/0.45 tsf)						1.9 P 0.8 T	
55 / 25												
50 / 30		4 / 33"		225 psi	--yellowish brown, low plasticity (pp=1.75/2.0/1.75 tsf, tv=0.4/0.38/0.35 tsf)						1.8 P 0.8 T	
45 / 35												
40 / 40		5 / 12"		(58)	WELL-GRADED GRAVEL WITH SILT AND SAND (GM), dense, brown, wet, coarse grained gravel							
35 / 45					SILTY CLAY (CL-ML), very stiff, gray, moist, low plasticity							

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 25, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-11a

LOCATION: Approx. 370 ft. S of Santa Clara St. and approx. 100 ft. W of Montgomery St. N 1,945,972 E 6,154,178

SURFACE EL: 81.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30 / 55		6 / 33"		300 psi	--very stiff, increasing sand (pp=2.0/2.25/1.75 tsf, tv=0.4/0.45/0.4 tsf)	105	21		28	5	2.0 P 0.8 T	
25 / 60		7 / 33"		225 psi	--yellowish brown (pp=2.25/2.0/2.25 tsf)						2.2 P	
20 / 65												
15 / 70		8 / 10"		(68)	WELL-GRADED SAND WITH GRAVEL (SW), dense, brown, moist, coarse grained gravel up to 2 inches							
10 / 75					LEAN CLAY (CL), very stiff, dark gray, moist, trace fine grained sand, low plasticity							
5 / 80		9 / 33"		225 psi	--(pp=2.25/2.0/2.25 tsf) (OVM=0 ppm, OXY=21.5%, CH4=1 ppm)						2.2 P	
0 / 85												
-5 / 90		10 / 15"		(42)								
-10 / 95					POORLY-GRADED SAND WITH SILT (SP-SM), reddish brown, moist, medium grained sand							
-15												

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 25, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-11b

LOCATION: Approx. 370 ft. S of Santa Clara St. and approx. 100 ft. W of Montgomery St. N 1,945,972 E 6,154,178

SURFACE EL: 81.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-20 / 105		11 / 16"		(76)	--very dense		19	11				Hydrometer Test
-25					SILTY CLAY (CL-ML)							
110 / -30		12 / 15"		(103)	SILTY SAND WITH GRAVEL (SM), very dense, light brown, moist, coarse grained sand							
115 / -35												
120 / -40		13 / 32"		250 psi	LEAN CLAY (CL), very stiff, dark gray, moist, low plasticity							
					--(pp=2.25/2.5/2.25 tsf)	102	24				2.3 P	
125 / -45					SILTY SAND WITH GRAVEL (SM), dense, gray, moist							
130 / -50		14 / 16"		(53)	LEAN CLAY (CL), hard, grayish brown, moist, low plasticity							
135 / -55												
140 / -60		15 / 18"		(56)								
145 / -65												

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 25, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-11c

LOCATION: Approx. 370 ft. S of Santa Clara St. and approx. 100 ft. W of Montgomery St. N 1,945,972 E 6,154,178

SURFACE EL: 81.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-70	16 / 18"		(60)	SILTY CLAY (CL-ML), hard, yellowish brown, moist							
				--Ended drilling on 6/25/07 at 151 1/2 ft.							
	17 / 10"		(99/12")	--Began drilling on 6/26/07 at 70 ft. (hole caved in overnight)							
155	18 / 15"		(72)	WELL-GRADED SAND WITH GRAVEL (SW), dense, brown, wet, coarse grained gravel up to 2 inches							
-75	19 / 18"		(52)	SILTY SAND (SM), dense, light brown, wet, medium grained		23	83	30	9		Hydrometer Test
160	20 / 18"		(31)	LEAN CLAY WITH SAND (CL), hard, light brown, moist, medium plasticity							
-80	21 / 13"		450 psi							>4.5 P	
	22 / 15"		(102)	LEAN CLAY (CL), very stiff, gray, moist, medium plasticity		20	6				Hydrometer Test
165	23 / 16"		(101)	--hard, grayish brown, trace, fine grained sand (pp>4.5tsf)							
-85	24 / 18"		(45)	POORLY-GRADED SAND WITH SILT (SP-SM), very dense, grayish brown, moist, fine to medium grained		18	54				Hydrometer Test
170	25 / 15"		(70/6")	LEAN CLAY WITH GRAVEL (CL), very stiff, grayish brown, moist, low plasticity, gravel up to 1/2 inch							
-90	26 / 6"		(REF/4 1/2")			8	6				
	27 / 10"		(92/6")	POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), very dense, brown, wet, coarse grained gravel up to 1 1/2 inches							
175	28 / 10"		(74/6")	--gravel up to 2 inches							
-95	29 / 15"		(130)	SILTY SAND (SM), very dense, brown, wet							
180	30 / 10"		(87/7")	POORLY-GRADED GRAVEL WITH CLAY AND SAND (GP-GC), very dense, brown, moist, gravel up to 2 inches		10	6				
-100	31 / 15"		(78)	POORLY GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, brown, moist							
185	32 / 18"		(67)	SILT (ML), hard, yellowish brown, moist, fine grained sand							
-105	33 / 30"		400 psi	LEAN CLAY (CL), very stiff, yellowish brown, moist, low plasticity							
190	34 / 18"		(56)	--Ended drilling on 6/26/07 at 190 ft.	98	26					
-110				--Began drilling on 6/27/07 at 190 ft.							
	35 / 17"		400 psi	--hard, grayish brown, trace, coarse grained sand (OVM=0 ppm, OXY=22.2%, CH4=1 ppm)							
	36 / 17"		(124)	SILTY SAND (SM), very dense, reddish brown, moist, fine grained							
195				LEAN CLAY (CL), hard, reddish brown, wet							
-115	37 / 18"		(100)								
	38 / 15"		(114/9")								

Continued

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 25, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-11d

LOCATION: Approx. 370 ft. S of Santa Clara St. and approx. 100 ft. W of Montgomery St. N 1,945,972 E 6,154,178

SURFACE EL: 81.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
-120					SILT WITH SAND (ML), hard, grayish brown, wet, medium to coarse grained sand and subangular to subrounded gravel		27	75	35	9		Hydrometer Test
205 -125					--interbedded clay/sand to 207 feet							
					POORLY-GRADED GRAVEL (GP), gravel lens from 207 feet to 209 feet							
210 -130		39 18"		(87)	LEAN CLAY (CL), hard, reddish brown, moist, medium plasticity, trace sand							
215 -135												
220 -140												
225 -145												
230 -150												
235 -155												
240 -160												
245 -165												

BORING DEPTH: 211.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 25, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-11e

LOCATION: Approx. 350 ft SE of Lenzen Ave. Approx. 75 ft SW of Stockton Ave. N 1,947,990 E 6,152,019

SURFACE EL: 83.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
83.1 / 0					4 1/4 inches of ASPHALT CONCRETE							
		1 / 16"		(7)	LEAN CLAY (CL), medium, yellowish brown, moist, medium plasticity							
80 / 5		2 / 30"		225 psi	--stiff, light brown, low plasticity (pp=1.75/1.75/1.75 tsf, tv=0.35/0.35/0.35 tsf) (OXY=20.9%, CH4=0 ppm, OVM=0 ppm)						1.8 P 0.7 T	
					--Began rotary wash, set casing to 8 1/2 ft							
75 / 10		3 / 30"		100 psi	SILTY CLAY (CL-ML), stiff, brown, moist, low plasticity (pp=1.75/1.75/1.75 tsf, tv=0.35 tsf)						1.8 P 0.8 T	
70 / 15		4 / 29"		100 psi	LEAN CLAY (CL), medium, dark brown, moist (pp=0.5/0.75/0.5 tsf)						0.6 P	
65 / 20		5 / 32"		125 psi	ORGANIC SILT (MH)/FAT CLAY (CH), medium, grayish brown, moist, medium plasticity (pp=0.5/0.75/1.0 tsf, tv=0.4 tsf)							
		6 / 30"		150 psi			40		55	25	0.8 P 0.8 T	
60 / 25		7 / 29"		125 psi	LEAN CLAY (CL), medium, brown, moist, low to medium plasticity (pp=1.0/0.75/0.75 tsf, tv=0.5 tsf)						0.8 P 1.0 T	
		8 / 29"		125 psi	--stiff (pp=1.25/1.5/1.0 tsf, tv=0.4 tsf)						1.3 P 0.8 T	
55 / 30		9 / 25"		375 psi	--medium, low plasticity (pp=0.5/0.75/0.5 tsf, tv=0.35 tsf)						0.6 P 0.7 T	
		10 / 15"		(3)	SILTY SAND (SM), grayish brown, moist, medium to coarse grained, lost drilling fluid at 31 feet (10 gallons)	104	23	39				
50 / 35		11 / 12"		(67)	SANDY SILT WITH GRAVEL (ML), very soft, dark brown, moist, fine grained sand, lost drilling fluid at 33 feet (10 gallons)							
45 / 40		12 / 15"		(79)	WELL-GRADED GRAVEL WITH SAND (GW), dense, gray, wet, coarse grained gravel up to 2 inches		8	5				
		13 / 0"		(13)								
40 / 45		14		(16)	POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), very dense, gray, wet, coarse grained gravel							
		15 / 18"		150 psi								
		16 / 15"		(22)	SILTY CLAY (CL-ML), stiff, gray, moist, low to medium plasticity (disturbed sample obtained on second attempt)						1.9 P 0.9 T	
35		17 / 16"		(24)	--low plasticity (pp=1.75/2.0/2.0 tsf, tv=0.45 tsf)		30		38	15		

Continued

BORING DEPTH: 101.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 23, 2007
COMPLETION DATE: July 24, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: G. Tripathi/R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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FIGURE A-12a

LOCATION: Approx. 350 ft SE of Lenzen Ave. Approx. 75 ft SW of Stockton Ave. N 1,947,990 E 6,152,019

SURFACE EL: 83.1 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
		18 16"		(23)	LEAN CLAY (CL), stiff, brown, moist							
					--very stiff	100	26		35	12		
		19 18"		(28)	--stiff, light brown, wet, lost of drilling fluid at 51 feet							
30	55				SILTY CLAY (CL-ML), very stiff, gravel at the bottom of the sampler							
		20 17"			--increasing gravel, lost fluid at 56 feet (15 gallons)							
25		21 14"		(82)	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, dark gray, wet, coarse grained sand		9	6				
	60	22 15"		(60)	WELL-GRADED GRAVEL WITH SAND (GW), dense, dark brown, moist, subangular and subrounded gravel up to 1 1/2 inches, some fine grained sand							
20		23 10"		(21)			9	13				
	65	24 17"		100 psi	SILTY GRAVEL (GM), medium dense, yellowish brown, wet, gravel up to 1 1/2 inches, encountered clay pocket							
15		25 15"		(67)	--Ended drilling at 64 ft on 7/23/07							
					--Began drilling at 62 ft on 7/24/07		8	6				
	70	26 13"		(96)	SILTY SAND (SM), dark gray, wet (OXY=20.9%, CH4=0 ppm, OVM=0 ppm)							
10		27 15"		(98)	POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), dense, gray, moist, gravel up to 1 inch							
	75	28 15"		(60)	--very dense, gravel up to 1 1/2 inches							
					--gray, wet, gravel up to 3/4 inch, more sand at bottom of sample							
5		29 14"		(99)	--lost drilling fluid at 74 feet		7	5				
	80	30 15"		(35)	WELL-GRADED GRAVEL WITH SAND (GW), dense, gray, moist							
0		31 14"		(50)	SILTY CLAY (CL-ML), gray, wet, low plasticity							
	85	32 30"		150 psi	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), very dense, gray, moist							
-5					LEAN CLAY (CL), very stiff, light brown, moist, gravel up to 1/2 inch							3.9 P 1.0 T
	90	33 30"		100 psi	WELL-GRADED GRAVEL WITH SAND (GW), dense, gray, wet							
					SILT (ML), light brown, wet							
-10					SILTY CLAY (CL-ML), very stiff, gray, moist, low plasticity (pp=3.75/4.0/4.0 tsf, tv=0.5 tsf)							2.6 P 1.3 T
	95				--(pp=2.75/2.25/2.75 tsf, tv=0.63 tsf)							
		34 30"		350 psi	LEAN CLAY (CL), very stiff, gray, moist, medium plasticity (pp=2.25/2.25/2.0 tsf, tv=0.75 tsf)		25		34	15		2.2 P 1.5 T
-15												

Continued

BORING DEPTH: 101.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 23, 2007
COMPLETION DATE: July 24, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: G. Tripathi/R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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San Jose, California

FIGURE A-12b

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
					LOCATION: Approx. 350 ft SE of Lenzen Ave. Approx. 75 ft SW of Stockton Ave. N 1,947,990 E 6,152,019 SURFACE EL: 83.1 ft (1988 NAVD datum)							
-20 / 105		35 / 18"		(43)	--light brown (OXY=20.9%, CH4=0 ppm, OVM=0 ppm)	105	23					
-25												
-30 / 110												
-35 / 115												
-40 / 120												
-45 / 125												
-50 / 130												
-55 / 135												
-60 / 140												
-65 / 145												

BORING DEPTH: 101.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 23, 2007
COMPLETION DATE: July 24, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: G. Tripathi/R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-95

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-12c

LOCATION: Approx. 550 ft SW of Stockton Ave., Approx. 110 ft NW of Newhall St. N 1,952,134 E 6,147,865

SURFACE EL: 67.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
65 / 0	1 / 14"		(16)	CLAYEY GRAVEL (GC), loose, dark gray, moist							
				SANDY LEAN CLAY (CL), stiff, black, moist, trace gravel							
60 / 5	2 / 23"		250 psi	LEAN CLAY (CL), very stiff, dark brown, moist (pp=2.5/2.5/2.5 tsf, tv=0.55/0.5/0.5 tsf)						2.5 P 1.0 T	
				--Began rotary wash at 7 1/2 feet, set casing at 8 1/2 ft							
55 / 10	3 / 12"		(9)	SANDY LEAN CLAY (CL), medium, dark brown, moist							
				FAT CLAY (CH), stiff, yellowish brown, moist, medium to high plasticity							
50 / 15	4 / 24"		100 psi	--(pp=1.5/1.75/1.5 tsf, tv=0.55/0.5/0.5 tsf)	78	43	99	62	32	1.6 P 1.0 T	Hydrometer Test
				LEAN CLAY (CL), medium, dark brown, moist (OXY=20.9% CH4=2.0 ppm, OVM=0 ppm)							
45 / 20	5 / 16"		(9)	WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), dense, brown, wet, medium to coarse grained gravel to 1 inch							
40 / 25	6 / 16"		(45)	SANDY SILT (ML), stiff, gray, moist, low plasticity							
35 / 30	7 / 15"		(19)	SANDY LEAN CLAY (CL), very stiff, light brown, wet							
	8 / 28"		100 psi								
30 / 35			300 psi	--(pp=3.5/4.0/3.5 tsf, tv=0.45/0.5/0.5 tsf)						3.7 P 1.0 T	
25 / 40	9 / 14"		(54)	SILTY SAND (SM), dense, light brown, moist, fine to medium grained sand, some gravel up to 1 inch							
				SILT (ML), very stiff, grayish yellow, moist,							
20 / 45	10 / 26"		150 psi	--(pp=2.5/2.5/3.0 tsf, tv=0.30/0.35/0.30 tsf)		30				2.7 P 0.6 T	#200 wash
				POORLY-GRADED SAND WITH SILT AND							

Continued

BORING DEPTH: 91.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 11, 2007
COMPLETION DATE: June 11, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedamtham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-13a

LOCATION: Approx. 550 ft SW of Stockton Ave., Approx. 110 ft NW of Newhall St. N 1,952,134 E 6,147,865

SURFACE EL: 67.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
15 / 55		11 / 13"		(86)	GRAVEL (SP-SM), very dense, grayish brown, moist, coarse grained sand, gravel up to 3/4 inch		10	7				
10 / 60		12 / 5"		(52/4 1/2")	WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), very dense, gray, moist to wet, gravel up to 1 inch							
		13 / 10"		(50/4 1/2")	SILTY SAND WITH GRAVEL (SM), very dense, brown, wet, medium to coarse grained sand							
5 / 65		14 / 12"		(79)	WELL-GRADED SAND WITH SILT (SW-SM), very dense, gray, moist, subangular gravel in the slough up to 2 1/2 inches							
0 / 70		15 / 10"		(66/6")	CLAYEY GRAVEL WITH SAND (GC), very dense, gray, moist, coarse grained gravel up to 1 inch		14	24				
-5 / 75		16 / 11"		350 psi	SANDY LEAN CLAY (CL), stiff, yellowish brown, wet, fine grained sand, low plasticity (pp=1.5/1.25/1.75 tsf, tv=0.65/0.95/0.95 tsf)						1.5 P 1.7 T	
-10 / 80		17 / 12"		(83)	WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), very dense, brown, moist, coarse grained gravel 1/2 inch to 2 inches							
-15 / 85		18 / 10"		(63/6")	WELL-GRADED GRAVEL (GW), very dense, gray, wet, coarse grained gravel from 1/2 inch to 2 inches		6	1				
-20 / 90		19 / 11"		(21)	CLAYEY GRAVEL (GC), medium dense, gray, moist (OXY=20.9%, CH4=0 ppm, OVM=0 ppm)							
-25 / 95												
-30												

BORING DEPTH: 91.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 11, 2007
COMPLETION DATE: June 11, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedamtham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-13b

LOCATION: Approx. 550 ft SW of Stockton Ave. Approx. 400 ft NW of Newhall St. N 1,952,314 E 6,147,638

SURFACE EL: 66.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
65 / 0	1 / 6"		(14)	SANDY SILT WITH GRAVEL (ML), stiff, brown, moist, coarse grained sand							
60 / 5	2 / 10"		225 psi	LEAN CLAY (CL), stiff, grayish brown, moist, low plasticity (pp=1.5/1.75/2.0 tsf, tv=0.6/0.45/0.4 tsf) (OXY=21%, CH4=0 ppm, OVM=0 ppm)						1.8 P 1.0 T	
				--Began rotary wash, set casing to 8 1/2 ft							
55 / 10	3 / 13"		(7)	ELASTIC SILT (MH), medium, dark mottled bluish brown, moist, medium to high plasticity	86	36		60	27		
50 / 15	4 / 30"		125 psi	SILTY CLAY (CL-ML), stiff, grayish brown, moist, medium plasticity (pp=1.5/2.0/1.75 tsf, tv=0.3/0.4/0.35 tsf)						1.8 P 0.7 T	
45 / 20	5 / 15"		(5)	LEAN CLAY (CL), soft, light gray, moist							
40 / 25	6 / 26"		100 psi	--medium, dark brown, low plasticity (pp=0.5/1.0/0.75 tsf, tv=0.2/0.35/0.3 tsf)						0.8 P 0.6 T	
35 / 30	7 / 16"		(8)	SILTY CLAY (CL-ML), medium, gray, moist, low plasticity							
30 / 35	8 / 32"		200 psi	SANDY SILT (ML), gray, moist, fine grained sand		22	51				Hydrometer Test
25 / 40	9 / 15"		(70)	SILTY SAND (SM), very dense, light brown and gray, moist, fine to medium grained	105	22	21				Hydrometer Test
				SILTY CLAYEY GRAVEL (GC), medium dense, coarse grained --lost drilling fluid at 45 feet (30 gallons)							
20 / 45	10 / 12"		(25)	LEAN CLAY (CL), very stiff, yellowish brown, moist		31	90				Hydrometer Test
				SILTY CLAY (CL-ML), very stiff, grayish brown,							

Continued

BORING DEPTH: 61.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 3, 2007
COMPLETION DATE: July 3, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-14a

LOCATION: Approx. 550 ft SW of Stockton Ave. Approx. 400 ft NW of Newhall St. N 1,952,314 E 6,147,638

SURFACE EL: 66.1 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
15 / 55		11 / 32"		200 psi	moist, low plasticity --(pp=2.5/2.0/2.25 tsf)						2.3 P	
10 / 60		12 / 17"		(25)	SILT (ML), very stiff, light brown, moist, low plasticity		34		39	9		
5 / 65		13 / 15"		(102)	WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), very dense, brown, moist, coarse grained gravel up to 1 1/2 inches							
0 / 70												
-5 / 75												
-10 / 80												
-15 / 85												
-20 / 90												
-25 / 95												
-30												

BORING DEPTH: 61.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 3, 2007
COMPLETION DATE: July 3, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-14b

LOCATION: Approx. 600 ft SW of Stockton Ave. Approx. 500 ft NW of Newhall St. N 1,952,365 E 6,147,458

SURFACE EL: 66.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
65 / 0	1 / 16"		(22)	FAT CLAY WITH SAND (CH), stiff, black, dry to moist, medium to high plasticity, trace fine grained sand (OXY=21.8%, PID=0 ppm)							
60 / 5	2 / 32"		150 psi	LEAN CLAY (CL), stiff, grayish black, moist, medium plasticity (pp=1.5/1.5/0.5 tsf, tv=0.5/0.7/0.7 tsf)						1.3 P 1.3 T	
				--Began rotary wash, set casing at 8 1/2 ft							
55 / 10	3 / 12"		(9)	--medium, dark gray							
50 / 15	4 / 28"		125 psi								
				SILT (ML), stiff, gray, moist to wet, low plasticity, trace fine grained sand (pp=1.5/1.25/1.0 tsf, tv=0.2/0.3/0.35 tsf)						1.3 P 0.6 T	
45 / 20	5 / 18"		(8)	FAT CLAY (CH), medium, dark gray and black, moist, high plasticity							
				--color changed to brown at 23 feet							
40 / 25	6 / 29"		125 psi	LEAN CLAY (CL), medium to stiff, yellowish brown, wet, low plasticity							
				--(pp=0.75/1.2/1.0 tsf, tv=0.5/0.35/0.65 tsf)						1.0 P 1.0 T	
35 / 30	7 / 18"		(0)	SANDY LEAN CLAY (CL), very soft, light gray, moist to wet		27	61	27	11		
				LEAN CLAY (CL), stiff, yellowish brown, moist							
30 / 35	8 / 29"		75 psi								
				--(pp=1.7/2.2/2.0 tsf, tv=0.5/0.45/0.5 tsf)						2.0 P 1.0 T	
25 / 40	9 / 18"		(8)	--medium, light gray, low to medium plasticity							
20 / 45	10 / 28"		190 psi								
				SILTY SAND (SM), gray, wet, fine to medium grained	107	20	27				Hydrometer Test

Continued

BORING DEPTH: 81.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 29, 2007
COMPLETION DATE: June 29, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: P. Chan
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-15a

LOCATION: Approx. 600 ft SW of Stockton Ave. Approx. 500 ft NW of Newhall St. N 1,952,365 E 6,147,458

SURFACE EL: 66.5 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
15 / 55		11 / 18"		(21)	LEAN CLAY (CL), stiff, gray, wet						0.8 P	
10 / 60		12 / 31"		100 psi	SANDY LEAN CLAY (CL), very stiff, yellowish brown, moist, trace gravels --(pp=2.5/2.65/2.0 tsf, tv=0.7/0.65/0.7 tsf)		20	72			2.4 P 1.4 T	
5 / 65		13 / 12"		(58/6")	WELL-GRADED GRAVEL WITH SAND (GW), very dense, grayish brown, wet, subrounded gravel up to 1 1/2 inches							
0 / 70		14 / 16"		(112)	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, grayish brown, wet, subangular gravel up to 1 1/2 inches		10	5				Hydrometer Test
-5 / 75		15 / 16"		(67)	--dense, subangular gravel up to 1 inch							
-10 / 80		16 / 18"		(70)	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), dense, brownish gray, wet, subangular gravel up to 1 inch --lost drilling fluid at 76 feet		10	7				
-15 / 85		17 / 18"		(114)	--very dense							
-20 / 90												
-25 / 95												
-30												

BORING DEPTH: 81.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 29, 2007
COMPLETION DATE: June 29, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: P. Chan
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-15b

LOCATION: Approx. 600 ft SW of Stockton Ave. Approx. 750 ft NW of Newhall St N 1,952,553 E 6,147,141

SURFACE EL: 65.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
65 / 0	1 / 15"		(19)	FAT CLAY (CH), stiff, dark mottled brown, moist, high plasticity							
60 / 5	2 / 28"		200 psi	--(pp=1.5/2.0/1.75 tsf, tv=0.4/0.35/0.45 tsf) (OXY=20.9%, CH4=0 ppm, OVM=0 ppm)						1.8 P 0.8 T	
				--Began rotary wash, set casing to 8 1/2 ft							
55 / 10	3 / 15"		(7)	LEAN CLAY (CL), medium, grayish brown, moist, medium plasticity							
50 / 15	4 / 30"		125 psi								
45 / 20	5 / 16"		(10)	--gray							
40 / 25	6 / 33"		150 psi	SILTY CLAY (CL-ML), very stiff, gray, moist, low plasticity (pp=2.5/3.25/3.5 tsf)	105	22		27	7	3.1 P	
35 / 30	7 / 16"		(54)	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), dense, brown, moist, coarse grained gravel up to 1 inch		11	8				
30 / 35	8 / 16"		(32)	CLAYEY SAND (SC), medium dense, grayish brown, moist, medium to coarse grained		20	45				Hydrometer Test
25 / 40	9 / 16"		(55)	POORLY-GRADED SAND WITH SILT (SP-SM), dense, grayish brown, moist, medium to coarse grained		10	11				Hydrometer Test
20 / 45											

BORING DEPTH: 41.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: July 3, 2007
COMPLETION DATE: July 3, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-16

LOCATION: Approx. 700 feet NW of Las Plumas Ave., 10 feet NE of UPRR tracks N 1,956,655 E 6,162,937

SURFACE EL: 90.8 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
90 / 0		1 / 16"		(30)	Cored through 8 inches of ballast (OXY=20.9%, CH4=110 ppm, PID=0 ppm)							
					CLAYEY SAND WITH GRAVEL (SC), medium dense, brown, moist, some angular gravel up to 1 inch							
85 / 5		2 / 12"		(9)	POORLY-GRADED GRAVEL WITH SILT AND SAND (GP-GM), loose, gray, moist, some angular gravel up to 1 1/2 to 2 inches		8	5				
					SILT (ML), medium, brown, moist, trace sand (pp=0.5/0.5/0.75 tsf, tv=0.2 tsf) --Began rotary wash, set casing to 8 1/2 ft							
80 / 10		3 / 27"		150 psi							0.6 P 0.4 T	
					LEAN CLAY (CL), very stiff, brown, moist (pp=2.0/2.25/2.25 tsf, tv=0.8 tsf)							
75 / 15		4 / 28"		200 psi							2.2 P 1.6 T	
					FAT CLAY (CH), medium, brown, moist, medium to high plasticity (pp=0.5/0.5/0.5 tsf) (OXY=20.9%, CH4=15 ppm, PID=0 ppm) (disturbed sample from second attempt)							
70 / 20		5 / 26"		200 psi		81	41		52	25	0.5 P	
					LEAN CLAY (CL), stiff, brown, wet, low plasticity (pp=1.5/2.0/2.0 tsf, tv=0.7 tsf)							
65 / 25		6 / 23"		50 psi							1.8 P 1.4 T	
					--gray (pp=2.0/2.0/1.5 tsf, tv=0.5 tsf)							
60 / 30		7 / 25"		180 psi							1.8 P 1.0 T	
					--very stiff, yellowish gray (pp=2.25/2.25/2.25 tsf, tv=0.8 tsf)							
55 / 35		8 / 28"		190 psi		107	21		31	12	2.3 P 1.6 T	
					--stiff, brown (pp=2.0/1.5/1.5 tsf, tv=0.65 tsf) (OXY=20.9%, CH4=15 ppm, PID=0 ppm)							
50 / 40		9 / 28"		180 psi							1.7 P 1.3 T	
					--(pp=2.0/2.0/2.0 tsf, tv=0.75 tsf)							
45 / 45		10 / 22"		190 psi							2.0 P 1.5 T	
					SANDY SILT (ML), very stiff, brown, moist,							

Continued

BORING DEPTH: 52.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 4, 2007
COMPLETION DATE: June 4, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedamtham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-17a

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
					LOCATION: Approx. 700 feet NW of Las Plumas Ave., 10 feet NE of UPRR tracks N 1,956,655 E 6,162,937 SURFACE EL: 90.8 ft (1988 NAVD datum)							
40 / 55		11 / 27"		200 psi	increasing sand at the bottom (pp=3.0/3.5/3.5 tsf, tv=0.45 tsf)						3.3 P 0.9 T	
35 / 60												
30 / 65												
25 / 70												
20 / 75												
15 / 80												
10 / 85												
5 / 90												
0 / 95												
-5												

BORING DEPTH: 52.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 4, 2007
COMPLETION DATE: June 4, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: L Bhangoo/R Vedamtham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-101

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-17b

LOCATION: At the median of Stockton Ave. approx. 170 ft. NW of Taylor St. N 1,949,762 E 6,150,659

SURFACE EL: 80.4 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
80			1 18"		(28)	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), medium dense, brown to gray, moist, gravel up to 1 inch, medium grained sand (FILL)							
75	5		2 18"		19	--Begin rotary wash, set casing to 3 1/2 ft							
						--lost drilling fluid at 7 1/2 feet							
70	10		3 18"		27	WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), medium dense, brown, moist, gravel up to 1/2 inch, fine grained sand							
65	15		4 18"		30	--increasing clay content							
						LEAN CLAY (CL), medium, gray, moist, low to medium plasticity, fine grained sand (pp=0.5/0.75/0.75 tsf, tv=0.25 tsf) --Extended casing to 18 1/2 ft.							
60	20		5 29"		50 psi							0.7 P 0.5 T	
55	25		6 24"		500 psi	--less sand (pp=0.75/0.75/1.0 tsf, tv=0.25 tsf)	88	33	94			0.8 P 0.5 T	Hydrometer Test
50	30		7 34"	GB		--dark brown and gray, low plasticity							
			8 29"	GB		--increasing sand							
45	35		9 24"	GB		SILTY SAND (SM), fine grained							
						SANDY SILT (ML), gray, moist, low plasticity, some sand							
40	40		10 34"	GB		LEAN CLAY (CL), gray, moist, low plasticity							
			11 45"	GB									
35	45		12 33"	GB		SILTY SAND (SM), fine sand							
			13	GB		WELL-GRADED GRAVEL WITH SILT AND SAND			7				

Continued

BORING DEPTH: 80.0 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 22, 2007
COMPLETION DATE: June 25, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi/O. Gouthier
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-102

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-18a

LOCATION: At the median of Stockton Ave. approx. 170 ft. NW of Taylor St. N 1,949,762 E 6,150,659

SURFACE EL: 80.4 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
30	55	15"			(GW-GM)							
		14			--lost drilling fluid at 50 1/2 feet							
		0"										
		15		(11)	LEAN CLAY (CL) (OXY=20.9%, CH4=0 ppm, PID=0 ppm)							
		14"			--medium, brown, low plasticity							
		16										
25		18"	GB									
		17			SILTY SAND WITH GRAVEL (SM), brown, wet							
		18"	GB		--lost drilling fluid at 57 feet							
		18										
		0"										
		19		(82)	WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM), very dense, brown, wet, gravel up to 2 inches (OVM=0 ppm, OXY=20.9%, CH4=0 ppm)			4				
20	60	15"										
		20		(59)								
		13"										
		21		(36)	--Ended drilling on 6/22/07 at 61 1/2 ft.							
		10"			--Began drilling on 6/25/07 at 60 1/2 ft.							
		22		(26)	--dense, lost drilling fluid at 62 feet							
		14"										
15	65	23		(33)	--medium dense, gravel up to 1 1/2 inches							
		15"										
		24			SILT (ML), very stiff, grayish brown, wet, low plasticity, no recovery from Geo-barrel sampler			72				Hydrometer Test
		0"										
		25		(26)	SILTY CLAY (CL-ML), very stiff, brown, moist, low plasticity							
		18"										
10	70	26										
		23"	GB									
		27										
		19"	GB									
		28		(69)	POORLY-GRADED SAND WITH SILT AND GRAVEL (SP-SM), very dense, gravel up to 1 inch							
		16"										
5	75	29		(83)	--lost drilling fluid at 75 feet							
		17"										
		30		(72)	WELL-GRADED GRAVEL WITH SILT AND SAND (GW-GM), very dense, brown, moist, subrounded gravel up to 1 inch			9				
		16"										
0	80	31		(61)	--dense							
		15"										
-5	85											
-10	90											
-15	95											

BORING DEPTH: 80.0 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 22, 2007
COMPLETION DATE: June 25, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi/O. Gouthier
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-18b

LOCATION: Median of Stockton Ave., approx. 330 ft. NW of Taylor St. N 1,949,890 E 6,150,551

SURFACE EL: 79.8 ft (1988 NAVD datum)

ELEVATION, ft	DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT/ PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
			1 16"		(11)	LEAN CLAY (CL), medium, dark brown, moist, low plasticity (OVM=0 ppm, OXY=20.9%, CH4=0 ppm)							
						--began rotary wash, set casing to 3 1/2 ft.							
75	5		2 16"		8	SILTY CLAY (CL-ML), medium, brown, moist, low plasticity							
70	10		3 16"		6	SANDY SILT (ML), medium, brown, moist, fine-grained sand							
65	15		4 16"		4	SILT (ML), soft, brown to gray, moist, low to medium plasticity							
60	20		5 30"		50 psi	--stiff, dark gray, moist, (pp=1.0/1.5/1.5 tsf, tv=0.5 tsf)						1.3 P 1.0 T	
55	25		6 26"		400 psi	LEAN CLAY (CL), stiff, brown, moist, medium plasticity, (pp=1.25/1.5/1.0 tsf, tv=0.5 tsf)						1.3 P 1.0 T	
50	30		7 14"	GB		FAT CLAY (CH), dark gray, moist, medium to high plasticity							
			8 24"	GB					90	59	37		Hydrometer Test
45	35		9 24"	GB		LEAN CLAY (CL), yellowish gray, moist, fine-grained sand							
			10 24"	GB		--brown, medium plasticity							
			11 22"	GB									
40	40		12 0"			POORLY-GRADED GRAVEL (GP), no recovery							
			13 0"			--lost drilling fluid at 42 feet							
			14 0"			--lost drilling fluid at 43 feet							
35	45		15 2"		(75)	--very dense, dark mottled brown, fine to medium grained sand							
			16 14"		(50)								
			17 0"			WELL GRADED GRAVEL WITH SILT AND SAND (GW-GM), dense, brown, moist, lost drilling fluid at			5				
			18		(87)								

Continued

BORING DEPTH: 90.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 20, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi/O. Gouthier
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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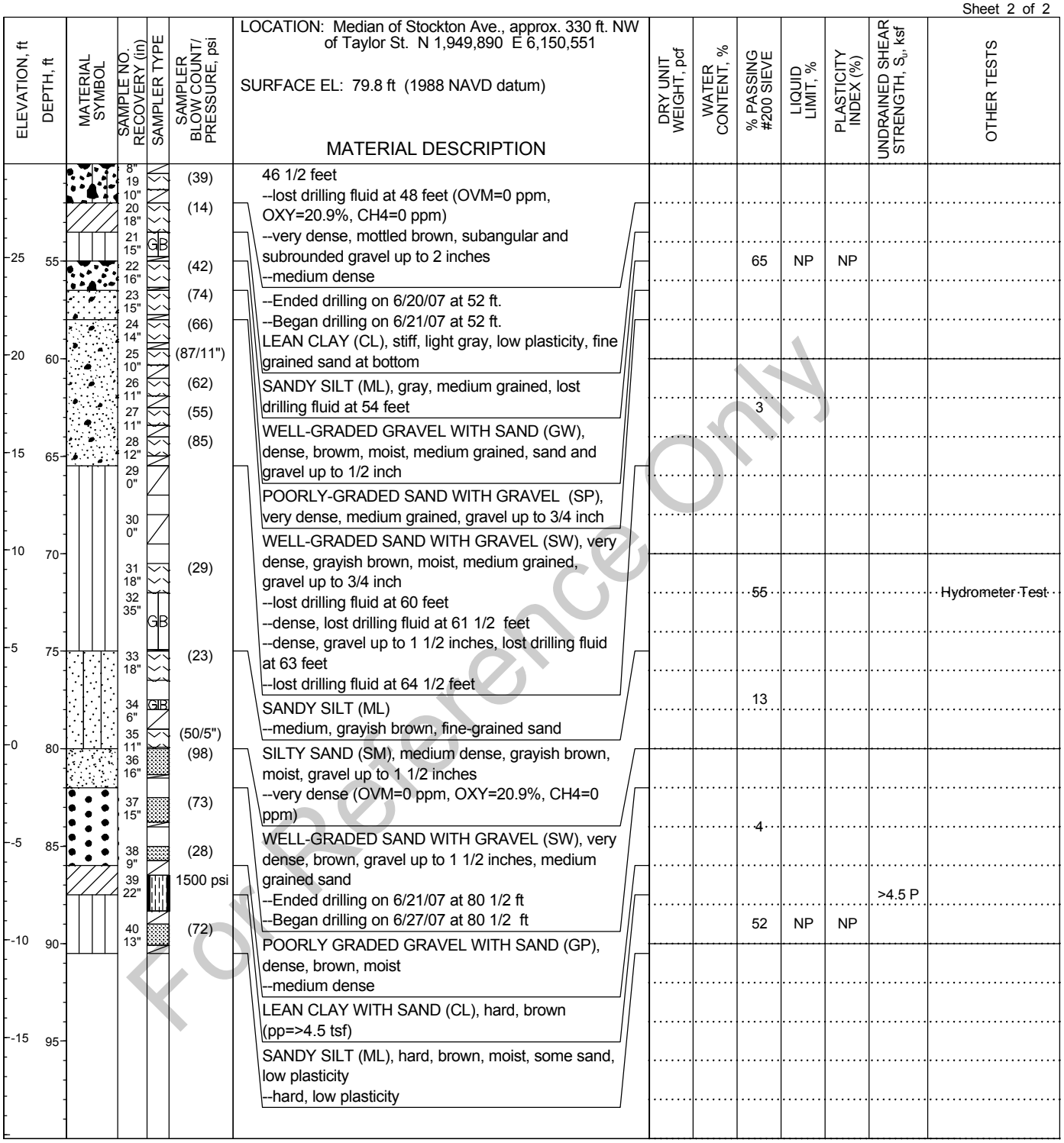
Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-19a



BORING DEPTH: 90.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 20, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi/O. Gouthier
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-103

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-19b

LOCATION: NE side of Santa Clara Street, approx. 30 feet SE of 1st Street N 1,947,855 E 6,157,321

SURFACE EL: 86.9 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
					11 inches of ASPHALT CONCRETE							
85 /		1 / 15"		(13)	SANDY LEAN CLAY (CL), stiff, brown, moist, low plasticity							
5 / 80		2 / 19"		400 psi	SILT WITH GRAVEL (ML), brown, moist, low plasticity							
10 / 75		3 / 10"		(32)	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), medium dense, brown, wet, coarse grained up to 3/4 inch		8	12				
15 / 70		4 / 30"		150 psi	LEAN CLAY (CL), medium, dark gray, moist, medium plasticity						0.3 P 0.8 T	
					--(pp=0.5/0.25/0.25 tsf, tv=0.4/0.45/0.35 tsf)							
20 / 65		5 / 30"		100 psi	--trace fine grained sand (pp=1.0/1.0/0.5 tsf, tv=0.3/0.35/0.4 tsf)						0.8 P 0.7 T	
		6 / 14"		8	SILTY SAND (SM), loose, black, moist, fine-grained		27	50	NP	NP		
25 / 60		7 / 31"		50 psi								
		8 / 18"		14	--medium dense, wet	84	35	34	NP	NP		
30 / 55		9 / 30"		100 psi								
		10 / 10"		0	LEAN CLAY (CL), medium, gray, moist, low to medium plasticity (pp=0.75/.075/0.75 tsf, tv=0.45/0.5/0.5 tsf)		32	45	29	10	0.8 P 1.0 T	
35 / 50		11 / 34"		40 psi	CLAYEY SAND (SC), very loose, gray, wet, fine-grained							
		12 / 18"		10	LEAN CLAY (CL), medium, mottled brown, moist, low plasticity, trace fine grained sand and root (pp=0.5/0.75/0.5 tsf, tv=0.35/0.4/0.4 tsf)		65	48	86	24	0.6 P 0.8 T	
40 / 45		13 / 9"		27	SILTY SAND (SM)/SANDY ORGANIC SILT (OH), medium dense, gray with reddish brown, moist, trace rotten root and organic material		13	10				
45 / 40		14 / 18"		0	WELL-GRADED SAND WITH SILT AND GRAVEL (SW-SM), medium dense, dark gray, wet, coarse-grained							
					SILTY CLAY (CL-ML), very soft, light brown, wet, low plasticity							

Continued

BORING DEPTH: 51.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 23, 2007
COMPLETION DATE: June 23, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

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Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-20a

ELEVATION, ft / DEPTH, ft	MATERIAL SYMBOL	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	LOCATION: NE side of Santa Clara Street, approx. 30 feet SE of 1st Street N 1,947,855 E 6,157,321 SURFACE EL: 86.9 ft (1988 NAVD datum) MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
35 / 55		15 15"		4	--soft, light brown							
30 / 60												
25 / 65												
20 / 70												
15 / 75												
10 / 80												
5 / 85												
0 / 90												
-5 / 95												
-10												

BORING DEPTH: 51.5 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 23, 2007
COMPLETION DATE: June 23, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Failing 1500
DRILLED BY: Pitcher Drilling, L. Willard/J. Musich
LOGGED BY: R. Vedantham
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-105

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-20b

LOCATION: SW side of Stockton Ave., approx. 150 ft NW of Asbury St. N 1,950,038 E 6,150,410

SURFACE EL: 78.3 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
78.3 / 0				6 inches of ASPHALT CONCRETE (OVM=0 ppm, OXY=20.8%, CH4=0 ppm)							
75 / 3.3	1 / 9"		(16)	SANDY LEAN CLAY (CL), brown, dry (FILL)							
	2 / 30"		1000 psi	FAT CLAY (CH), stiff, dark brown, dry to moist, high plasticity --Began rotary wash, set casing to 3 1/2 ft.							
70 / 8.3				SANDY SILT (ML), very stiff, light brown, dry, trace fine grained sand, non-plastic							
	3 / 30"		100 psi	LEAN CLAY (CL), stiff, light brown, moist, low plasticity --(pp=1.5/1.75/1.5 tsf, tv=0.25/0.50/0.125 tsf)						1.5 P 0.6 T	
65 / 13.3	4 / 24"		400 psi	SANDY SILT (ML), very stiff, light brown, moist, non-plastic (pp=3.0/3.5/3.5 tsf)						3.3 P	
60 / 18.3	5 / 27"		400 psi	LEAN CLAY (CL), very stiff, black, moist, medium plasticity --brown, (pp=2.0/1.5/2.0 tsf, tv=0.75 tsf)				31	14	2.1 P 1.5 T	
55 / 23.3	6 / 30"		400 psi	--stiff (pp=1.5/2.0/1.5 tsf, tv=1.1 tsf)						1.7 P 2.3 T	
50 / 28.3	7 / 36"	GB		--black, trace fat clay pocket at depth 30 feet --trace organic material, lost drilling fluid at 33 feet							
45 / 33.3	8 / 34"	GB		--gray, low plasticity							
35 / 43.3	9 / 19"	GB									
40 / 38.3	10 / 30"	GB		--brown, moist to wet							
	11 / 10"	GB		POORLY-GRADED GRAVEL WITH SAND (GP), medium dense, brown, wet, angular gravel up to 2 inches			4				
35 / 43.3	12 / 10"	GB									
	13 / 10"		(50)	--medium grained sand							
45 / 33.3	14 / 9"	GB		--more medium grained sand							
	15 / 12"		(64)								
30 / 48.3	16		(62)	WELL-GRADED GRAVEL WITH SAND (GW), very dense, brown, wet, gravel up to 3/4 inch			5				

Continued

BORING DEPTH: 90.0 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 26, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi/O. Gouthier
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-106

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-21a

LOCATION: SW side of Stockton Ave., approx. 150 ft NW of Asbury St. N 1,950,038 E 6,150,410

SURFACE EL: 78.3 ft (1988 NAVD datum)

ELEVATION, ft / DEPTH, ft	SAMPLE NO. / RECOVERY (in)	SAMPLER TYPE	SAMPLER BLOW COUNT / PRESSURE, psi	MATERIAL DESCRIPTION	DRY UNIT WEIGHT, pcf	WATER CONTENT, %	% PASSING #200 SIEVE	LIQUID LIMIT, %	PLASTICITY INDEX (%)	UNDRAINED SHEAR STRENGTH, S_u, ksf	OTHER TESTS
25 / 55	14"	KN		--lost drilling fluid at 49 feet							
	17	KN	(39)	--very dense, gravel up to 1 inch							
	6"	KN		--dense, dark brown							
	18	KN	(47)	--brown, moist							
	12"	KN		--lost drilling fluid at 54 feet							
	19	KN	(26)								
	10"	KN		--increasing fines							
	20	KN	(48)								
	6"	KN									
20 / 60	21	KN	(21)	SILT (ML), very stiff, dark gray, wet, low plasticity			90				Hydrometer Test
	15"			--trace SILTY CLAY lense from 57 1/2 to 58 feet							
	22	GB		--gray							
	5"										
15 / 65	23			No recovery from Geo-barrel							
	0"										
	24		(21)	--dark gray							
	17"										
	25	GB		WELL GRADED GRAVEL WITH SILT AND SAND(GW-GM), dark gray, wet							
10 / 70	6"										
	26		(30)	SANDY SILT (ML), very stiff, brown, wet, gravel up to 1/2 inch (OVM=0 ppm, OXY=20.9%, CH4=0 ppm)			51	NP	NP		Hydrometer Test
	18"			--Ended drilling on 6/26/07 at 68 1/2 ft.							
	27		(39)	--Began drilling on 6/27/07 at 63 1/2 ft. due to cave in							
	18"			--moist, trace gravel (OVM=0 ppm, OXY=20.9%, CH4=0 ppm)							
	28			SANDY LEAN CLAY WITH GRAVEL(CL), very stiff, brown, moist, angular gravel							
	18"	GB		SILTY CLAY WITH SAND (CL-ML), very stiff, brown, moist							
5 / 75	29		(30)	SILT (ML), brown, moist							
	13"			LEAN CLAY (CL), brown, moist, trace organic materials (No recovery)							
	30			SILT (ML), very stiff, gray, moist				32	9		
	30"	GB		--light brown, some angular gravel up to 1 inch, trace silty clay lense							
0 / 80	31			--trace SILTY SAND pocket from 84 1/4 to 85 feet							
	0"			LEAN CLAY (CL), gray, wet, low plasticity							
	32		(21)	SANDY SILT WITH GRAVEL (ML), yellowish brown, moist, round gravel up to 1 1/2 inches.							
	19"										
-5 / 85	33										
	20"	GB									
	34	GB									
	12"										
-10 / 90	35										
	22"	GB									
-15 / 95											
-20											

BORING DEPTH: 90.0 ft
DEPTH TO WATER: Not Measured
BACKFILL: Neat Cement Grout
START DATE: June 26, 2007
COMPLETION DATE: June 27, 2007

DRILLING METHOD: 5-in. dia. Rotary Wash
HAMMER TYPE: Automatic Trip
RIG TYPE: Fraste XL
DRILLED BY: Pitcher Drilling, R. Medina/A. Bazan
LOGGED BY: G. Tripathi/O. Gouthier
CHECKED BY: F. Wang

NOTES: 1. Terms and symbols defined on Plate A-1.
2. Groundwater levels measured at the time of drilling may not be representative of actual groundwater conditions and should not be used for design purposes. For applicable groundwater information, please refer to piezometer and observation well data.

LOG OF BORING NO. BH-106

Silicon Valley Rapid Transit Project
San Jose, California

FIGURE A-21b

Appendix 2: Cone Penetration Test (CPT) Results