FOR CONTRACT NO.: 03-3797U4

INFORMATION HANDOUT

WATER QUALITY

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
CENTRAL VALLEY REGION

PERMITS

STATE OF CALIFORNIA
DEPARTMENT OF FISH AND GAME
NOTIFICATION NO. 1600-2009-0043-R2

UNITED STATES ARMY CORPS OF ENGINEERS
NON-REPORTING NATIONWIDE 404 PERMIT

AGREEMENTS

UNITED STATES FISH AND WILDLIFE SERVICE (Biological Opinion)

ENCROACHMENT PERMITS

THE CENTRAL VALLEY FLOOD PROTECTION BOARD
PERMIT NO. 18614 BD

MATERIALS INFORMATION

AERIALLY DEPOSITED LEAD SITE INVESTIGATION REPORT

FOUNDATION REPORTS

TUNNEL SAFETY ORDERS

ROUTE: 03-Sac-80-R10.9/R11.7,M0.0/M10.4

California Regional Water Quality Control Board
Central Valley Region
Katherine Hart, Chair

Linda S. Adams
Secretary for Environmental Protection

11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114
Phone (916) 464-3291 • FAX (916) 464-4645
http://www.waterboards.ca.gov/centralvalley

Arnold Schwarzenegger
Governor

23 July 2010

Jeremy Ketchum
California Department of Transportation
2389 Gateway Oaks Drive, Suite #100
Sacramento, CA 95833

CLEAN WATER ACT §401 TECHNICALLY CONDITIONED WATER QUALITY CERTIFICATION FOR DISCHARGE OF DREDGED AND/OR FILL MATERIALS FOR THE I-80 ACROSS THE TOP BUS/CARPOOL LANE PROJECT (WDID#5A34CR00447), SACRAMENTO COUNTY

This Order responds to your 27 February 2009 application submittal for the Water Quality Certification of a transportation project permanently impacting approximately 0.556 acre and temporarily impacting approximately 2.30 acres of waters of the United States.

WATER QUALITY CERTIFICATION STANDARD CONDITIONS:

1. This certification action is subject to modification or revocation upon administrative or judicial review, including review and amendment pursuant to §13330 of the California Water Code and §3867 of Title 23 of the California Code of Regulations (23 CCR).

2. This certification action is not intended and shall not be construed to apply to any discharge from any activity involving a hydroelectric facility requiring a Federal Energy Regulatory Commission (FERC) license or an amendment to a FERC license unless the pertinent certification application was filed pursuant to 23 CCR subsection 3855(b) and the application specifically identified that a FERC license or amendment to a FERC license for a hydroelectric facility was being sought.

3. The validity of any non-denial certification action shall be conditioned upon total payment of the full fee required under 23 CCR §3833, unless otherwise stated in writing by the certifying agency.

4. Certification is valid for the duration of the described project. This certification is no longer valid if the project (as currently described) is modified, or coverage under Section 404 of the Clean Water Act has expired.

ADDITIONAL TECHNICALLY CONDITIONED CERTIFICATION CONDITIONS:

In addition to the four standard conditions, the California Department of Transportation shall satisfy the following:

1. The California Department of Transportation shall notify the Central Valley Water Quality Control Board (Central Valley Water Board) in writing 7 days in advance of the start of any in-water activities.

2. Except for activities permitted by the U.S. Army Corps under §404 of the Clean Water Act, soil, silt, or other organic materials shall not be placed where such materials could pass into surface water or surface water drainage courses.

3. All areas disturbed by project activities shall be protected from washout or erosion.

4. The California Department of Transportation shall maintain a copy of this Certification and supporting documentation (Project Information Sheet) at the Project site during construction for review by site personnel and agencies. All personnel (employees, contractors, and subcontractors) performing work on the proposed project shall be adequately informed and trained regarding the conditions of this Certification.

5. All temporarily affected areas will be restored to pre-construction contours and conditions upon completion of construction activities.

6. The California Department of Transportation shall perform surface water sampling: 1) When performing any in-water work; 2) In the event that project activities result in any materials reaching surface waters or; 3) When any activities result in the creation of a visible plume in surface waters. The following monitoring shall be conducted immediately upstream out of the influence of the project and 300 feet downstream of the active work area. Sampling results shall be submitted to this office within two weeks of initiation of sampling and every two weeks thereafter. The sampling frequency may be modified for certain projects with written permission from the Central Valley Water Board.

Parameter	Unit	Type of Sample	Frequency of Sample
Turbidity	NTU	Grab	Every 4 hours during in water work
Settleable Material	ml/l	Grab	Same as above.
Visible construction related pollutants	Observations	Visible Inspections	Continuous throughout the construction period

7. Activities shall not cause turbidity increases in surface water to exceed:

   (a) where natural turbidity is less than 1 Nephelometric Turbidity Units (NTUs), controllable factors shall not cause downstream turbidity to exceed 2 NTU;
   (b) where natural turbidity is between 1 and 5 NTUs, increases shall not exceed 1 NTU;
   (c) where natural turbidity is between 5 and 50 NTUs, increases shall not exceed 20 percent;
   (d) where natural turbidity is between 50 and 100 NTUs, increases shall not exceed 10 NTUs;
   (e) where natural turbidity is greater than 100 NTUs, increases shall not exceed 10 percent.

   Except that these limits will be eased during in-water working periods to allow a turbidity increase of 15 NTU over background turbidity as measured in surface waters 300 feet downstream from the working area. In determining compliance with the above limits, appropriate averaging periods may be applied provided that beneficial uses will be fully protected. Averaging periods may only be assessed by prior permission of the Central Valley Water Board.

8. Activities shall not cause settleable matter to exceed 0.1 ml/l in surface waters as measured in surface waters 300 feet downstream from the project.

9. The discharge of petroleum products or other excavated materials to surface water is prohibited. Activities shall not cause visible oil, grease, or foam in the work area or downstream. The California Department of Transportation shall notify the Central Valley Water Board immediately of any spill of petroleum products or other organic or earthen materials.

10. The California Department of Transportation shall notify the Central Valley Water Board immediately if the above criteria for turbidity, settleable matter, oil/grease, or foam are exceeded.

11. The California Department of Transportation shall comply with all California Department of Fish and Game 1600 requirements for the project.

12. The California Department of Transportation must obtain coverage under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities issued by the State Water Resources Control Board for any project disturbing an area of 1 acre or greater.

13. The Conditions in this water quality certification are based on the information in the attached "Project Information." If the information in the attached Project Information is modified or the project changes, this water quality certification is no longer valid until amended by the Central Valley Water Board.

14. The Minimization/Avoidance/Compensation measures specified the Animal Species, and Hydrology, Water Quality, Storm Water sections of Appendix E of the 2008 Environmental Impact Report for the project must be implemented.

15. In the event of any violation or threatened violation of the conditions of this Order, the violation or threatened violation shall be subject to any remedies, penalties, process, or sanctions as provided for under State law and section 401 (d) of the federal Clean Water Act. The applicability of any State law authorizing remedies, penalties, process, or sanctions for the violation or threatened violation constitutes a limitation necessary to ensure compliance with this Order.

    a. If the California Department of Transportation or a duly authorized representative of the project fails or refuses to furnish technical or monitoring reports, as required under this Order, or falsifies any information provided in the monitoring reports, the applicant is subject to civil, for each day of violation, or criminal liability.

    b. In response to a suspected violation of any condition of this Order, the Central Valley Water Board may require the California Department of Transportation to furnish, under penalty of perjury, any technical or monitoring reports the Central Valley Water Board deems appropriate, provided that the burden, including cost of the reports, shall be in reasonable relationship to the need for the reports and the benefits to be obtained from the reports.

    c. The California Department of Transportation shall allow the staff(s) of the Central Valley Water Board, or an authorized representative(s), upon the presentation of credentials and other documents, as may be required by law, to enter the project premises for inspection, including taking photographs and securing copies of project-related records, for the purpose of assuring compliance with this certification and determining the ecological success of the project.

16. The California Department of Transportation shall provide a Notice of Completion (NOC) no later than 30 days after the project completion. The NOC shall demonstrate that that the project has been carried out in accordance with the project's description (and any amendments approved). The NOC shall include a map of the project location(s), including final boundaries of any in situ restoration area(s), if appropriate, and representative pre and post construction photographs. Each photograph shall include a descriptive title, date taken, photographic site, and photographic orientation.

17. All temporarily disturbed areas, including temporary fills, must be returned to preconstruction contours and conditions. Temporary fills must be removed in their entirety.

18. All disturbed project areas must be vegetated with native plants after construction activities are completed.

ADDITIONAL STORM WATER QUALITY CONDITIONS:

The California Department of Transportation shall also satisfy the following additional storm water quality conditions:

1. During the construction phase, The California Department of Transportation must employ strategies to minimize erosion and the introduction of pollutants into storm water runoff. These strategies must include the following:

(a) the Storm Water Pollution Prevention Plan (SWPPP) must be prepared during the project planning and design phases and implemented, as appropriate, before construction;
(b) an effective combination of erosion and sediment control Best Management Practices (BMPs) must be implemented and adequately working prior to the rainy season and during all phases of construction.

2. The California Department of Transportation must minimize the short and long-term impacts on receiving water quality from the I-80 Across the Top Bus/Carpool Lane Project by implementing the following post-construction storm water management practices, as appropriate:

   (a) reduce peak runoff flows;
   (b) provide treatment BMPs to reduce pollutants in runoff;
   (c) ensure existing waters of the State (e.g., wetlands, vernal pools, or creeks) are not used as pollutant source controls and/or treatment controls;
   (d) preserve and, where possible, create or restore areas that provide important water quality benefits, such as riparian corridors, wetlands, and buffer zones;
   (e) limit disturbances of natural water bodies and natural drainage
   (f) control post-development peak storm water run-off discharge rates and velocities to prevent or reduce downstream erosion, and to protect stream habitat.

REGIONAL WATER QUALITY CONTROL BOARD CONTACT PERSON:

Daniel Worth, Environmental Scientist
11020 Sun Center Drive #200
Rancho Cordova, California 95670-6114
dworth@waterboards.ca.gov
(916) 464-4709

WATER QUALITY CERTIFICATION:

I hereby issue an order certifying that any discharge from the California Department of Transportation, I-80 Across the Top Bus/Carpool Lane Project (WDID# 5A34CR00447) will comply with the applicable provisions of §301 ("Effluent Limitations"), §302 ("Water Quality Related Effluent Limitations"), §303 ("Water Quality Standards and Implementation Plans"), §306 ("National Standards of Performance"), and §307 ("Toxic and Pretreatment Effluent Standards") of the Clean Water Act. This discharge is also regulated under State Water Resources Control Board Water Quality Order No. 2003-0017 DWQ "Statewide General Waste Discharge Requirements For Dredged Or Fill Discharges That Have Received State Water Quality Certification (General WDRs)".

Continue on next page

Except insofar as may be modified by any preceding conditions, all certification actions are contingent on (a) the discharge being limited and all proposed mitigation being completed in strict compliance with the California Department of Transportation's project description and the attached Project Information Sheet, and (b) compliance with all applicable requirements of the *Water Quality Control Plan for the Sacramento River and San Joaquin River*, Fourth Edition, revised September 2009.

for Pamela C. Creedon
Executive Officer

Enclosure: Project Information

cc: See enclosure, page 10

PROJECT INFORMATION

Application Date: 27 February 2009

Applicant: Jeremy Ketchum
California Department of Transportation
2389 Gateway Oaks Drive, Suite #100
Sacramento, CA 95833

Project Name: I-80 Across the Top Bus/Carpool Lane Project

Application Number: WDID# 5A34CR00447

Type of Project: Transportation Project

Project Location: Section 3, 4, 11, 13, 17, 18, 21, 22, 23, 26, 27, 28, 31 and 32, Township 9 North, Range 4 and 5 East, MDB&M
Latitude: 38°38'28" and Longitude: -121°28'21"

County: Sacramento County

Receiving Water(s) (hydrologic unit): Steelhead Creek, Sacramento Hydrologic Basin, Valley-American Hydrologic Unit #519.20, Coon-American HSA

Water Body Type: Wetlands, Streambed

Designated Beneficial Uses: The *Water Quality Control Plan for the Sacramento River and San Joaquin River*, Fourth Edition, revised September 2009 (Basin Plan) has designated beneficial uses for surface and ground waters within the region. Beneficial uses that could be impacted by the project include: Municipal and Domestic Water Supply (MUN); Agricultural Supply (AGR); Industrial Supply (IND), Hydropower Generation (POW); Groundwater Recharge, Water Contact Recreation (REC-1); Non-Contact Water Recreation (REC-2); Warm Freshwater Habitat (WARM); Cold Freshwater Habitat (COLD); and Wildlife Habitat (WILD).

Project Description (purpose/goal): The I-80 Across the Top Bus/Carpool Lane Project proposes the construction of 9.8 miles of High-Occupancy Vehicle (HOV) lanes in the median of Interstate 80 from just east of the Sacramento River to Watt Avenue. Construction of the HOV lanes will permanently pave approximately 45 acres within the existing median. This project also requires the construction of the following items.

1) Eight, 5-foot by 3.5-foot oblong columns will be constructed within the Natomas East Main Drainage Canal (NEMDC). These columns will support the proposed HOV lanes, which will be built between the existing bridge crossings over the NEMDC. Additionally, six concrete infill walls will be constructed between six pairs of existing columns within the NEMDC. The infill walls will provide additional strength to the existing bridge structures for seismic stability. The walls will be built in a north-south orientation, and thus will negligibly impede the flow of water in the canal during the wet season. These structural components will permanently fill 0.004 acre of waters of the United States.

2) A temporary bridge (for construction equipment access) will be used to cross Steelhead Creek. Steelhead Creek is a natural stream which is contained within the levees of the NEMDC. The temporary structure will be built completely out of the creek. No work will occur within the bed and banks of Steelhead Creek, and no debris, soil, or other fill material will be allowed in the creek. In addition, a temporary staging area will be constructed within the banks of the NEMDC, but not within the banks of Steelhead Creek. These temporary activities will affect 2.30 acres of waters of the United States. All temporarily disturbed areas, including temporary fills, must be returned to pre-construction contours and conditions. Temporary fills must be removed in their entirety. All disturbed project areas must be vegetated with a native seed mix and monitored for three years.

3) Rock slope protection (RSP) will be installed in the NEMDC directly underneath the Interstate 80 Bridge to stabilize the banks. RSP will not be installed within Steelhead Creek unless the California Department of Fish and Game and the National Marine Fisheries Service provide written authorization to do so. This activity will permanently impact 0.111 acre of waters of the United States.

4) Along Interstate 80, approximately 3,225 feet of roadside drainage in the westbound direction, and 3,250 feet of roadside drainage in the eastbound direction will be relocated and re-vegetated to allow for road widening. The total impacts to the roadside drainage are approximately 0.44 acre. The road widening will also require relocation of 0.001 acre of wetland. These roadside drainages and wetlands will be replaced on site.

Preliminary Water Quality Concerns: Construction activities may impact surface waters with increased turbidity and settleable matter.

Proposed Mitigation to Address Concerns: The California Department of Transportation will implement Best Management Practices (BMPs) to control sedimentation and erosion. All temporary affected areas will be restored to pre-construction contours and conditions upon completion of construction activities. The California Department of Transportation will conduct turbidity and settleable matter testing during in-water work, stopping work if the Basin Plan criteria are exceeded or are observed.

Fill/Excavation Area: Approximately 1,651 cubic yards of clean soil will be placed into 0.001 acre of jurisdictional wetland, and 0.440 acre of un-vegetated roadside ditch. This project will also result in the installation of 278 cubic yards of concrete, and 2,380 cubic yards of rock slope protection within 0.115 acre (0.111 acre + 0.004 acre) of the NEMDC. Additionally, 2.30 acres within the NEMDC will be temporarily impacted. The total disturbance to waters of the United States is approximately 2.856 acres (2.30 acre of temporary impacts and 0.556 acre of permanent impacts).

Dredge Volume: Approximately 278 cubic yards of soil will be removed from within the NEMDC to make room for the new concrete columns.

U.S. Army Corps File Number: 200700309

U.S. Army Corps of Engineers Permit Number: Nationwide Permit #14

Department of Fish and Game Streambed Alteration Agreement: The California Department of Transportation applied for a Streambed Alteration Agreement in January 2008.

Possible Listed Species: Central Valley steelhead, giant garter snake

Status of CEQA Compliance: The California Department of Transportation approved the Final Environmental Impact Report on 31 January 2008 and filed a Notice of Determination for this project on 8 February 2008 (State Clearinghouse Number SCH2006092057).

As a Responsible Agency under California Environmental Quality Act (CEQA), the Central Valley Water Board reviewed the Environmental Impact Report and found that impacts to water quality were adequately addressed.

With regard to the remaining impacts identified in the Environmental Impact Report, the corresponding mitigation measures proposed are within the responsibility and jurisdiction of another public agency, and not within the jurisdiction of the Central Valley Water Board. Such impacts and mitigation measures do not relate to water quality or related nuisance, and therefore fall outside of the Central Valley Water Board's jurisdiction.

Compensatory Mitigation: To mitigate for approximately 2.30 acre of temporary impacts to riparian buffer habitat located within the NEMDC, Caltrans must completely restore all 2.30 acres of the temporarily disturbed NEMDC to its pre-construction condition, and Caltrans must purchase 0.021 acre of Riparian credits from Beach Lake Mitigation Bank as required by the U.S. Army Corps of Engineers. To mitigate for permanent impacts to 0.440 acre of vegetated roadside ditch and 0.001 acre of jurisdictional wetland, approximately 0.440 acre of vegetated roadside ditch and 0.001 acre of jurisdictional wetland must be created on site. To mitigate for the permanent loss of 0.115 acre of waters of the United States, Caltrans must purchase 0.115 acre of Perennial Wetland Credits from the Beach Lake Mitigation Bank as required by the U.S. Army Corps of Engineers. Additionally, Caltrans will purchase 0.32 acre of giant garter snake (GGS) habitat from the Gilsizer Conservation GGS Bank as required by the U.S. Fish and Wildlife Service.

Application Fee Provided: Total fees of $8,511.00 have been submitted to the Central Valley Water Board as required by 23 CCR §3833b(3)(A) and by 23 CCR §2200(e).

DISTRIBUTION LIST

United States Army Corp of Engineers
Sacramento District Office
Regulatory Section, Room 1480
1325 J Street
Sacramento, CA 95814-2922

United States Fish & Wildlife Service
Sacramento Fish & Wildlife Office
2800 Cottage Way
Sacramento, CA 95825

Jeff Drongesen
Department of Fish and Game
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670

Bill Jennings
CA Sportfishing Protection Alliance
3536 Rainier Avenue
Stockton, CA 95204

(Electronic copy only) Bill Orme
State Water Resources Control Board
401 Certification and Wetlands Unit Chief

(Electronic copy only) Dave Smith
Wetlands Section Chief (W-3)
United States Environmental Protection Agency

DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670
916-358-2900

"NOTICE OF EXEMPTION"

The Department has determined that your project as described in the subject Lake or Streambed Alteration Agreement is exempt from the California Environmental Quality Act (CEQA) and will file a notice of Exemption for your project. The Notice will be filed with the Office of Planning and Research, as required by CEQA. The Department's compliance with CEQA may be legally challenged for 35 days following the filing of the Notice of Exemption.

This completes the Department's agreement process. You may proceed with your project according to the terms and provisions of your Streambed Alteration Agreement if you have obtained all other permits required from local, other State, and Federal agencies.

AGREEMENT REGARDING PROPOSED STREAM ALTERATION

THIS AGREEMENT, entered into between the State of California, Department of Fish and Game, hereinafter called DFG, and California Department of Transportation of Sacramento, State of California, hereafter called Caltrans, is as follows:

WHEREAS, pursuant to California Fish and Game Code, Section 1602, Caltrans, on February 27, 2009, notified DFG that it intends to substantially divert or obstruct the natural flow of, or substantially change the bed, channel, or bank of, or use material from the streambed of, the following water: Natomas East Main Drainage Canal (NEMDC) also known as Steelhead Creek, in the County of Sacramento, State of California, Section 4, Township 9N, Range 4E, USGS Map Rio Linda MDB&M.

WHEREAS, DFG, represented by Gary Hobgood, has determined that such operations may substantially adversely affect existing fish and wildlife resources including: borrowing owl (*Athene cunicularia*); giant garter snake (*Thamnophis couchi gigas*); Western Pond Turtle (*Actinemys marmorata*); Cliff Swallow (*Petrochelidon pyrrhonota*); white-throated swift (*Aeronautes saxatalis*); Swainson's hawk (*Buteo swainsoni*); fall-/late fall-run Chinook salmon (*O. tshawytscha*); Central Valley steelhead (*O. mykiss*); warm water fish species, amphibians, and other aquatic and terrestrial plant and wildlife species.

THEREFORE, DFG hereby proposes measures to protect fish and wildlife during Caltrans' work. Caltrans hereby agrees to accept the following recommendations as part of his work:

Project Description: I-80 Across the Top Bus/Carpool Lanes Project

The project will require the construction of eight (8) new 5-foot by 3.5-foot oblong columns (0.003 acres) within the Natomas East Main Drainage Canal (NEMDC), located just east of Northgate Boulevard, to support the proposed median lanes that will be built between the existing bridge crossing over the NEMDC. A natural stream, Steelhead Creek, is contained within the levees of the NEMDC. The proposed new columns will be installed in the NEMDC channel when it is dry, and no construction activities will occur within Steelhead Creek. A temporary bridge (for construction equipment access) will be used to cross Steelhead Creek. The temporary structure will be completely out of the creek, no work will occur in the creek, and no debris, soil or other fill material will be allowed in the creek.

Concrete infill walls (20 feet long, 1.5 feet wide, and 7 feet deep; 0.004 acres) will be constructed between the existing columns at six locations within the NEMDC (three infill walls in each direction). The infill walls provide additional strength to the existing structure. The walls will be built in a north-south orientation, and thus will not impede the flow of water in the canal during the wet season.

Two existing roadside ditches, which includes a small 0.001-acre wetland, will be filled. The ditches will be relocated and the wetland replaced on-site.

Construction of auxiliary lanes between West El Camino Ave. and I-5 and adjacent to the West Drainage Canal (WDC) will require one season to complete.

Temporary impacts to other waters within the NEMDC included approximately 2.3 acres underneath the two existing bridge structures and an area adjacent to the toe of the eastern levee. Temporary staging areas included these areas and the Caltrans maintenance yards south of the project area.

Access to the site will be from the eastern levee road and from the western levee using a temporary bridge over Steelhead Creek (see figures in Attachment 1).

Temporary impacts to NEMDC will be minimized by working during the summer months when the NEMDC channel is dry (except for Steelhead Creek), and by using mats to minimize compaction of soil. All appropriate Best Management Practices (BMP's), which will be part of the Storm Water Pollution Prevention Plan (SWPPP), will be implemented to avoid and minimize impacts to the NEMDC and Steelhead Creek.

Construction of auxiliary lanes between West El Camino Ave. and I-5 and adjacent to the West Drainage Canal (WDC) will require one season to complete. The proposed project will avoid the WDC channel entirely.

The construction of auxiliary lanes between West El Camino Avenue and I-5 will require filling the roadside ditches (0.44 acres), which includes the one small wetland (0.001 acres). The project will require the relocation of the ditches adjacent to the auxiliary lane. The new ditches will be graded to receive roadway and irrigation runoff as they do now. The 0.001-acre wetland will be replaced on-site in the same complex as the relocated ditches. Hydrophytic vegetation is expected to re-establish itself in the wetland.

Temporary impacts in the NEMDC channel will be reduced by restoring all areas to pre-construction conditions and planting native riparian plants.

Stream Zone Defined: The stream zone is that portion of the stream channel that restricts lateral movement of water. For this project, the stream zone is delineated as the area on the water side of the water side hinge-point of the levee.

1. The notification, together with all supporting documents submitted with the notification, including the **I-80 Across the Top Bus/Carpool Lanes Project SACRAMENTO COUNTY, CALIFORNIA DISTRICT 3 – SAC – 80, PM 0.3/10.4 03-37970 FINAL ENVIRONMENTAL IMPACT REPORT/ENVIRONMENTAL ASSESSMENT**, Dated February 2008, are hereby incorporated into this agreement to describe the location and features of the proposed project. Caltrans agrees that all work shall be done as described in the notification and supporting documents, incorporating all project modifications, wildlife resource protection features, mitigation measures, and provisions as described in this agreement. Where apparent conflicts exist between the notification and the provisions listed in this agreement, Caltrans shall comply with the provisions listed in this agreement. Caltrans further agrees to notify DFG of any modifications made to the project plans submitted to DFG. At the discretion of DFG, this agreement will be amended to accommodate modifications to the project plans submitted to DFG and/or new project activities. Please see the current fee schedule to determine the appropriate amendment fee.

2. Documents, plans, surveys, notifications, and requests pertaining to this project or required by this agreement may be sent via email to Gary Hobgood at ghobgood@dfg.ca.gov or delivered to DFG of Fish and Game at 1701 Nimbus Road, Suite A, Rancho Cordova, CA 95670. Refer to Notification Number 1600-2009-0016-R2 when submitting documents to DFG.

3. The time period for completing the work within the stream zone of Steehead Creek shall be

restricted to periods of low stream flow and dry weather and shall be confined to the period of May 1 to October 15. Construction activities shall be timed with awareness of precipitation forecasts and likely increases in stream flow. Construction activities within the stream zone shall cease until all reasonable erosion control measures, inside and outside of the stream zone, have been implemented prior to all storm events. Revegetation, restoration and erosion control work is not confined to this time period.

4. If Caltrans finds more time is needed to complete the authorized activity, Caltrans shall submit a written request for a work period time extension to DFG. The work period extension request shall provide the following information: 1) Describe the extent of work already completed; 2) Provide specific detail of the activities that remain to be completed within the stream zone; and 3) Detail the actual time required to complete each of the remaining activities within the stream zone. The work period extension request should consider the effects of increased stream conditions, rain delays, increased erosion control measures, limited access due to saturated soil conditions, and limited growth of erosion control grasses due to cool weather. Photographs of the work completed and the proposed work areas are helpful in assisting DFG in its evaluation. Time extensions are issued at the discretion of DFG. DFG will review the written request to work beyond the established work period. DFG will have ten calendar days to approve the proposed work period extension. DFG reserves the right to require additional measures designed to protect natural resources.

5. Caltrans is responsible for obtaining all required permits and authorizations from local, state and federal agencies. Caltrans shall notify DFG where conflicts exist between the provisions of this agreement and those imposed by other regulatory agencies. Unless otherwise notified, Caltrans shall comply with the provision that offers the greatest protection to water quality, species of special concern and/or critical habitat.

6. The contractor shall sign Caltrans' copy of this agreement prior to working within the stream zone. A copy of this agreement and a copy of the original notification, including the project description, as submitted to DFG, must be available upon request at the work site. The contractor or a designated crew supervisor shall be on site the entire time a work crew is working near the stream zone. The supervisor shall be completely familiar with the terms and conditions of this agreement and shall ensure compliance with all terms and conditions. DFG reserves the right to inspect the project site to ensure that there is compliance with the terms/conditions of this Agreement.

7. For each construction season, Caltrans shall notify DFG within two working days of beginning work within the stream zone of Steelhead Creek. At the closes of each construction season, Caltrans shall provide DFG a summary to the work completed during the construction season that just ended and a summary of the work planned for the subsequent construction season. Upon completion of the project activities described in this agreement, the work area within the stream zone shall be digitally photographed. Photographs shall be submitted to DFG within two days of completion. Photographs and project commencement notification shall be submitted as instructed in item number 2 above.

8. Unless otherwise stated in this agreement the following Caltrans proposed Minimization and Avoidance Measures shall be implemented:

<u>Steelhead and Chinook Salmon</u>

- No work will occur within the bed and banks of Steelhead Creek.
- All construction within NEMDC will occur during daylight hours.
- Mats will be placed in NEMDC to minimize potential compaction of soils and to reduce the potential for sediments to enter Steelhead Creek.
- Measures consistent with the current Caltrans' Construction BMP's Manual (including the Storm Water Pollution Prevention Plan [SWPPP] and WPCP Manuals will be implemented to minimize effects to migrating salmonids during construction.
- In the October following each construction season, all areas temporarily disturbed during construction (e.g., equipment storage and access areas) will be reseeded with erosion control seeding consisting of a sterile, non-proliferating grass species, such as cereal barley. The seed mix shall not include any fertilizers or chemicals.
- Following project completion, all areas temporarily disturbed during construction will be restored following the "*Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat*", outlined below.
- The disturbed area(s) will be re-graded to its pre-existing contour and ripped, if necessary, to de-compact the soil.
- If appropriate, the areas should be hydroseeded, with a mix containing at least 20 to 40 percent native grass seeds. The seed mix should also contain 2 to 10 percent native forb seeds, and approximately 40 to 68 percent of the seed mix may be non-native, non-aggressive European annual grass. Aggressive non-native grasses should not be included in the seed mix. Endophyte-infected grasses should not be included in the seed mix.

<u>Giant Garter Snake</u>

Upland Habitat:
- Construction activity within 200 feet of giant garter snake aquatic habitat will be conducted between May 1 and October 1 to minimize adverse effects to this species. This is the active period for giant garter snakes and thus direct mortality is lessened because snakes are expected to actively move and avoid danger.
- Movement of heavy equipment will be confined to existing roadways where feasible to reduce ground disturbance. Equipment for work in the NEMDC will be staged outside the Steelhead Creek channel. Equipment for work near the West Drainage Canal will be staged outside potential GGS upland habitat. Equipment staging for all other activities will occur at an existing Caltrans facility southwest of the NEMDC overcrossing.
- Caltrans will confine construction to the minimal area necessary and will designate Environmentally Sensitive Areas for avoidance.
- Construction personnel will receive USFWS-approved work awareness training on the giant garter snake. Proof of attendance by personnel will be submitted to the USFWS.
- Surveys for giant garter snakes shall be conducted within 24 hours of initiation of construction activities. Surveys will be repeated if a construction lapse of greater than two weeks occurs.
- A USFWS-approved biologist will monitor all ground-disturbing activities within 200 feet of the NEMDC and West Drainage Canal. If a snake is encountered, this biologist shall have the authority to stop all activities which may threaten the snake and redirect activities if needed until it is determined that the snake will not be harmed. The biologist will report all sightings of live or dead snakes within three days of their discovery to the Assistant Field Supervisor of the Endangered Species Division at the Sacramento Fish and Wildlife Office.
- Non-entangling erosion control matting will be used in snake habitat.

- Best management practices will be implemented to reduce siltation to receiving snake aquatic habitat.
- Caltrans proposes to restore in accordance with the *Guidance for Restoration and/or Replacement of Giant Garter Snakes Habitat (*Guidelines; Appendix C of the Programmatic Consultation) the 3.0 acres of snake habitat that will be temporarily impacted within the NEMDC. Caltrans proposes to compensate for permanent impacts to 0.007 acre of snake habitat within the NEMDC at a 3:1 replacement ratio for a total of 0.021 acre of upland snake habitat, by securing credits equal to 0.021 acre from the Caltrans Beach Lake Mitigation Bank pursuant to the "Agreement on Mitigation Strategy pertaining to Implementation and Operation of the Beach Lake Mitigation Bank".
- Caltrans proposes to restore all areas in accordance with the Guidelines which may be temporarily disturbed as a result of the construction of the auxiliary lanes. In order to ensure that all areas disturbed as a result of construction activities shall have successfully established post-project appropriate vegetation quality, a qualified biologist shall document the species composition and percent cover of an appropriate representative portion of each separate location disturbed during construction, in a vegetation restoration monitoring report. The USFWS and the California Department of Fish and Game (DFG) may require remedial actions to restore vegetation on these sites in the event that these areas do not contain 80% cover, as documented no later than June 1 of the year following construction. The monitoring report shall be sent to the Sacramento Fish and Wildlife Office address above, and Mr. Todd Gardner of the DFG – North Central Region, at 1701 Nimbus Rd., Suite A, Rancho Cordova, CA 95670.
- Caltrans proposed to compensate for permanent impacts to 0.55 acres of snake habitat within 200 feet of the West Drainage Canal at a 3:1 replacement ratio by funding the permanent preservation, management, and monitoring of 1.65 acres of snake habitat at a USFWS-approved site within the Natomas Basin. Caltrans proposes to provide the USFWS and the DFG written documentation that funds have been expended to secure and record a USFWS-approved conservation easement for the protection of habitat in perpetuity from future development has been recorded for the 1.65-acre site. Caltrans proposes to provide the site location, an operating and management plan to manage the site for the benefit of the snake, and a funding source (such as an endowment) for the perpetual management of the site to be approved by USFWS and DFG prior to ground breaking on the proposed project.
- In accordance with the Guidelines, Caltrans proposes to monitor all areas which are restored for at least one year, and submit monitoring report to the USFWS.
- If applicable, any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
- After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-project conditions.
- All construction within NEMDC will be conducted during daylight hours.
- Measures consistent with the current Caltrans' Construction Site Best Management Practices (BMPs) Manual (including the Storm Water Pollution Prevention Plan [SWPPP] and Water Pollution Control Program [WPCP] Manuals will be implemented to minimize effects to GGS (e.g., siltation) during construction.
- A WPCP will be prepared by the contractor in accordance with typical provisions associated with a Regional General Permit for Construction (on file with the Central Valley RWQCB). The WPCP will contain a Spill Response Plan with instructions and procedures for reporting spills, the use and location of spill containment equipment, and the use and location of spill collection materials.

<u>Swainson's Hawk</u>

- Tree removal will occur during the non-breeding season between September 1 and February 1, to the extent possible, to comply with the Migratory Bird Treaty Act. If trees cannot be removed during this time period, a qualified biologist will conduct a pre-construction survey prior to the start of construction to search for raptor nests. If Swainson's hawks or other raptors are observed nesting, California Dept. of Fish and Game shall be contacted for their advice on establishing a buffer zone of appropriate size.

<u>Western Pond Turtle</u>

- Construction activities in the NEMDC will occur during the summer months to minimize potential impacts to steelhead and giant garter snake, and only during the daylight hours. Western pond turtles are most active during this time period as well; as a result, it is expected that turtles would move upstream or downstream of the temporary construction activities.

<u>Western Burrowing Owl (BUOW)</u>

- A qualified biologist will survey the ESL for BUOW no more than 30 days prior to the start of construction. If BUOW or sign is discovered, Caltrans will place environmental sensitive area fencing around the nest and consult with CDFG.

<u>White-tailed Kite</u>

- A qualified biologist will conduct pre-construction surveys in the spring, prior to the start of construction. If kites or other raptors are observed nesting, CDFG will be contacted and a suitable buffer zone will be established.
- Any trees that require removal should be removed outside the nesting season, after September 1st and before February 1st., if feasible, to conform to the MBTA.
- All construction within NEMDC will be conducted during daylight hours.

<u>Loggerhead Shrike</u>

- A qualified biologist will conduct pre-construction surveys in the spring prior to construction, to determine the nesting status of loggerhead shrike. If a found nesting, the CDFG will be notified and an appropriate buffer will be established around the nest until the young have fledged. If no nests are found, then avoidance or minimization measures will not be required.

<u>Nuttall's Woodpecker</u>

- The project will comply with the Migratory Bird Treaty Act regulations to minimize potential impacts to Nuttall's woodpecker and other migratory birds. Tree removal will occur between September 1 and February 1.

<u>Purple Martin</u>

- Surveys will be conducted each season prior to construction to document the status of the Roseville Road colony and identify new colonies that may become established at other overcrossings.
- Weep holes will be plugged during the non-breeding season (September 1 – March 1) of the year of project construction, to conform with the MBTA. Exclusion devices will be left in place until August 31 or until all work is completed. The CDFG will be consulted regarding the exclusion of martins on any structures within the project area.

<u>Swallows and Swifts</u>

Because work will occur during the swallow/swift nesting season (March 1 – August 31) swallows will be excluded, if necessary, by a qualified company during the non-breeding season immediately prior to start of construction. Exclusion structures (e.g., netting and weep hole plugs) will be left in place and maintained through August 31 of each breeding season, or until the work is complete.

9. Work within the flowing portion or bank of the low flow channel of Steelhead Creek is not allowed without the written authorization of DFG.

10. The temporary bridge crossings staging area, falsework and all other construction material and debris shall be removed from the stream zone on or before October 15 of each construction season.

11. No active nests of birds that are protected by the Migratory Bird Act shall be disturbed until all eggs have hatched and young birds have fledged without prior consultation and approval of a Department representative. This provision applies any colony of cliff swallows using the underside of the existing structure. Caltrans shall submit for review and approval a Cliff Swallow Management Plan. Cliff Swallow Management Plan shall also consider avoidance and/or exclusion of the White-throated Swift. The Cliff Swallow Management plan should be submitted for review well before the start of swallow breeding activity (mid-March). The Cliff Swallow Management plan should consider the use of netting and/or daily removal of nest material with high-pressure water spray. DFG will have ten calendar days to approve the Cliff Swallow Management plan. If DFG does not reply within ten days, the Cliff Swallow Management plan shall be implemented as submitted. The Cliff Swallow Management plan shall be submitted as instructed in item number 2 above.

12. Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations. No native trees with a trunk diameter at breast height (DBH) in excess of two (2) inches shall be removed or damaged without prior consultation and approval of a Department representative. Using hand tools (clippers, chain saw, etc.), trees may be trimmed to the extent necessary to gain access to the work sites. All cleared material/vegetation shall be removed out of the riparian/stream zone.

13. Precautions to minimize turbidity/siltation shall be taken into account during project planning and implementation. This may require the placement of silt fencing, coir logs, coir rolls, straw bale dikes, or other siltation barriers so that silt and/or other deleterious materials are not allowed to pass to downstream reaches. Passage of sediment beyond the sediment barrier(s) is prohibited. If any sediment barrier fails to retain sediment, corrective measures shall be taken. The sediment barrier(s) shall be maintained in good operating condition throughout the construction period and the following rainy season. Maintenance includes, but is not limited to, removal of accumulated silt and/or replacement of damaged silt fencing, coir logs, coir rolls, and/or straw bale dikes. Caltrans is responsible for the removal of non-biodegradable silt barriers (such as plastic silt fencing) after the disturbed areas have been stabilized with erosion control vegetation (usually after the first growing season). Upon Department determination that turbidity/siltation levels resulting from project related activities constitute a threat to aquatic life, activities associated with the turbidity/siltation shall be halted until effective Department approved control devices are installed or abatement procedures are initiated.

14. Raw cement/concrete or washings thereof, asphalt, paint or other coating material, oil or other

petroleum products, or any other substances which could be hazardous to aquatic life, resulting from project related activities, shall be prevented from contaminating the soil and/or entering the waters of the state. Any of these materials, placed within or where they may enter a stream or lake by Caltrans or any party working under contract or with the permission of Caltrans, shall be removed immediately. DFG shall be notified immediately by Caltrans of any spills and shall be consulted regarding clean-up procedures.

15. During construction, the contractor shall not dump any litter or construction debris within the stream zone. All construction debris and associated materials shall be removed from the work site upon completion of this project.

16. All exposed/disturbed areas and access points within the stream zone left barren of vegetation as a result of the construction activities shall be restored using locally native grass seeds, locally native grass plugs and/or a mix of quick growing sterile non-native grass with locally native grass seeds. Seeded areas shall be covered with broadcast straw and/or jut netted (monofilament erosion blankets are not authorized).

17. This agreement is not valid and work may not begin until the agreement is signed by a representative of DFG of Fish & Game. Stream alteration work authorized by this agreement expires on December 31, 2013. This agreement shall remain in effect for that time necessary to satisfy all required mitigation and monitoring measures.

18. Requests for Extensions (agreement renewal), Minor Amendments, and Major Amendments must be submitted in writing prior to expiration of the agreement or commencement of work on modified project plans. Extensions and Amendments are issued at the discretion of DFG. Please see the current fee schedule to determine the appropriate fee.

19. DFG may take enforcement action and reserves the right to suspend and/or revoke this agreement if DFG determines that the circumstances warrant. The circumstances that could require these Department actions include, but are not limited to, the following: A) Failure to comply with the terms/conditions of this agreement. B) The information provided by Caltrans in support of the agreement/notification is determined by DFG to be incomplete, or inaccurate. C) When new information becomes available to DFG representative(s) that was not known when preparing the original terms/conditions of this agreement. D) The project as described in the notification, agreement, or amendment has changed, or conditions affecting fish and wildlife resources change.

20. If, in the opinion of DFG, conditions arise or change in such a manner as to be considered deleterious to aquatic life, operations shall cease until corrective measures are taken.

21. It is understood that DFG enters into this agreement for purposes of establishing protective features for fish and wildlife, in the event that a project is implemented. The decision to proceed with the project is the sole responsibility of Caltrans, and is not required by this agreement. It is agreed that all liability and/or incurred costs related to or arising out of Caltrans' project and the fish and wildlife protective conditions of this agreement, remain the sole responsibility of Caltrans. Caltrans agrees to hold harmless and defend the State of California and the Department of Fish and Game against any related claim made by any party or parties for personal injury or other damage.

SIGNATURE PAGE

Caltrans, as designated by the signature on this agreement, shall be responsible for the execution of all elements of this agreement. A copy of this agreement must be provided to contractor and subcontractors and must be in their possession at the work site.

Failure to comply with the provisions of this agreement and with other pertinent Code Sections, including but not limited to Fish and Game Code Sections 5650, 5652 and 5948, may result in prosecution.

Nothing in this agreement authorizes Caltrans to trespass on any land or property, nor does it relieve Caltrans of responsibility for compliance with applicable federal, state, or local laws or ordinances.

This agreement is not valid and work may not begin until the agreement is signed by a representative of the Department of Fish & Game.

Caltrans Representative: ROBERT NGUYEN
Please print and sign name

Date 4/20/09

Contractor: ______________________ Date __________

Title: ______________________

Company: ______________________

Department Representative: for Sandra Morey, Regional Manager Date 4/23/09

State of California – The Resources Agency
ARNOLD SCHWARZENEGGER, Governor
DEPARTMENT OF FISH AND GAME
http://www.dfg.ca.gov
North Central Region
1701 Nimbus Road, Suite A
Rancho Cordova, CA 95670
(916) 358-2900

June 23, 2010

Erik J. Schwab
Caltrans - District 3
2800 Gateway Oaks Drive, Suite 100
Sacramento, CA 95833

Re: Lake or Streambed Alteration Notification
Notification No.: 1600-2009-0043-R2
Project Name: I-80 Across the Top Bus/Carpool Lanes Project
Water: Natomas East Main Drainage Canal (NEMDC)
County: Sacramento

Dear Mr. Schwab:

The Department of Fish and Game ("Department") has received your request to amend Lake or Streambed Alteration Agreement 1600-2009-0043-R2 ("Agreement") and the required fee in the amount of $168.00 for a minor amendment. The proposed activities for this amendment include: Rock slope protection (RSP) will be placed on the levee slope and on the canal under the bridge structures. The RSP will be 6" deep for the purpose of removing vegetation with a 2' key on the bottom of the slope. Total depth of the RSP is 2'.7". RSP within the canal section of the Natomas East Main Drain Canal (NEMDC) will cover 0.11 acre. RSP within the levee section of the NEMDC will cover 0.45 acre. The RSP coverage area on the western side is 10,000 SF, and coverage area on the eastern side is 14,000 SF. Total amount of RSP used: 2,380 cubic yards.

All the conditions in the original Agreement or as amended earlier, remain in effect. The project description for the I-80 Across the Top Bus/Carpool Lanes Project hereby includes the additional RSP placement as shown in the construction plans provided to the Department with the June 16, 2010, amendment request.

Copies of the original Agreement and this letter must be readily available at project worksites and must be presented when requested by a Department representative or agency with inspection authority.

If you have any questions regarding this matter, please contact me at ghobgood@dfg.ca.gov or phone number (916) 983-6920.

Sincerely,

Gary L. Hobgood
Staff Environment Scientist

Conserving California's Wildlife Since 1870

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

February 19, 2009

Regulatory Division (SPK-2007-00309)

California Department of Transportation
Jeremy Ketchum
Office of Environmental Management, S1
2800 Gateway Oaks Drive, Suite 100, MS #19
Sacramento, California 95833

Dear Mr. Ketchum:

We are responding to your January 12, 2009, request for a Department of the Army permit for the Interstate 80 (I-80) Median and Auxiliary Lane and Seismic Stability project. This approximately 521-acre project involves activities, including discharges of dredged or fill material, in waters of the United States to construct six concrete seismic stability walls within the Natomas East Main Drainage Canal (NEMDC) and the construction of an additional travel and break down lane (auxiliary lanes). The site is located on or near Steelhead Creek and the (NEMDC) in Sections 3, 4, 11, 13, 17, 18, 21, 22, 23, 26, 27, 28, 31, and 32, Township 9 North, Range 4 East, City of Sacramento, Sacramento County, California.

Based on the information you provided, the proposed activity in approximately 0.445 acres of waters (permanent impacts) and 2.30 acres of waters (**temporary impacts**) is authorized by Nationwide Permit Number 14. However, until Section 401 Water Quality Certification for the activity has been issued or waived, our authorization is denied without prejudice. Once you have provided us evidence of water quality certification, the activity is authorized and the work may proceed subject to the conditions of certification and the Nationwide Permit. Your work must comply with the general terms and conditions listed on the enclosed Nationwide Permit information sheets and the following special conditions:

1. To mitigate for the loss of 0.004 acres of waters of the United States, including wetlands, you shall mitigate by debiting (0.021 acres) of riparian creation credits from Beach Lake Mitigation Bank. Evidence of this debiting shall be provided to this office in the form of an updated ledger sheet indicating the amount of creation credits available prior to proceeding with any activity otherwise authorized by this permit.

2. To mitigate for the loss of 0.441acres of seasonal drainages you shall create at least 0.441 acres of seasonal drainages adjacent to the expanded roadway area (auxiliary lanes). The seasonal drainages shall be designed to current dimensions and shall be vegetated with native seed mix. Specific detailed plans for these ditches shall be submitted to and approved by the Corps of Engineers prior to proceeding with any activity otherwise authorized by this permit.

3. All temporarily disturbed waters and wetlands, including temporary fills, shall be returned to preconstruction elevations and conditions. Temporary fills shall be removed in their entirety. The affected areas must be vegetated with a native seed mix and monitored for three years.

4. To prevent unauthorized access and disturbance, you shall, prior to proceeding with any activity otherwise authorized by this permit, install fencing and appropriate signage around the perimeter of avoided waters of the U.S, including wetlands. All fencing surrounding avoidance areas shall allow unrestricted visibility of these areas to discourage vandalism or disposing of trash or other debris in these areas. An example of fencing includes chain link or other appropriate type.

5. You shall have a qualified biologist, who is aware of the locations of all waters of the United States within the project boundary monitor construction activities. The monitor shall ensure no unauthorized activities occur within avoided waters. The monitor shall have the authority to stop work immediately if any unauthorized fill occurs in waters of the United States, including wetlands. Our office shall be contacted immediately.

6. To document pre- and post- project construction conditions, you shall submit numbered and dated photos of the waters (including both the permanently and temporary impacted areas) within the project site prior to project implementation and post-construction photos of the project site within 30 days after project completion.

7. All equipment staging shall take place within Caltrans approved areas within the project boundary. Prior to construction implementation you shall ensure all equipment staging, demolition and disposal, excavation, off pavement detour, and borrow and fill areas, have been evaluated under National Environmental Policy Act (NEPA), Section 401 and 404 of the Clean Water Act, Section 7 of the Endangered Species Act and Section 106 of the National Historical Preservation Act and all required permits have been obtained.

8. This Corps permit does not authorize you to take an endangered species, in particular giant garter snake *(Thamnophis gigas)*, or designated critical habitat. In order to legally take a listed species, you must have separate authorization under the Endangered Species Act (e.g., an Endangered Species Act Section 10 permit, or a Biological Opinion under Endangered Species Act Section 7, with "incidental take" provisions with which you must comply). The enclosed Fish and Wildlife Service Biological Opinion (Number 81420-2008-F-0095-1, dated January 17, 2008), contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the Biological Opinion. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with "incidental take" of the attached Biological Opinion, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the Biological Opinion, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps permit. The Fish and Wildlife Service is the appropriate authority to determine compliance with the terms and conditions of its Biological Opinion, and with the Endangered Species Act. The permittee must comply with all conditions of this Biological Opinion, including those ascribed to the Corps.

9. To insure your project complies with the Federal Endangered Species Act, you must implement all of the mitigating measures identified in the enclosed The enclosed National Marine Fisheries Service letter of concurrence (Number FWS 2007/01083, dated March 9, 2007), including those ascribed to the Corps therein. If you are unable to implement any of these measures, you must immediately notify this office and the National Marine Fisheries Service so we may consult as appropriate, prior to initiating the work, in accordance with Federal law.

10. You must allow representatives from the Corps of Engineers to inspect the authorized activity and any mitigation, preservation, or avoidance areas at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

11. You must sign the enclosed Compliance Certification and return it to this office within 30 days after completion of the authorized work.

This verification is valid for two years from the date of this letter or until the Nationwide Permit is modified, reissued, or revoked, whichever comes first. Failure to comply with the General Conditions of this Nationwide Permit, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing our customer survey at *http://www.spk.usace.army.mil/customer_survey.html*. Your passcode is "conigliaro".

Please reference identification number SPK-2007-00309 in any correspondence concerning this project. If you have any questions, please contact Paul Maniccia at our California North Branch, email *paul.m.maniccia@usace.army.mil*, or telephone 916-557-6704. You may also use our website: *www.spk.usace.army.mil/regulatory.html*.

Sincerely,

Nancy A. Haley

Nancy A. Haley
Chief, California North Branch

Enclosure(s)

Copy furnished without enclosure(s)

William Marshall, Storm Water and Water Quality Certification Unit, Central Valley Regional Water Quality Control Board, 11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114

U.S. Fish and Wildlife Service, Endangered Species Division, 2800 Cottage Way, Suite 2605, Sacramento, California 95825-3901

Vincent King, Planner I, Planning and Community Development Department, County of Sacramento, 827 7th Street, Room 230, Sacramento, California 95814-2406

Maria Rea, Regional Administrator, National Marine Fisheries Service, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814-4706

Nationwide Permit Summary

U S Army Corps of Engineers
Sacramento District

33 CFR Part 330; Issuance of Nationwide Permits – March 19, 2007 includes corrections of May 8, 2007 and addition of regional conditions December 2007

14. Linear Transportation Projects. Activities required for the construction, expansion, modification, or improvement of linear transportation projects (e.g., roads, highways, railways, trails, airport runways, and taxiways) in waters of the United States. For linear transportation projects in non-tidal waters, the discharge cannot cause the loss of greater than 1/2-acre of waters of the United States. For linear transportation projects in tidal waters, the discharge cannot cause the loss of greater than 1/3-acre of waters of the United States. Any stream channel modification, including bank stabilization, is limited to the minimum necessary to construct or protect the linear transportation project; such modifications must be in the immediate vicinity of the project.

This NWP also authorizes temporary structures, fills, and work necessary to construct the linear transportation project. Appropriate measures must be taken to maintain normal downstream flows and minimize flooding to the maximum extent practicable, when temporary structures, work, and discharges, including cofferdams, are necessary for construction activities, access fills, or dewatering of construction sites. Temporary fills must consist of materials, and be placed in a manner, that will not be eroded by expected high flows. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The areas affected by temporary fills must be revegetated, as appropriate.

This NWP cannot be used to authorize non-linear features commonly associated with transportation projects, such as vehicle maintenance or storage buildings, parking lots, train stations, or aircraft hangars.

Notification: The permittee must submit a pre-construction notification to the district engineer prior to commencing the activity if: (1) the loss of waters of the United States exceeds 1/10 acre; or (2) there is a discharge in a special aquatic site, including wetlands. (See general condition 27.) (Sections 10 and 404)

Note: Some discharges for the construction of farm roads or forest roads, or temporary roads for moving mining equipment, may qualify for an exemption under Section 404(f) of the Clean Water Act (see 33 CFR 323.4)

A. Nationwide Permit General Conditions

Note: To qualify for NWP authorization, the prospective permittee must comply with the following general conditions, as appropriate, in addition to any regional or case-specific conditions imposed by the division engineer or district engineer. Prospective permittees should contact the appropriate Corps district office to determine if regional conditions have been imposed on an NWP. Prospective permittees should also contact the appropriate Corps district office to determine the status of Clean Water Act Section 401 water quality certification and/or Coastal Zone Management Act consistency for an NWP.

☐ **1. Navigation.**

☐ (a) No activity may cause more than a minimal adverse effect on navigation.

☐ (b) Any safety lights and signals prescribed by the U.S. Coast Guard, through regulations or otherwise, must be installed and maintained at the permittee's expense on authorized facilities in navigable waters of the United States.

☐ (c) The permittee understands and agrees that, if future operations by the United States require the removal, relocation, or other alteration, of the structure or work herein authorized, or if, in the opinion of the Secretary of the Army or his authorized representative, said structure or work shall cause unreasonable obstruction to the free navigation of the navigable waters, the permittee will be required, upon due notice from the Corps of Engineers, to remove, relocate, or alter the structural work or obstructions caused thereby, without expense to the United States. No claim shall be made against the United States on account of any such removal or alteration.

☐ **2. Aquatic Life Movements**. No activity may substantially disrupt the necessary life cycle movements of those species of aquatic life indigenous to the waterbody, including those species that normally migrate through the area, unless the activity's primary purpose is to impound water. Culverts placed in streams must be installed to maintain low flow conditions.

☐ **3 Spawning Areas.** Activities in spawning areas during spawning seasons must be avoided to the maximum extent practicable. Activities that result in the physical destruction (e.g., through excavation, fill, or downstream smothering by substantial turbidity) of an important spawning area are not authorized.

☐ **4. Migratory Bird Breeding Areas.** Activities in waters of the United States that serve as breeding areas for migratory birds must be avoided to the maximum extent practicable.

☐ **5. Shellfish Beds**. No activity may occur in areas of concentrated shellfish populations, unless the activity is directly related to a shellfish harvesting activity authorized by NWPs 4 and 48.

☐ **6. Suitable Material**. No activity may use unsuitable material (e.g., trash, debris, car bodies, asphalt, etc.). Material used for construction or discharged must be free from toxic pollutants in toxic amounts (see Section 307 of the Clean Water Act).

☐ **7. Water Supply Intakes**. No activity may occur in the proximity of a public water supply intake, except where the activity is for the repair or improvement of public water supply intake structures or adjacent bank stabilization.

☐ **8. Adverse Effects From Impoundments**. If the activity creates an impoundment of water, adverse effects to the aquatic system due to accelerating the passage of water, and/or restricting its flow must be minimized to the maximum extent practicable.

☐ 9. **Management of Water Flows**. To the maximum extent practicable, the pre-construction course, condition, capacity, and location of open waters must be maintained for each activity, including stream channelization and storm water management activities, except as provided below. The activity must be constructed to withstand expected high flows. The activity must not restrict or impede the passage of normal or high flows, unless the primary purpose of the activity is to impound water or manage high flows. The activity may alter the pre-construction course, condition, capacity, and location of open waters if it benefits the aquatic environment (e.g., stream restoration or relocation activities).

☐ 10. **Fills Within 100-Year Floodplains**. The activity must comply with applicable FEMA-approved state or local floodplain management requirements.

☐ 11. **Equipment**. Heavy equipment working in wetlands or mudflats must be placed on mats, or other measures must be taken to minimize soil disturbance.

☐ 12. **Soil Erosion and Sediment Controls**. Appropriate soil erosion and sediment controls must be used and maintained in effective operating condition during construction, and all exposed soil and other fills, as well as any work below the ordinary high water mark or high tide line, must be permanently stabilized at the earliest practicable date. Permittees are encouraged to perform work within waters of the United States during periods of low-flow or no-flow.

☐ 13. **Removal of Temporary Fills**. Temporary fills must be removed in their entirety and the affected areas returned to pre-construction elevations. The affected areas must be revegetated, as appropriate.

☐ 14. **Proper Maintenance**. Any authorized structure or fill shall be properly maintained, including maintenance to ensure public safety.

☐ 15. **Wild and Scenic Rivers**. No activity may occur in a component of the National Wild and Scenic River System, or in a river officially designated by Congress as a "study river" for possible inclusion in the system while the river is in an official study status, unless the appropriate Federal agency with direct management responsibility for such river, has determined in writing that the proposed activity will not adversely affect the Wild and Scenic River designation or study status. Information on Wild and Scenic Rivers may be obtained from the appropriate Federal land management agency in the area (e.g., National Park Service, U.S. Forest Service, Bureau of Land Management, U.S. Fish and Wildlife Service).

☐ 16. **Tribal Rights**. No activity or its operation may impair reserved tribal rights, including, but not limited to, reserved water rights and treaty fishing and hunting rights.

☐ 17. **Endangered Species**.

☐ (a) No activity is authorized under any NWP which is likely to jeopardize the continued existence of a threatened or endangered species or a species proposed for such designation, as identified under the Federal Endangered Species Act (ESA), or which will destroy or adversely modify the critical habitat of such species. No activity is authorized under any NWP which "may affect" a listed species or critical habitat, unless Section 7 consultation addressing the effects of the proposed activity has been completed.

☐ (b) Federal agencies should follow their own procedures for complying with the requirements of the ESA. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

☐ (c) Non-federal permittees shall notify the district engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, and shall not begin work on the activity until notified by the district engineer that the requirements of the ESA have been satisfied and that the activity is authorized. For activities that might affect Federally-listed endangered or threatened species or designated critical habitat, the pre-construction notification must include the name(s) of the endangered or threatened species that may be affected by the proposed work or that utilize the designated critical habitat that may be affected by the proposed work. The district engineer will determine whether the proposed activity "may affect" or will have "no effect" to listed species and designated critical habitat and will notify the non-Federal applicant of the Corps' determination within 45 days of receipt of a complete pre-construction notification. In cases where the non-Federal applicant has identified listed species or critical habitat that might be affected or is in the vicinity of the project, and has so notified the Corps, the applicant shall not begin work until the Corps has provided notification the proposed activities will have "no effect" on listed species or critical habitat, or until Section 7 consultation has been completed.

☐ (d) As a result of formal or informal consultation with the FWS or NMFS the district engineer may add species-specific regional endangered species conditions to the NWPs.

☐ (e) Authorization of an activity by a NWP does not authorize the "take" of a threatened or endangered species as defined under the ESA. In the absence of separate authorization (e.g., an ESA Section 10 Permit, a Biological Opinion with "incidental take" provisions, etc.) from the U.S. FWS or the NMFS, both lethal and non-lethal "takes" of protected species are in violation of the ESA. Information on the location of threatened and endangered species and their critical habitat can be obtained directly from the offices of the U.S. FWS and NMFS or their world wide Web pages at http://www.fws.gov/ and http://www.noaa.gov/fisheries.html respectively.

☐ 18. **Historic Properties**.

☐ (a) In cases where the district engineer determines that the activity may affect properties listed, or eligible for listing, in the National Register of Historic Places, the activity is not authorized, until the requirements of Section 106 of the National Historic Preservation Act (NHPA) have been satisfied.

☐ (b) Federal permittees should follow their own procedures for complying with the requirements of Section 106 of the National Historic Preservation Act. Federal permittees must provide the district engineer with the appropriate documentation to demonstrate compliance with those requirements.

☐ (c) Non-federal permittees must submit a pre-construction notification to the district engineer if the authorized activity may have the potential to cause effects to any historic properties listed, determined to be eligible for listing on, or potentially eligible for listing on the National Register of Historic Places, including previously unidentified properties. For such activities, the pre-construction notification must state which historic properties may be affected by the proposed work or include a vicinity map indicating the location of the historic properties or the potential for the presence of historic properties. Assistance regarding information on the location of or potential for the presence of historic resources can be sought from the State Historic Preservation Officer or Tribal Historic Preservation Officer, as appropriate, and the National Register of Historic Places (see 33 CFR 330.4(g)). The district engineer shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. Based on the information submitted and these efforts, the district engineer shall determine whether the proposed activity has the potential to cause an effect on the historic properties. Where the non-Federal applicant has identified historic properties which the activity may have the potential to cause effects and so notified the Corps, the non-Federal applicant shall not begin the activity until notified by the district engineer either that the activity has no potential to cause effects or that consultation under Section 106 of the NHPA has been completed.

☐ (d) The district engineer will notify the prospective permittee within 45 days of receipt of a complete pre-construction notification whether NHPA Section 106 consultation is required. Section 106 consultation is not required when the Corps determines that the activity does not have the potential to cause effects on historic properties (see 36 CFR §800.3(a)). If NHPA section 106 consultation is required and will occur, the district engineer will notify the non-Federal applicant that he or she cannot begin work until Section 106 consultation is completed.

☐ (e) Prospective permittees should be aware that section 110k of the NHPA (16 U.S.C. 470h-2(k)) prevents the Corps from granting a permit or other assistance to an applicant who, with intent to avoid the requirements of Section 106 of the NHPA, has intentionally significantly adversely affected a historic property to which the permit would relate, or having legal power to prevent it, allowed such significant adverse effect to occur, unless the Corps, after consultation with the Advisory Council on Historic Preservation (ACHP), determines that circumstances justify granting such assistance despite the adverse effect created or permitted by the applicant. If circumstances justify granting the assistance, the Corps is required to notify the ACHP and provide documentation specifying the circumstances, explaining the degree of damage to the integrity of any historic properties affected, and proposed mitigation. This documentation must include any views obtained from the applicant, SHPO/THPO, appropriate Indian tribes if the undertaking occurs on or affects historic properties on tribal lands or affects properties of interest to those tribes, and other parties known to have a legitimate interest in the impacts to the permitted activity on historic properties.

☐ **19. Designated Critical Resource Waters.** Critical resource waters include, NOAA-designated marine sanctuaries, National Estuarine Research Reserves, state natural heritage sites, and outstanding national resource waters or other waters officially designated by a state as having particular environmental or ecological significance and identified by the district engineer after notice and opportunity for public comment. The district engineer may also designate additional critical resource waters after notice and opportunity for comment.

☐ (a) Discharges of dredged or fill material into waters of the United States are not authorized by NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50 for any activity within, or directly affecting, critical resource waters, including wetlands adjacent to such waters.

☐ (b) For NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37, and 38, notification is required in accordance with general condition 27, for any activity proposed in the designated critical resource waters including wetlands adjacent to those waters. The district engineer may authorize activities under these NWPs only after it is determined that the impacts to the critical resource waters will be no more than minimal.

☐ **20 Mitigation.** The district engineer will consider the following factors when determining appropriate and practicable mitigation necessary to ensure that adverse effects on the aquatic environment are minimal:

☐ (a) The activity must be designed and constructed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States to the maximum extent practicable at the project site (i.e., on site).

☐ (b) Mitigation in all its forms (avoiding, minimizing, rectifying, reducing, or compensating) will be required to the extent necessary to ensure that the adverse effects to the aquatic environment are minimal.

☐ (c) Compensatory mitigation at a minimum one-for-one ratio will be required for all wetland losses that exceed 1/10 acre and require pre-construction notification, unless the district engineer determines in writing that some other form of mitigation would be more environmentally appropriate and provides a project-specific waiver of this requirement. For wetland losses of 1/10 acre or less that require pre-construction notification, the district engineer may determine on a case-by-case basis that compensatory mitigation is required to ensure that the activity results in minimal adverse effects on the aquatic environment. Since the likelihood of success is greater and the impacts to potentially valuable uplands are reduced, wetland restoration should be the first compensatory mitigation option considered.

☐ (d) For losses of streams or other open waters that require pre-construction notification, the district engineer may require compensatory mitigation, such as stream restoration, to ensure that the activity results in minimal adverse effects on the aquatic environment.

☐ (e) Compensatory mitigation will not be used to increase the acreage losses allowed by the acreage limits of the NWPs. For example, if an NWP has an acreage limit of 1/2 acre, it cannot be used to authorize any project resulting in the loss of greater than 1/2 acre of waters of the United States, even if compensatory mitigation is provided that replaces or restores some of the lost waters. However, compensatory mitigation can and should be used, as necessary, to ensure that a project already meeting the established acreage limits also satisfies the minimal impact requirement associated with the NWPs.

☐ (f) Compensatory mitigation plans for projects in or near streams or other open waters will normally include a requirement for the establishment, maintenance, and legal protection (e.g., conservation easements) of riparian areas next to open waters. In some cases, riparian areas may be the only compensatory mitigation required. Riparian areas should consist of native species. The width of the required riparian area will address documented water quality or aquatic habitat loss concerns. Normally, the riparian area will be 25 to 50 feet wide on each side of the stream, but the district engineer may require slightly wider riparian areas to address documented water quality or habitat loss concerns. Where both wetlands and open waters exist on the project site, the district engineer will determine the appropriate compensatory mitigation (e.g., riparian areas and/or wetlands compensation) based on what is best for the aquatic environment on a watershed basis. In cases where riparian areas are determined to be the most appropriate form of compensatory mitigation, the district engineer may waive or reduce the requirement to provide wetland compensatory mitigation for wetland losses.

☐ (g) Permittees may propose the use of mitigation banks, in-lieu fee arrangements or separate activity-specific compensatory mitigation. In all cases, the mitigation provisions will specify the party responsible for accomplishing and/or complying with the mitigation plan.

☐ (h) Where certain functions and services of waters of the United States are permanently adversely affected, such as the conversion of a forested or scrub-shrub wetland to a herbaceous wetland in a permanently maintained utility line right-of-way, mitigation may be required to reduce the adverse effects of the project to the minimal level.

☐ **21. Water Quality.** Where States and authorized Tribes, or EPA where applicable, have not previously certified compliance of an NWP with CWA Section 401, individual 401 Water Quality Certification must be obtained or waived (see 33 CFR 330.4(c)). The district engineer or State or Tribe may require additional water quality management measures to ensure that the authorized activity does not result in more than minimal degradation of water quality.

☐ **22. Coastal Zone Management**. In coastal states where an NWP has not previously received a state coastal zone management consistency concurrence, an individual state coastal zone management consistency concurrence must be obtained, or a presumption of concurrence must occur (see 33 CFR 330.4(d)). The district engineer or a State may require additional measures to ensure that the authorized activity is consistent with state coastal zone management requirements.

☐ **23. Regional and Case-By-Case Conditions**. The activity must comply with any regional conditions that may have been added by the Division Engineer (see 33 CFR 330.4(e)) and with any case specific conditions added by the Corps or by the state, Indian Tribe, or U.S. EPA in its section 401 Water Quality Certification, or by the state in its Coastal Zone Management Act consistency determination.

☐ **24. Use of Multiple Nationwide Permits**. The use of more than one NWP for a single and complete project is prohibited, except when the acreage loss of waters of the United States authorized by the NWPs does not exceed the acreage limit of the NWP with the highest specified acreage limit. For example, if a road crossing over tidal waters is constructed under NWP 14, with associated bank stabilization authorized by NWP 13, the maximum acreage loss of waters of the United States for the total project cannot exceed 1/3-acre.

☐ **25. Transfer of Nationwide Permit Verifications**. If the permittee sells the property associated with a nationwide permit verification, the permittee may transfer the nationwide permit verification to the new owner by submitting a letter to the appropriate Corps district office to validate the transfer. A copy of the nationwide permit verification must be attached to the letter, and the letter must contain the following statement and signature:

> "When the structures or work authorized by this nationwide permit are still in existence at the time the property is transferred, the terms and conditions of this nationwide permit, including any special conditions, will continue to be binding on the new owner(s) of the property. To validate the transfer of this nationwide permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below."

(Transferee)

(Date)

☐ **26. Compliance Certification**. Each permittee who received an NWP verification from the Corps must submit a signed certification regarding the completed work and any required mitigation. The certification form must be forwarded by the Corps with the NWP verification letter and will include:

☐ (a) A statement that the authorized work was done in accordance with the NWP authorization, including any general or specific conditions;

☐ (b) A statement that any required mitigation was completed in accordance with the permit conditions; and

☐ (c) The signature of the permittee certifying the completion of the work and mitigation.

☐ **27. Pre-Construction Notification.**

☐ (a) **Timing**.. Where required by the terms of the NWP, the prospective permittee must notify the district engineer by submitting a pre-construction notification (PCN) as early as possible. The district engineer must determine if the PCN is complete within 30 calendar days of the date of receipt and, as a general rule, will request additional information necessary to make the PCN complete only once. However, if the prospective permittee does not provide all of the requested information, then the district engineer will notify the prospective permittee that the PCN is still incomplete and the PCN review process will not commence until all of the requested information has been received by the district engineer. The prospective permittee shall not begin the activity until either:

☐ (1) He or she is notified in writing by the district engineer that the activity may proceed under the NWP with any special conditions imposed by the district or division engineer; or

☐ (2) Forty-five calendar days have passed from the district engineer's receipt of the complete PCN and the prospective permittee has not received written notice from the district or division engineer. However, if the permittee was required to notify the Corps pursuant to general condition 17 that listed species or critical habitat might affected or in the vicinity of the project, or to notify the Corps pursuant to general condition 18 that the activity may have the potential to cause effects to historic properties, the permittee cannot begin the activity until receiving written notification from the Corps that is "no effect" on listed species or "no potential to cause effects" on historic properties, or that any consultation required under Section 7 of the Endangered Species Act (see 33 CFR 330.4(f)) and/or Section 106 of the National Historic Preservation (see 33 CFR 330.4(g)) is completed. Also, work cannot begin under NWPs 21, 49, or 50 until the permittee has received written approval from the Corps. If the proposed activity requires a written waiver to exceed specified limits of an NWP, the permittee cannot begin the activity until the district engineer issues the waiver. If the district or division engineer notifies the permittee in writing that an individual permit is required within 45 calendar days of receipt of a complete PCN, the permittee cannot begin the activity until an individual permit has been obtained. Subsequently, the permittee's right to proceed under the NWP may be modified, suspended, or revoked only in accordance with the procedure set forth in 33 CFR 330.5(d)(2).

☐ (b) Contents of Pre-Construction Notification: The PCN must be in writing and include the following information:

☐ (1) Name, address and telephone numbers of the prospective permittee;

☐ (2) Location of the proposed project;

☐ (3) A description of the proposed project; the project's purpose; direct and indirect adverse environmental effects the project would cause; any other NWP(s), regional general permit(s), or individual permit(s) used or intended to be used to authorize any part of the proposed project or any related activity. The description should be sufficiently detailed to allow the district engineer to determine that the adverse effects of the project will be minimal and to determine the need for compensatory mitigation. Sketches should be provided when necessary to show that the activity complies with the terms of the NWP. (Sketches usually clarify the project and when provided result in a quicker decision.);

☐ (4) The PCN must include a delineation of special aquatic sites and other waters of the United States on the project site. Wetland delineations must be prepared in accordance with the current method required by the Corps. The permittee may ask the Corps to delineate the special aquatic sites and other waters of the United States, but there may be a delay if the Corps does the delineation, especially if the project site is large or contains many waters of the United States. Furthermore, the 45 day period will not start until the delineation has been submitted to or completed by the Corps, where appropriate;

☐ (5) If the proposed activity will result in the loss of greater than 1/10 acre of wetlands and a PCN is required, the prospective permittee must submit a statement describing how the mitigation requirement will be satisfied. As an alternative, the prospective permittee may submit a conceptual or detailed mitigation plan.

☐ (6) If any listed species or designated critical habitat might be affected or is in the vicinity of the project, or if the project is located in designated critical habitat, for non-Federal applicants the PCN must include the name(s) of those endangered or threatened species that might be affected by the proposed work or utilize the designated critical habitat that may be affected by the proposed work. Federal applicants must provide documentation demonstrating compliance with the Endangered Species Act; and

☐ (7) For an activity that may affect a historic property listed on, determined to be eligible for listing on, or potentially eligible for listing on, the National Register of Historic Places, for non-Federal applicants the PCN must state which historic property may be affected by the proposed work or include a vicinity map indicating the location of the historic property. Federal applicants must provide documentation demonstrating compliance with Section 106 of the National Historic Preservation Act.

☐ (c) Form of Pre-Construction Notification: The standard individual permit application form (Form ENG 4345) may be used, but the completed application form must clearly indicate that it is a PCN and must include all of the information required in paragraphs (b)(1) through (7) of this general condition. A letter containing the required information may also be used.

☐ (d) Agency Coordination:

☐ (1) The district engineer will consider any comments from Federal and state agencies concerning the proposed activity's compliance with the terms and conditions of the NWPs and the need for mitigation to reduce the project's adverse environmental effects to a minimal level.

☐ (2) For all NWP 48 activities requiring pre-construction notification and for other NWP activities requiring pre-construction notification to the district engineer that result in the loss of greater than 1/2-acre of waters of the United States, the district engineer will immediately provide (e.g., via facsimile transmission, overnight mail, or other expeditious manner) a copy of the PCN to the appropriate Federal or state offices (U.S. FWS, state natural resource or water quality agency, EPA, State Historic Preservation Officer (SHPO) or Tribal Historic Preservation Office (THPO), and, if appropriate, the NMFS). With the exception of NWP 37, these agencies will then have 10 calendar days from the date the material is transmitted to telephone or fax the district engineer notice that they intend to provide substantive, site-specific comments. If so contacted by an agency, the district engineer will wait an additional 15 calendar days before making a decision on the pre-construction notification. The district engineer will fully consider agency comments received within the specified time frame, but will provide no response to the resource agency, except as provided below. The district engineer will indicate in the administrative record associated with each pre-construction notification that the resource agencies' concerns were considered. For NWP 37, the emergency watershed protection and rehabilitation activity may proceed immediately in cases where there is an unacceptable hazard to life or a significant loss of property or economic hardship will occur. The district engineer will consider any comments received to decide whether the NWP 37 authorization should be modified, suspended, or revoked in accordance with the procedures at 33 CFR 330.5.

☐ (3) In cases of where the prospective permittee is not a Federal agency, the district engineer will provide a response to NMFS within 30 calendar days of receipt of any Essential Fish Habitat conservation recommendations, as required by Section 305(b)(4)(B) of the Magnuson-Stevens Fishery Conservation and Management Act.

☐ (4) Applicants are encouraged to provide the Corps multiple copies of pre-construction notifications to expedite agency coordination.

☐ (5) For NWP 48 activities that require reporting, the district engineer will provide a copy of each report within 10 calendar days of receipt to the appropriate regional office of the NMFS.

☐ (e) In reviewing the PCN for the proposed activity, the district engineer will determine whether the activity authorized by the NWP will result in more than minimal individual or cumulative adverse environmental effects or may be contrary to the public interest. If the proposed activity requires a PCN and will result in a loss of greater than 1/10 acre of wetlands, the prospective permittee should submit a mitigation proposal with the PCN. Applicants may also propose compensatory mitigation for projects with smaller impacts. The district engineer will consider any proposed compensatory mitigation the applicant has included in the proposal in determining whether the net adverse environmental effects to the aquatic environment of the proposed work are minimal. The compensatory mitigation proposal may be either conceptual or detailed. If the district engineer determines that the activity complies with the terms and conditions of the NWP and that the adverse effects on the aquatic environment are minimal, after considering mitigation, the district engineer will notify the permittee and include any conditions the district engineer deems necessary. The district engineer must approve any compensatory mitigation proposal before the permittee commences work. If the prospective permittee elects to submit a compensatory mitigation plan with the PCN, the district engineer will expeditiously review the proposed compensatory mitigation plan. The district engineer must review the plan within 45 calendar days of receiving a complete PCN and determine whether the proposed mitigation would ensure no more than minimal adverse effects on the aquatic environment. If the net adverse effects of the project on the aquatic environment (after consideration of the compensatory mitigation proposal) are determined by the district engineer to be minimal, the district engineer will provide a timely written response to the applicant. The response will state that the project can proceed under the terms and conditions of the NWP.

If the district engineer determines that the adverse effects of the proposed work are more than minimal, then the district engineer will notify the applicant either: (1) That the project does not qualify for authorization under the NWP and instruct the applicant on the procedures to seek authorization under an individual permit; (2) that the project is authorized under the NWP subject to the applicant's submission of a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level; or (3) that the project is authorized under the NWP with specific modifications or conditions. Where the district engineer determines that mitigation is required to ensure no more than minimal adverse effects occur to the aquatic environment, the activity will be authorized within the 45-day PCN period. The authorization will include the necessary conceptual or specific mitigation or a requirement that the applicant submit a mitigation plan that would reduce the adverse effects on the aquatic environment to the minimal level. When mitigation is required, no work in waters of the United States may occur until the district engineer has approved a specific mitigation plan.

☐ **(a) 28. Single and Complete Project.** The activity must be a single and complete project. The same NWP cannot be used more than once for the same single and complete project.

B. Regional Conditions:

I. Sacramento District (All States, except Colorado)

1. When pre-construction notification (PCN) is required, the prospective permittee shall notify the Sacramento District in accordance with General Condition 27 using either the South Pacific Division Preconstruction Notification (PCN) Checklist or a completed application form (ENG Form 4345). In addition, the PCN shall include:

a. A written statement explaining how the activity has been designed to avoid and minimize adverse effects, both temporary and permanent, to waters of the United States;

b. Drawings, including plan and cross-section views, clearly depicting the location, size and dimensions of the proposed activity. The drawings shall contain a title block, legend and scale, amount (in cubic yards) and size (in acreage) of fill in Corps jurisdiction, including both permanent and temporary fills/structures. The ordinary high water mark or, if tidal waters, the high tide line should be shown (in feet), based on National Geodetic Vertical Datum (NGVD) or other appropriate referenced elevation; and

c. Pre-project color photographs of the project site taken from designatedlocations documented on the plan drawing.

2. The permittee shall complete compensatory mitigation required by special conditions of the NWP verification before or concurrent with construction of the authorized activity, except when specifically determined to be impracticable by the Sacramento District. When project mitigation involves use of a mitigation bank or in-lieu fee program, payment shall be made before commencing construction.

3. The permittee shall record the NWP verification with the Registrar of Deeds or other appropriate official charged with the responsibility for maintaining records of title to or interest in real property against areas (1) designated to be preserved as part of mitigation for authorized impacts, including any associated covenants or restrictions, or (2) where structures such as boat ramps or docks, marinas, piers, and permanently moored vessels will be constructed in or adjacent to navigable waters (Section 10 and Section 404). The recordation shall also include a map showing the surveyed location of the authorized structure and any associated areas preserved to minimize or compensate for project impacts.

4. The permittee shall place wetlands, other aquatic areas, and any vegetative buffers preserved as part of mitigation for impacts into a separate "preserve" parcel prior to discharging dredged or fill material into waters of the United States, except where specifically determined to be impracticable by the Sacramento District. Permanent legal protection shall be established for all preserve parcels, following Sacramento District approval of the legal instrument.

5. The permittee shall allow Corps representatives to inspect the authorized activity and any mitigation areas at any time deemed necessary to determine compliance with the terms and conditions of the NWP verification. The permittee will be notified in advance of an inspection.

6. For NWPs 29, 39, 40, 42, 43, 44, and 46, requests to waive the 300 linear foot limitation for intermittent or ephemeral waters of the U.S. shall include an evaluation of functions and services provided by the waterbody taking into account the watershed, measures to be implemented to avoid and minimize impacts, other measures to avoid and minimize that were found to be impracticable, and a mitigation plan for offsetting impacts.

7. Road crossings shall be designed to ensure fish passage, especially for anadromous fisheries. Permittees shall employ bridge designs that span the stream or river, utilize pier or pile supported structures, or involve large bottomless culverts with a natural streambed, where the substrate and streamflow conditions approximate existing channel conditions. Approach fills in waters of the United States below the ordinary high water mark are not authorized under the NWPs, except where avoidance has specifically been determined to be impracticable by the Sacramento District.

8. For NWP 12, clay blocks, bentonite, or other suitable material shall be used to seal the trench to prevent the utility line from draining waters of the United States, including wetlands.

9. For NWP 13, bank stabilization shall include the use of vegetation or other biotechnical design to the maximum extent practicable. Activities involving hard-armoring of the bank toe or slope requires submission of a PCN per General Condition 27.

10. For NWP 23, the PCN shall include a copy of the signed Categorical Exclusion document and final agency determinations regarding compliance with Section 7 of the Endangered Species Act, Essential Fish Habitat under the Magnussen-Stevens Act, and Section 106 of the National Historic Preservation Act.

11. For NWP 44, the discharge shall not cause the loss of more than 300 linear feet of streambed. For intermittent and ephemeral streams, the 300 linear foot limit may be waived in writing by the Sacramento District. This NWP does not authorize discharges in waters of the United States supporting anadromous fisheries.

12. For NWPs 29 and 39, channelization or relocation of intermittent or perennial drainage, is not authorized, except when, as determined by the Sacramento District, the relocation would result in a net increase in functions of the aquatic ecosystem within the watershed.

13. For NWP 33, temporary fills for construction access in waters of the United States supporting fisheries shall be accomplished with clean, washed spawning quality gravels where practicable as determined by the Sacramento District, in consultation with appropriate federal and state wildlife agencies.

14. For NWP 46, the discharge shall not cause the loss of greater than 0.5 acres of waters of the United States or the loss of more than 300 linear feet of ditch, unless this 300 foot linear foot limit is waived in writing by the Sacramento District.

15. For NWPs 29, 39, 40, 42, and 43, upland vegetated buffers shall be established and maintained in perpetuity, to the maximum extent practicable, next to all preserved open waters, streams and wetlands including created, restored, enhanced or preserved waters of the U.S., consistent with General Condition 20. Except in unusual circumstances, vegetated buffers shall be at least 50 feet in width.

16. All NWPs except 3, 6, 20, 27, 32, 38, and 47, are revoked for activities in histosols and fens and in wetlands contiguous with fens. Fens are defined as slope wetlands with a histic epipedon that are hydrologically supported by groundwater. Fens are normally saturated throughout the growing season, although they may not be during drought conditions. For NWPs 3, 6, 20, 27, 32, and 38, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27.

17. For all NWPs, when activities are proposed within 100 feet of the point of groundwater discharge of a natural spring, prospective permittees shall submit a PCN to the Sacramento District in accordance with General Condition 27. A spring source is defined as any location where ground water emanates from a point in the ground. For purposes of this condition, springs do not include seeps or other discharges which lack a defined channel.

II. California Only

1. In the Lake Tahoe Basin, all NWPs are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

2. In the Primary and Secondary Zones of the Legal Delta, NWPs 29 and 39 are revoked. New development activities in the Legal Delta will be reviewed through the Corps' standard permit process.

III. Nevada Only

1. In the Lake Tahoe Basin, all NWPs are revoked. Activities in this area shall be authorized under Regional General Permit 16 or through an individual permit.

IV. Utah Only

1. For all NWPs, except NWP 47, prospective permittees shall submit a PCN in accordance with General Condition 27 for any activity, in waters of the United States, below 4217 feet mean sea level (msl) adjacent to the Great Salt Lake and below 4500 feet msl adjacent to Utah Lake.

2. A PCN is required for all bank stabilization activities in a perennial stream that would affect more than 100 linear feet of stream

3. For NWP 27, facilities for controlling stormwater runoff, construction of water parks such as kayak courses, and use of grout or concrete to construct in-stream structures are not authorized. A PCN is required for all projects exceeding 1500 linear feet as measured on the stream thalweg, using in stream structures exceeding 50 cubic yards per structure and/or incorporating grade control structures exceeding 1 foot vertical drop. For any stream restoration project, the post project stream sinuosity shall be appropriate to the geomorphology of the surrounding area and shall be equal to, or greater than, pre project sinuosity. Sinuosity is defined as the ratio of stream length to project reach length. Structures shall allow the passage of aquatic organisms, recreational water craft or other navigational activities unless specifically waived in writing by the District Engineer.

V. Colorado Only

1. Final Regional Conditions Applicable to Specific Nationwide Permits within Colorado.

a. Nationwide Permit Nos. 12 and 14, Utility Line Activities and Linear Transportation Projects. In the Colorado River Basin, utility line and road activities crossing perennial water or special aquatic sites require notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification).

b. Nationwide Permit No. 13 Bank Stabilization. In Colorado, bank stabilization activities necessary for erosion prevention in streams that average less than 20 feet in width (measured between the ordinary high water marks) are limited to the placement of no more than 1/4 cubic yard of suitable fill* material per running foot below the plane of the ordinary high water mark. Activities greater than 1/4 cubic yard may be authorized if the permittee notifies the District Engineer in accordance with General Condition 27 (Pre-Construction Notification) and the Corps determines the adverse environmental effects are minimal. [* See (g) for definition of Suitable Fill]

c. Nationwide Permit No. 27 Aquatic Habitat Restoration, Establishment, and Enhancement Activities.

(1) For activities that include a fishery enhancement component, the Corps will send the Pre-Construction Notification to the Colorado Division of Wildlife (CDOW) for review. In accordance with General Condition 27 (Pre-Construction Notification), CDOW will have 10 days from the receipt of Corps notification to indicate that they will be commenting on the proposed project. CDOW will then have an additional 15 days after the initial 10-day period to provide those comments. If CDOW raises concerns, the applicant may either modify their plan, in coordination with CDOW, or apply for a standard individual permit.

(2) For activities involving the length of a stream, the post-project stream sinuosity will not be significantly reduced, unless it is demonstrated that the reduction in sinuosity is consistent with the natural morphological evolution of the stream (sinuosity is the ratio of stream length to project reach length).

(3) Structures will allow the upstream and downstream passage of aquatic organisms, including fish native to the reach, as well as recreational water craft or other navigational activities, unless specifically waived in writing by the District Engineer. The use of grout and/or concrete in

building structures is not authorized by this nationwide permit.

(4) The construction of water parks (i.e., kayak courses) and flood control projects are not authorized by this nationwide permit.

d. Nationwide Permits Nos. 29 and 39; Residential Developments and Commercial and Institutional Developments. A copy of the existing FEMA/locally-approved floodplain map must be submitted with the Pre-Construction Notification. When reviewing proposed developments, the Corps will utilize the most accurate and reliable FEMA/locally-approved pre-project floodplain mapping, not post-project floodplain mapping based on a CLOMR or LOMR. However, the Corps will accept revisions to existing floodplain mapping if the revisions resolve inaccuracies in the original floodplain mapping and if the revisions accurately reflect pre-project conditions.

2. Final Regional Conditions Applicable to All Nationwide Permits within Colorado

e. Removal of Temporary Fills. General Condition 13 (Removal of Temporary Fills) is amended by adding the following: When temporary fills are placed in wetlands in Colorado, a horizontal marker (i.e. fabric, certified weed-free straw, etc.) must be used to delineate the existing ground elevation of wetlands that will be temporarily filled during construction.

f. Spawning Areas. General Condition 3 (Spawning Areas) is amended by adding the following: In Colorado, all Designated Critical Resource Waters (see enclosure 1) are considered important spawning areas. Therefore, In accordance with General Condition 19 (Designated Critical Resource Waters), the discharge of dredged or fill material in not authorized by the following nationwide permits in these waters: NWPs 7, 12, 14, 16, 17, 21, 29, 31, 35, 39, 40, 42, 43, 44, 49, and 50. In addition, in accordance with General Condition 27 (Pre-Construction Notification), notification to the District Engineer is required for use of the following nationwide permits in these waters: NWPs 3, 8, 10, 13, 15, 18, 19, 22, 23, 25, 27, 28, 30, 33, 34, 36, 37 and 38".

g. Suitable Fill. In Colorado, use of broken concrete as fill material requires notification to the District Engineer in accordance with General Condition 27 (Pre-Construction Notification). Permittees must demonstrate that soft engineering methods utilizing native or non-manmade materials are not practicable (with respect to cost, existing technology, and logistics), before broken concrete is allowed as suitable fill. Use of broken concrete with exposed rebar is prohibited in perennial waters and special aquatic sites.

h. Invasive Aquatic Species. General Condition 11 is amended by adding the following condition for work in perennial or intermittent waters of the United States: If heavy equipment is used for the subject project that was previously working in another stream, river, lake, pond, or wetland within 10 days of initiating work, one the following procedures is necessary to prevent the spread of New Zealand Mud Snails and other aquatic hitchhikers:

(1) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and keep the equipment dry for 10 days. OR

(2) Remove all mud and debris from Equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with either a 1:1 solution of Formula 409 Household Cleaner and water, or a solution of Sparquat 256 (5 ounces Sparquat per gallon of water). Treated equipment must be kept moist for at least 10 minutes. OR

(3) Remove all mud and debris from equipment (tracks, turrets, buckets, drags, teeth, etc.) and spray/soak equipment with water greater than 120 degrees F for at least 10 minutes.

3. Final Regional Conditions for Revocation/Special Notification Specific to Certain Geographic Areas

i. Fens: All Nationwide permits, except permit Nos. 3, 6, 20, 27, 32, 38 and 47, are revoked in fens and wetlands adjacent to fens. Use of nationwide permit Nos. 3, 20, 27 and 38, requires notification to the District Engineer, in accordance with General Condition 27 (Pre-Construction Notification), and the permittee may not begin the activity until the Corps determines the adverse environmental effects are minimal. The following defines a fen:

Fen soils (histosols) are normally saturated throughout the growing season, although they may not be during drought conditions. The primary source of hydrology for fens is groundwater. Histosols are defined in accordance with the U.S. Department of Agriculture, Natural Resources Conservation Service publications on Keys to Soil Taxonomy and Field Indicators of Hydric Soils in the United States (http://soils.usda.gov/technical/classification/taxonomy).

j. Springs: Within the state of Colorado, all NWPs, except permit 47 (original 'C'), require preconstruction notification pursuant to General Condition 27 for discharges of dredged or fill material within 100 feet of the point of groundwater discharge of natural springs. A spring source is defined as any location where groundwater emanates from a point in the ground. For purposes of this regional condition, springs do not include seeps or other discharges which do not have a defined channel.

4. Additional Information

The following provides additional information regarding minimization of impacts and compliance with existing general Conditions:

a. Permittees are reminded of the existing General Condition No. 6 which prohibits the use of unsuitable material. Organic debris, building waste, asphalt, car bodies, and trash are not suitable material. Also, General Condition 12 requires appropriate erosion and sediment controls (i.e. all fills must be permanently stabilized to prevent erosion and siltation into waters and wetlands at the earliest practicable date). Streambed material or other small aggregate material placed along a bank as stabilization will not meet General Condition 12. Also, use of erosion control mates that contain plastic netting may not meet General Condition 12 if deemed harmful to wildlife.

b. Designated Critical Resource Waters in Colorado. In Colorado, a list of designated Critical Resource Waters has been published in accordance with General Condition 19 (Designated Critical Resource Waters). This list will be published on the Albuquerque District Regulatory home page (http://www.spa.usace.army.mil/reg/)

c. Federally-Listed Threatened and Endangered Species. General condition 17 requires that nod-federal permittees notify the District Engineer if any listed species or designated critical habitat might be affected or is in the vicinity of the project. Information on such species, to include occurrence by county in Colorado, may be found at the following U.S. Fish and Wildlife Service website: http://www.fws.gov/mountain%2Dprairie/endspp/name_county_search.htm

C. Further Information

1. District Engineers have authority to determine if an activity complies with the terms and conditions of an NWP.

2. NWPs do not obviate the need to obtain other federal, state, or local permits, approvals, or authorizations required by law.

3. NWPs do not grant any property rights or exclusive privileges.

4. NWPs do not authorize any injury to the property or rights of others.

5. NWPs do not authorize interference with any existing or proposed Federal project.

D. Definitions

Best management practices (BMPs): Policies, practices, procedures, or structures implemented to mitigate the adverse environmental effects on surface water quality resulting from development. BMPs are categorized as structural or non-structural.

Compensatory mitigation: The restoration, establishment (creation), enhancement, or preservation of aquatic resources for the purpose of compensating for unavoidable adverse impacts which remain after all appropriate and practicable avoidance and minimization has been achieved.

Currently serviceable: Useable as is or with some maintenance, but not so degraded as to essentially require reconstruction.

Discharge: The term "discharge" means any discharge of dredged or fill material.

Enhancement: The manipulation of the physical, chemical, or biological characteristics of an aquatic resource to heighten, intensify, or improve a specific aquatic resource function(s). Enhancement results in the gain of selected aquatic resource function(s), but may also lead to a decline in other aquatic resource function(s). Enhancement does not result in a gain in aquatic resource area.

Ephemeral stream: An ephemeral stream has flowing water only during, and for a short duration after, precipitation events in a typical year. Ephemeral stream beds are located above the water table year-round. Groundwater is not a source of water for the stream. Runoff from rainfall is the primary source of water for stream flow.

Establishment (creation): The manipulation of the physical, chemical, or biological characteristics present to develop an aquatic resource that did not previously exist at an upland site. Establishment results in a gain in aquatic resource area.

Historic Property: Any prehistoric or historic district, site (including archaeological site), building, structure, or other object included in, or eligible for inclusion in, the National Register of Historic Places maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization and that meet the National Register criteria (36 CFR part 60).

Independent utility: A test to determine what constitutes a single and complete project in the Corps regulatory program. A project is considered to have independent utility if it would be constructed absent the construction of other projects in the project area. Portions of a multi-phase project that depend upon other phases of the project do not have independent utility. Phases of a project that would be constructed even if the other phases were not built can be considered as separate single and complete projects with independent utility.

Intermittent stream: An intermittent stream has flowing water during certain times of the year, when groundwater provides water for stream flow. During dry periods, intermittent streams may not have flowing water. Runoff from rainfall is a supplemental source of water for stream flow.

Loss of waters of the United States: Waters of the United States that are permanently adversely affected by filling, flooding, excavation, or drainage because of the regulated activity. Permanent adverse effects include permanent discharges of dredged or fill material that change an aquatic area to dry land, increase the bottom elevation of a waterbody, or change the use of a waterbody. The acreage of loss of waters of the United States is a threshold measurement of the impact to jurisdictional waters for determining whether a project may qualify for an NWP; it is not a net threshold that is calculated after considering compensatory mitigation that may be used to offset losses of aquatic functions and services. The loss of stream bed includes the linear feet of stream bed that is filled or excavated. Waters of the United States temporarily filled, flooded, excavated, or drained, but restored to pre-construction contours and elevations after construction, are not included in the measurement of loss of waters of the United States. Impacts resulting from activities eligible for exemptions under Section 404(f) of the Clean Water Act are not considered when calculating the loss of waters of the United States.

Non-tidal wetland: A non-tidal wetland is a wetland that is not subject to the ebb and flow of tidal waters. The definition of a wetland can be found at 33 CFR 328.3(b). Non-tidal wetlands contiguous to tidal waters are located landward of the high tide line (i.e., spring high tide line).

Open water: For purposes of the NWPs, an open water is any area that in a year with normal patterns of precipitation has water flowing or standing above ground to the extent that an ordinary high water mark can be determined. Aquatic vegetation within the area of standing or flowing water is either non-emergent, sparse, or absent. Vegetated shallows are considered to be open waters. Examples of "open waters" include rivers, streams, lakes, and ponds.

Ordinary High Water Mark: An ordinary high water mark is a line on the shore established by the fluctuations of water and indicated by physical characteristics, or by other appropriate means that consider the characteristics of the surrounding areas (see 33 CFR 328.3(e)).

Perennial stream: A perennial stream has flowing water year-round during a typical year. The water table is located above the stream bed for most of the year. Groundwater is the primary source of water for stream flow. Runoff from rainfall is a supplemental source of water for stream flow.

Practicable: Available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall project purposes.

Pre-construction notification: A request submitted by the project proponent to the Corps for confirmation that a particular activity is authorized by nationwide permit. The request may be a permit application, letter, or similar document that includes information about the proposed work and its anticipated environmental effects. Pre-construction notification may be required by the terms and conditions of a nationwide permit, or by regional conditions. A pre-construction notification may be voluntarily submitted in cases where pre-construction notification is not required and the project proponent wants confirmation that the activity is authorized by nationwide permit.

Preservation: The removal of a threat to, or preventing the decline of, aquatic resources by an action in or near those aquatic resources. This term includes activities commonly associated with the protection and maintenance of aquatic resources through the implementation of appropriate legal and physical mechanisms. Preservation does not result in a gain of aquatic resource area or functions.

Re-establishment: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former aquatic resource. Re-establishment results in rebuilding a former aquatic resource and results in a gain in aquatic resource area.

Rehabilitation: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of repairing natural/historic functions to a degraded aquatic resource. Rehabilitation results in a gain in aquatic resource function, but does not result in a gain in aquatic resource area.

Restoration: The manipulation of the physical, chemical, or biological characteristics of a site with the goal of returning natural/historic functions to a former or degraded aquatic resource. For the purpose of tracking net gains in aquatic resource area, restoration is divided into two categories: re-establishment and rehabilitation.

Riffle and pool complex: Riffle and pool complexes are special aquatic sites under the 404(b)(1) Guidelines. Riffle and pool complexes sometimes characterize steep gradient sections of streams. Such stream sections are recognizable by their hydraulic characteristics. The rapid movement of water over a course substrate in riffles results in a rough flow, a turbulent surface, and high dissolved oxygen levels in the water. Pools are deeper areas associated with riffles. A slower stream velocity, a streaming flow, a smooth surface, and a finer substrate characterize pools.

Riparian areas: Riparian areas are lands adjacent to streams, lakes, and estuarine-marine shorelines. Riparian areas are transitional between terrestrial and aquatic ecosystems, through which surface and subsurface hydrology connects waterbodies with their adjacent uplands. Riparian areas provide a variety of ecological functions and services and help improve or maintain local water quality. (See general condition 20.)

Shellfish seeding: The placement of shellfish seed and/or suitable substrate to increase shellfish production. Shellfish seed consists of immature individual shellfish or individual shellfish attached to shells or shell fragments (i.e., spat on shell). Suitable substrate may consist of shellfish shells, shell fragments, or other appropriate materials placed into waters for shellfish habitat.

Single and complete project: The term "single and complete project" is defined at 33 CFR 330.2(i) as the total project proposed or accomplished by one owner/developer or partnership or other association of owners/developers. A single and complete project must have independent utility (see definition). For linear projects, a "single and complete project" is all crossings of a single water of the United States (i.e., a single waterbody) at a specific location. For linear projects crossing a single waterbody several times at separate and distant locations, each crossing is considered a single and complete project. However, individual channels in a braided stream or river, or individual arms of a large, irregularly shaped wetland or lake, etc., are not separate waterbodies, and crossings of such features cannot be considered separately.

Stormwater management: Stormwater management is the mechanism for controlling stormwater runoff for the purposes of reducing downstream erosion, water quality degradation, and flooding and mitigating the adverse effects of changes in land use on the aquatic environment.

Stormwater management facilities: Stormwater management facilities are those facilities, including but not limited to, stormwater retention and detention ponds and best management practices, which retain water for a period of time to control runoff and/or improve the quality (i.e., by reducing the concentration of nutrients, sediments, hazardous substances and other pollutants) of stormwater runoff.

Stream bed: The substrate of the stream channel between the ordinary high water marks. The substrate may be bedrock or inorganic particles that range in size from clay to boulders. Wetlands contiguous to the stream bed, but outside of the ordinary high water marks, are not considered part of the stream bed.

Stream channelization: The manipulation of a stream's course, condition, capacity, or location that causes more than minimal interruption of normal stream processes. A channelized stream remains a water of the United States.

Structure: An object that is arranged in a definite pattern of organization. Examples of structures include, without limitation, any pier, boat dock, boat ramp, wharf, dolphin, weir, boom, breakwater, bulkhead, revetment, riprap, jetty, artificial island, artificial reef, permanent mooring structure, power transmission line, permanently moored floating vessel, piling, aid to navigation, or any other manmade obstacle or obstruction.

Tidal wetland: A tidal wetland is a wetland (i.e., water of the United States) that is inundated by tidal waters. The definitions of a wetland and tidal waters can be found at 33 CFR 328.3(b) and 33 CFR 328.3(f), respectively. Tidal waters rise and fall in a predictable and measurable rhythm or cycle due to the gravitational pulls of the moon and sun. Tidal waters end where the rise and fall of the water surface can no longer be practically measured in a predictable rhythm due to masking by other waters, wind, or other effects. Tidal wetlands are located channelward of the high tide line, which is defined at 33 CFR 328.3(d).

Vegetated shallows: Vegetated shallows are special aquatic sites under the 404(b)(1) Guidelines. They are areas that are permanently inundated and under normal circumstances have rooted aquatic vegetation, such as seagrasses in marine and estuarine systems and a variety of vascular rooted plants in freshwater systems.

Waterbody: For purposes of the NWPs, a waterbody is a jurisdictional water of the United States that, during a year with normal patterns of precipitation, has water flowing or standing above ground to the extent that an ordinary high water mark (OHWM) or other indicators of jurisdiction can be determined, as well as any wetland area (see 33 CFR 328.3(b)). If a jurisdictional wetland is adjacent--meaning bordering, contiguous, or neighboring--to a jurisdictional waterbody displaying an OHWM or other indicators of jurisdiction, that waterbody and its adjacent wetlands are considered together as a single aquatic unit (see 33 CFR 328.4(c)(2)). Examples of "waterbodies" include streams, rivers, lakes, ponds, and wetlands.

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

July 23, 2010

Regulatory Division (SPK-2007-00309)

Mr. Jeremy Ketchum
California Department of Transportation
2800 Gateway Oaks Drive, Suite 100, MS #19
Sacramento, California 95833

Dear Mr. Ketchum:

We are responding to your June 29, 2010 request for a Department of the Army permit for the Interstate 80 (I-80) Median and Auxiliary Lane and Seismic Stability project. This approximately 521-acre project involves activities, including discharges of dredged or fill material, in waters of the United States to construct six concrete seismic stability walls within the Natomas East Main Drainage Canal (NEMDC), place Rock Slope Protection (RSP) within NEMDC, and construct additional travel and break down lanes (auxiliary lanes) along Interstate 80. The site is located on or near Steelhead Creek and NEMDC in Sections 3, 4, 11, 13, 17, 18, 21, 22, 23, 26, 27, 28, 31, and 32, Township 9 North, Range 4 East, City of Sacramento, Sacramento County, California.

Based on the information you provided, the proposed activity, in approximately 2.86 acres of Waters of the United States is authorized by Nationwide Permit Number 14. However, until Section 401 Water Quality Certification for the activity has been issued or waived, our authorization is denied without prejudice. Once you have provided us evidence of water quality certification, the activity is authorized and the work may proceed subject to the conditions of certification and the Nationwide Permit. Your work must comply with the general terms and conditions listed on the enclosed Nationwide Permit information sheets and the following special conditions:

Special Conditions

1. This permit is contingent upon the permittee applying for and being issued a Section 401 Water Quality Certification. Evidence of a water quality certification must be submitted to this office, prior to commencing work in Waters of the U.S. All terms and conditions of the Section 401 Water Quality Certification are expressly incorporated as conditions of this permit.

2. We understand the State of California, Department of Transportation (Caltrans) is the National Environmental Policy Act (NEPA) lead federal agency for this project, and as such, will ensure the authorized work complies with the National Environmental Policy Act, the Endangered Species Act, the National Historical Preservation Act and any other applicable federal laws. This authorization is contingent upon the permittee implementing all actions necessary to comply with these requirements.

3. This Corps permit does not authorize you to take an endangered species, in particular the Federally-listed Giant Garter Snake (*Thamnophis gigas*). In order to legally take a listed species, you must have separate authorization under the Endangered Species Act. The enclosed Fish and Wildlife Service Biological Opinion, as amended, 81420-2008-F-0095-R0012 dated July 28, 2010, contains mandatory terms and conditions to implement the reasonable and prudent measures that are associated with "incidental take" that is also specified in the Biological Opinion. Your authorization under this Corps permit is conditional upon your compliance with all of the mandatory terms and conditions associated with incidental take of the attached Biological Opinion, which terms and conditions are incorporated by reference in this permit. Failure to comply with the terms and conditions associated with incidental take of the Biological Opinion, where a take of the listed species occurs, would constitute an unauthorized take, and it would also constitute non-compliance with your Corps permit. The Fish and Wildlife Service is the appropriate authority to determine compliance with the terms and conditions of its Biological Opinion, and with the Endangered Species Act. You must comply with all conditions of this Biological Opinion, including those ascribed to the Corps.

4. To insure your project complies with the Federal Endangered Species Act, you must implement all of the mitigating measures identified in the enclosed National Marine Fisheries Service letter of concurrence (2007/06829 dated October 29, 2007), including those ascribed to the Corps therein. If you are unable to implement any of these measures, you must immediately notify this office and the Fish and Wildlife Service so we may consult as appropriate, prior to initiating the work, in accordance with Federal law.

5. To mitigate for the permanent loss of 0.114 acres of waters of the United States, including wetlands, you shall mitigate by debiting 0.114 acres of *Perennial Wetland* credits from Beach Lake Mitigation Bank. Evidence of this debiting shall be provided to this office in the form of an updated ledger sheet indicating the amount of the debit prior to proceeding with any activity otherwise authorized by this permit.

6. To mitigate for approximately 2.3 acres of temporary impacts to riparian buffer habitat authorized by this permit, you shall debit 1.701 acres of *Riparian Habitat* credits, as required in the attached Biological Opinion, from Gilsizer Slough South Giant Garter Snake Conservation Bank. Evidence of this purchase shall be provided to this office prior to proceeding with any activity otherwise authorized by this permit.

7. To mitigate for the loss of 0.441 acres of Waters of the U.S. (vegetated roadside ditches), you shall re-create approximately 0.441 acres of vegetated roadside ditches on-site. The impacted roadside ditches shall be replaced with vegetated biofiltration swales/strips where practicable, in accordance with Caltrans specifications. Specific detailed plans for these ditches shall be submitted to and approved by the Corps of Engineers prior to proceeding with any activity otherwise authorized by this permit.

8. Temporary fills, access roads and/or work structures shall be removed in their entirety and the affected areas returned to pre-construction elevations, contours and conditions within 30 days of activity completion. The affected areas must be revegetated with appropriate native trees, shrubs and/or seed mix, using techniques or other methods approved by Caltrans.

9. To ensure avoidance and minimization measures are successful and temporary fills have been removed, you shall take pre-construction, numbered and dated, photographs of the affected Waters of the U.S. no more than one year **prior** to construction impact. You shall take post-construction, numbered and dated, photographs of the affected Waters of the U.S. within 30 days **after** construction impact. You shall submit the photographs within 30 days after construction completion. The camera positions and view angles of pre- and post-photographs shall be identical and taken from designated locations documented on the plan drawing(s).

10. You shall design and construct all crossings of waters of the United States to retain a natural substrate and to accommodate all reasonably foreseeable wildlife passage, and expected high flows.

11. To ensure permanent impacts to Waters of the U.S. are avoided, heavy equipment operating in Waters of the U.S., especially special aquatic sites, shall be required to operate on protective mats approved by Caltrans.

12. All equipment staging, including Temporary Construction Areas (TCA's), shall take place within Caltrans approved areas within the project boundary. Prior to construction implementation, you shall ensure all equipment staging, TCA's, demolition and excavation, off pavement detours, borrow and fill areas, and upland disposal areas have been evaluated under National Environmental Policy Act, Section 401 and 404 of the Clean Water Act, Section 7 of the Endangered Species Act and Section 106 of the National Historical Preservation Act and all required permits have been obtained.

13. Prior to proceeding with any activity otherwise authorized by this permit, you shall install Environmentally Sensitive Area (ESA) fencing and employ appropriate water quality protection measures and/or Best Management Practices (BMP's), to ensure unauthorized fills and unforeseen impacts to Waters of the U.S. are avoided. All fencing surrounding avoidance areas shall allow unrestricted visibility of these areas to discourage vandalism, destruction or disturbance. An example of fencing includes high-visibility orange plastic or similar type.

14. You shall follow Caltrans specifications and standards described in the Storm Water Pollution Prevention Plan (SWPPP) and/or Water Pollution Control Plan (WPCP), to prevent erosion and sedimentation during and after construction. Construction work within Waters of the U. S. shall be performed when the flows are at their seasonal low or when they have ceased and the areas are dry, typically late summer through early fall. Between construction seasons all equipment and materials, with the exception of ESA fencing, will

be removed from Waters of the U.S. and all disturbed areas will be stabilized to prevent erosion and sedimentation.

15. You shall have a biological monitor, who is familiar with aquatic resources and buffer habitat, monitor all construction activities within Waters of the U.S., including wetlands, and within 100 feet of avoided waters. The monitor shall ensure unauthorized activities do not occur within avoided Waters of the U.S. during project implementation. The monitor shall have the authority to stop work immediately, if unauthorized activities occur.

16. You shall notify the Sacramento District, Regulatory Division Office immediately if any of the above conditions are violated or unauthorized activities occur, and shall provide a description of measures taken to remedy the violation.

17. The Permittee is responsible for all work authorized herein. To ensure that involved contractors are aware of the terms, conditions and limitations of this authorization, the permittee shall post a copy of the permit authorization and associated drawings at the project site during all phases of construction to ensure that contractors are aware of the terms and conditions of the authorization.

18. You shall notify this office of the start of the authorized work within seven (7) calendar days of initiating construction activities. Along with this notification, you shall submit a copy of the project construction/work schedule or similar report.

19. You must allow representatives from the Corps of Engineers to inspect the authorized activity and any mitigation, preservation, or avoidance areas at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit.

20. You shall notify this office of any proposed modifications to the project, including revisions to any of the work plans or documents cited in this authorization, for review and approval prior to construction work associated with the proposed modification.

21. You must sign the enclosed *Compliance Certification* form and return it to this office within 30 days after completion of the authorized work in Waters of the U.S.

This verification is valid for two years from the date of this letter or until the Nationwide Permit is modified, reissued, or revoked, whichever comes first. All of the existing NWPs are scheduled to be modified, reissued, or revoked prior to March 18, 2012. It is incumbent upon you to remain informed of changes to the NWPs. We will issue a public notice when the NWPs are reissued. Furthermore, if you commence or are under contract to commence this activity before the date that the relevant NWP is modified or revoked, you will have twelve (12) months from the date of the modification or revocation of the NWP to complete the activity under the present terms and conditions of this nationwide permit. Failure to comply with the General Conditions of this Nationwide Permit, or the project-specific Special Conditions of this authorization, may result in the suspension or revocation of your authorization.

We appreciate your feedback. At your earliest convenience, please tell us how we are doing by completing the customer survey on our website under *Customer Service Survey.*

Please refer to identification number SPK-2007-00309 in any correspondence concerning this project. If you have any questions, please contact me at the California South Branch Office, 1325 J Street, Room 1480, Sacramento, California 95814-2922, email *Leah.M.Fisher@usace.army.mil*, or telephone 916-557-6639.

For more information regarding our program, please visit our website at *www.spk.usace.army.mil/regulatory.html.*

Sincerely,

Leah M. Fisher
Project Manager, California South Branch

Enclosure(s):

1. *NWP 23, Summary Sheet*
2. *Compliance Certification Form*
3. *U.S. Fish and Wildlife Service Biological Opinion,* dated July 28, 2010
4. *National Marine Fisheries Service letter of concurrence,* dated October 29, 2007

Copy furnished without enclosure(s):

Dan Worth, Storm Water and Water Quality Certification Unit, Central Valley Regional Water Quality Control Board, 11020 Sun Center Drive #200, Rancho Cordova, California 95670-6114

U.S. Fish and Wildlife Service, Endangered Species Division, 2800 Cottage Way, Suite W2605, Sacramento, California 95825-3901

National Marine Fisheries Service, Regional Administrator, 650 Capitol Mall, Suite 8-300, Sacramento, California 95814-4706

California Department of Fish and Game, 1701 Nimbus Road, Rancho Cordova, California 95670-4504

Eva Begley, State of California, Department of Transportation, North Region 2800 Gateway Oaks Drive, Suite 100, MS #19 Sacramento, California 95833

COMPLIANCE CERTIFICATION

Permit File Number: SPK-2007-00309

Nationwide Permit Number: 14, Linear Transportation Projects

Permittee: Mr. Jeremy Ketchum
California Department of Transportation
2800 Gateway Oaks Drive, Suite 100, MS #19
Sacramento, California 95833

County: Sacramento

Date of Verification: July 23, 2010

Within 30 days after completion of the activity(s) authorized by this permit, sign this certification form and return it; along with the items identified in Special Condition #9, to the following address:

U.S. Army Corps of Engineers
Regulatory Division
1325 J Street, Room 1480
Sacramento, California 95814-2922
DLL-CESPK-RD-Compliance@usace.army.mil
FAX: (916) 557-6877

Please note that your permitted activity is subject to a compliance inspection by a U.S. Army Corps of Engineers representative. If you fail to comply with the terms and conditions of the permit your authorization may be suspended, modified, or revoked. If you have any questions about this certification, please contact the Corps of Engineers.

* * * * * * * * *

I hereby certify that the work authorized by the above-referenced permit, including all the required mitigation, was completed in accordance with the terms and conditions of the permit verification.

Signature of Permittee Date

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
81420-2008-F-0095-1

JAN 17 2008

Jeremy Ketchum
California Department of Transportation
District 3 – Environmental Management
2389 Gateway Oaks Drive, Suite 100
Sacramento, California 95833

Subject: Review of the Proposed Interstate 80 High-Occupancy Vehicle and Auxillary Lane Project in Sacramento County, California for Inclusion with the Giant Garter Snake Programmatic Consultation (1-1-03-F-0154)

Dear Mr. Ketchum:

This responds to your February 23, 2007, request for formal consultation with the U.S. Fish and Wildlife Service (Service) on the proposed Interstate 80 High-Occupancy Vehicle (HOV) and Auxiliary Lane Project (proposed project) in Sacramento County, California. The Service has reviewed the biological information submitted by your office describing the effects of the proposed project on the federally-threatened giant garter snake (*Thamnophis gigas*) (snake), and concurs that this species would be adversely affected by the proposed project. We have determined that the proposed project can be appended to the Service's *Programmatic Biological Opinion on the Effects of Small Highway Projects on the Threatened Giant Garter Snake in Butte, Colusa, Glenn Sacramento, San Joaquin, Solano, Sutter, Yolo, and Yuba Counties, California* (Programmatic Consultation). The Service has not designated critical habitat for the giant garter snake; therefore, none would be adversely modified or destroyed. This response is in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The findings and recommendations in this formal consultation are based on: (1) the January 2007 *Biological Assessment for USFWS, I-80 Median Lanes and Auxiliary Lanes Project, Sacramento County, California* (Biological Assessment); (2) the April 2007, *I-80 Across the Top Bus/Carpool Lanes Project, Draft Environmental Impact Report/Environmental Assessment* (Draft EIR/EIS)*;* (3) various e-mails, meetings, and phone conversations regarding the proposed project; and (4) other information available to the Service. A complete administrative record of this consultation is on file at the Sacramento Fish and Wildlife Office.

Consultation History

June 1, 2006: Kelly Fitzgerald and Karen Leyse of the Service and Ken Lastufka and Don Schmoldt of Caltrans conducted a visit of the proposed project site.

February 23, 2007: FHWA submitted a letter to the Service, requesting the initiation of formal consultation on the proposed project. The Service received this letter on February 26, 2007.

March 7, 2007: Caltrans submitted a copy of the January 2007, Biological Assessment to the Service.

April 16, 2007: The Service, upon review of the original January 2007 Biological Assessment for the project, sent an e-mail to Caltrans explaining concern that the area around the West Drainage Canal was not considered potential habitat for the snake. The Service believes it is potential habitat.

April 20, 2007: In response to an email request from the Service on April 16, 2007, Caltrans submitted a letter to the Service, revising the project description and proposed conservation measures. The Service received this letter on April 24, 2007.

April 23, 2007: The Service received the Draft EIR/EIS.

June 25, 2007: Email correspondence between Service, California Department of Fish and Game, and Caltrans representatives in May and June, 2007, considers the effects of the proposed project on the Natomas Basin Habitat Conservation Plan and the Plan's Federal- and State-listed species. In order to facilitate the consultation process, Caltrans requests separating the proposed project into two components: the geotechnical drilling component and the high-occupancy vehicle lane construction component. FHWA emailed the Service on June 25, 2007, requesting that the Service consult on these two project components separately.

October 5, 2007: Caltrans sends a letter to the Service regarding additional work within the Natomas East main Drainage Canal. The work involves the installation of six (6) infill walls for seismic stability between the existing columns (the infill consists of constructing walls with a 20-foot long span and a 1.5-foot wide base). The result of the additional work increases the amount of permanent GGS upland habitat loss from 0.003 acres (as reported in the Biological Assessment) to 0.007 acres.

November 21, 2007: The Service received an e-mail from Caltrans including a revised cumulative impact analysis of the project and other projects within the Natomas Basin, as requested by the Service.

November 28, 2007: The Service received an e-mail from Caltrans that explained that the construction of the auxiliary lanes can occur in one active season for the giant garter snake (May 1- October 1).

Project Description

Caltrans proposes to construct 12-foot wide auxiliary lanes in the shoulders of the eastbound and westbound directions of Interstate 80, between West El Camino Avenue and Interstate 5 and within the existing roadway between Northgate Boulevard and Norwood Avenue. Construction of these auxiliary lanes will result in the permanent disturbance of approximately 1.6 acres of land within the 200-foot wide existing right-of-way (ROW), of which 0.55 acres is within 200 feet of the West Drainage Canal. All work associated with the construction of the auxiliary lanes will be confined to one season (May 1 – October 1).

Caltrans proposes the construction of 9.8 miles of HOV lanes in the median of Interstate 80 from just east of the Sacramento River to Watt Avenue. Construction of the HOV lanes will permanently pave approximately 45 acres within the existing median.

The proposed project includes construction of eight (8) new 5-foot by 3.5-foot columns within the Natomas East Main Drainage Canal (NEMDC) to support the new HOV lanes across the bridge. This portion of the proposed project also includes joining together the two existing overcrossing structures to accommodate these new lanes. Six (6) infill walls will be constructed between 3 pairs of existing columns for seismic stability. These columns and walls will be constructed outside of Steelhead Creek, which flows through the NEMDC, and construction will occur during the dry season to minimize stormwater runoff from flowing into Steelhead Creek. This work will result in 0.007 acre of permanent disturbance, and temporarily disturb approximately 3.0 acres of giant garter snake upland habitat. All work associated with the proposed project within the NEMDC will take two seasons (May 1 – October 1) to complete.

The proposed project description includes geotechnical drilling to test substrate conditions in the NEMDC prior to construction of the columns. This portion of the project was addressed in a August 9, 2007, biological opinion from the Service (File Number 1-1-07-F-0111) and will not be addressed further in this biological opinion.

Caltrans does not propose to conduct work within aquatic giant garter snake habitat. However, there are two aquatic habitat features, the NEMDC and the West Drainage Canal, that are within 200 feet of proposed construction activities. Areas within 200 feet of suitable aquatic giant garter snake habitat are considered to be suitable upland habitat, per the Snake Programmatic Consultation. Caltrans has determined that 0.55 acres of suitable giant garter snake upland habitat within 200 feet of the West Drainage Canal will be permanently paved from the construction of auxiliary lanes, and 0.007 acre within 200 feet of the NEMDC will be permanently affected by the construction of support columns and walls.

Conservation Measures

The following is a summary of the measures outlined in section 4.2.1.4 *Avoidance and Minimization Measures* from the Biological Assessment:

1. Construction activity within 200 feet of giant garter snake aquatic habitat will be conducted between May 1 and October 1 to minimize adverse effects to this species. This is the active period for giant garter snakes and thus direct mortality is lessened because snakes are expected to actively move and avoid danger.

2. Movement of heavy equipment will be confined to existing roadways where feasible to reduce ground disturbance. Equipment for work in the NEMDC will be staged outside the Steelhead Creek channel. Equipment for work near the West Drainage Canal will be staged outside potential GGS upland habitat. Equipment staging for all other activities will occur at an existing Caltrans facility southwest of the NEMDC overcrossing.

3. Caltrans will confine construction to the minimal area necessary and will designate Environmentally Sensitive Areas for avoidance.

4. Construction personnel will receive Service-approved work awareness training on the giant garter snake. Proof of attendance by personnel will be submitted to the Service.

5. Surveys for giant garter snakes shall be conducted within 24 hours of initiation of construction activities. Surveys will be repeated if a construction lapse of greater than two weeks occurs.

6. A Service-approved biologist will monitor all ground-disturbing activities within 200 feet of the NEMDC and West Drainage Canal. If a snake is encountered, this biologist shall have the authority to stop all activities which may threaten the snake and redirect activities if needed until it is determined that the snake will not be harmed. The biologist will report all sightings of live or dead snakes within three days of their discovery to the Assistant Field Supervisor of the Endangered Species Division at the Sacramento Fish and Wildlife Office.

7. Non-entangling erosion control matting will be used in snake habitat.

8. Best management practices will be implemented to reduce siltation to receiving snake aquatic habitat.

9. Caltrans proposes to restore in accordance with the *Guidance for Restoration and/or Replacement of Giant Garter Snakes Habitat (*Guidelines; Appendix C of the Programmatic Consultation) the 3.0 acres of snake habitat that will be temporarily impacted within the NEMDC. Caltrans proposes to compensate for permanent

impacts to 0.007 acre of snake habitat within the NEMDC at a 3:1 replacement ratio for a total of 0.021 acre of upland snake habitat, by securing credits equal to 0.021 acre from the Caltrans Beach Lake Mitigation Bank pursuant to the "Agreement on Mitigation Strategy pertaining to Implementation and Operation of the Beach Lake Mitigation Bank".

10. Caltrans proposes to restore all areas in accordance with the Guidelines which may be temporarily disturbed as a result of the construction of the auxiliary lanes. In order to ensure that all areas disturbed as a result of construction activities shall have successfully established post-project appropriate vegetation quality, a qualified biologist shall document the species composition and percent cover of an appropriate representative portion of each separate location disturbed during construction, in a vegetation restoration monitoring report. The Service and the California Department of Fish and Game (DFG) may require remedial actions to restore vegetation on these sites in the event that these areas do not contain 80% cover, as documented no later than June 1 of the year following construction. The monitoring report shall be sent to the Sacramento Fish and Wildlife Office address above, and Mr. Todd Gardner of the DFG – North Central Region, at 1701 Nimbus Rd., Suite A, Rancho Cordova, CA 95670.

11. Caltrans proposed to compensate for permanent impacts to 0.55 acres of snake habitat within 200 feet of the West Drainage Canal at a 3:1 replacement ratio by funding the permanent preservation, management, and monitoring of 1.65 acres of snake habitat at a Service-approved site within the Natomas Basin. Caltrans proposes to provide the Service and the California Department of Fish and Game (CDFG) written documentation that funds have been expended to secure and record a Service-approved conservation easement for the protection of habitat in perpetuity from future development has been recorded for the 1.65-acre site. Caltrans proposes to provide the site location, an operating and management plan to manage the site for the benefit of the snake, and a funding source (such as an endowment) for the perpetual management of the site to be approved by the Service and CDFG prior to ground breaking on the proposed project.

12. In accordance with the Guidelines, Caltrans proposes to monitor all areas which are restored for at least one year, and submit monitoring report to the Service.

The biological conservation measures, as proposed above and in the project materials reviewed by the Service, are considered part of the proposed actions evaluated by the Service in this biological opinion. Any change in these plans or their implementation that might adversely affect listed species, either directly or indirectly, requires reinitiation of consultation with the Service, as set forth in the final paragraphs of this biological opinion.

Factors Affecting Giant Garter Snakes Within the Action Area

The proposed project site provides potential giant garter snake habitat in the form of aquatic habitat and associated adjacent uplands. This habitat provides (1) water during the snake's active period, (2) upland habitat for basking, cover, and retreat sites, and (3) higher elevation upland habitat for cover and refuge from flood waters. There are eighteen occurrences of giant garter snake reported in the California Natural Diversity Database within five miles of the proposed project area. All of these are in the Natomas Basin, which is defined as the area between the levees of the Sacramento River on the west, the Cross Canal on the north, the NEMDC on the east, and the American River on the south. Giant garter snakes have been documented to move up to 5 miles (8 kilometers) over a few days in response to dewatering of habitat (Wylie *et al.* 1997) and to use up to more than 8 miles (12.9 kilometers) of linear aquatic habitat over the course of a few months (Wylie and Martin 2004). Because of the presence of on-site suitable habitat, including both the West Drainage Canal and the NEMDC, and the surrounding upland habitat, and the proximity of verified recorded observations of the giant garter snake, the Service believes that this species is reasonably certain to occur within the proposed project's action area and, therefore, the proposed project is likely to adversely affect the snake through permanent and temporary loss of habitat.

The Natomas Basin Habitat Conservation Plan (NBHCP) applies to the 53,537-acre (21,666-hectare) area interior to the toes of the levees surrounding the Natomas Basin, located in the northern portion of Sacramento County and the southern portion of Sutter County. On June 27, 2003, the Service issued incidental take permits to the City of Sacramento, Sutter County, and the Natomas Basin Conservancy for activities associated with the implementation of the Final NBHCP. The NBHCP and the Metro Air Park HCP (MAPHCP) permits authorized the combined development of 17,500 acres (7,082 hectares) of land in the Natomas Basin; of this, approximately 8,512 acres (3,445 hectares) is suitable giant garter snake habitat (*e.g.*, ponds, canals, and rice fields). A key component of the MAPHCP and NBHCP's conservation strategy is the acquisition of 0.5 acre (0.2 hectare) of habitat mitigation lands for every acre of land developed.

The Natomas Basin Habitat Conservation Plan (NBHCP) specifies that the effectiveness of its Operating Conservation Program (OCP) relies on the permittees (the City of Sacramento and Sutter County) limiting development to a combined total of 15, 517 acres. Caltrans is not a permittee or plan participant under the NBHCP. The NBHCP specifies that any new development in the Natomas Basin would constitute a significant departure from the OCP and would trigger a new effects analysis, a new conservation strategy, and issuance of an incidental take permit for that additional development. The Service and the California Department of Fish and Game (DFG) requested Caltrans to provide an analysis of how this project along with other foreseeable projects in the Natomas Basin may affect the OCP of the NBHCP. Caltrans determined that the following foreseeable projects could result in loss of habitat for species covered under the NBHCP:

- Camino Norte
- Downtown Natomas Airport Light Rail
- Greenbriar
- Lower Northwest Interceptor
- Natomas Joint Vision Plan
- Pacific Gas & Electric Line 406/407 Pipeline
- Sacramento Area Flood Control Agency Natomas Levee Improvement Program Landside Improvements
- Sacramento International Airport Master Plan
- Sacramento River Water Reliability Study
- Sacramento Municipal Utility District Powerline – Elkhorn Substation

Caltrans determined that these projects could result in the loss of 8,370.50 acres of habitat in the Natomas Basin. The proposed project's effects to the giant garter snake would be cumulative with these projects, resulting in a substantial amount of habitat loss for the species. For development, evaluation and implementation of the NBHCP, the Service and DFG consider the entire basin as habitat for the snake. Approval of additional development in the Natomas Basin may: (1) result in additional direct, indirect and cumulative impacts to the NBHCP's 22 covered species; (2) biologically isolate the Natomas Basin Conservancy's conservation (mitigation) lands; (3) decrease biological connectivity between and within the Basin's three major geographic areas; (4) decrease the available acreage and locations of potential Conservancy acquisitions; and (5) adversely affect implementation of the NBHCP and its OCP.

The proposed project will permanently impact (i.e. pave) habitat in the area located within the Natomas Basin. This includes the ROW area between the edge of the Interstate 80 roadway pavement out to the ROW boundary, and between the western terminus of the project (just east of the Sacramento River) eastward to the West Drainage Canal. The Service has determined that the paving of 1.6 acres (including 0.55 acre within 200 feet of the West Drainage Canal) from the construction of the auxiliary lanes and the paving of approximately 27 acres within the median will not negatively and/or irreparably impact the NBHCP's OCS because all of this land is located within the existing maintained Interstate 80 ROW and has been mowed and otherwise disturbed for many years prior to the implementation of the NBHCP. It is unlikely that snakes use the upland habitat within the ROW for breeding, feeding, or sheltering activities. To further assure that the OCP will not be negatively impacted, and as per Appendix C of the Snake Programmatic Consultation, Caltrans has proposed to compensate for the loss of the 0.55 acre within 200 feet of the West Drainage Canal (Level 3 Effect) by purchasing 1.65 acres of snake habitat within the Natomas Basin to be permanently preserved and managed for the benefit of the snake.

Appending Proposed Project to the Programmatic Consultation

The Snake Programmatic Consultation identifies three levels of project impacts and appropriate conservation measures for each impact level. It is the Service's intent that following the Guidelines and the *Standard Avoidance and Minimization Measures During Construction*

Activities in Giant Garter Snake (Thamnophis gigas) Habitat (Avoidance Measures) will reduce habitat degradation while increasing the protected habitat areas across the species' range. The Guidelines and Avoidance Measures are included as Appendix A and C of the Snake Programmatic Consultation and are enclosed with this biological opinion. These measures include the following:

1. Avoidance of take and disturbance of habitat (Levels 1, 2, and 3);
2. Minimization of disturbance and habitat loss (Levels 1, 2, and 3);
3. Restoration of temporary habitat disturbance and associated impacts to snake habitat (Levels 1 and 2);
4. Replacement of permanent habitat loss (Levels 2 and 3); and
5. Monitoring of restored and replacement habitat (Levels 1, 2, and 3).

Caltrans will adhere to the avoidance and minimization measures described in the Guidelines and Avoidance Measures, and the terms and conditions of the Programmatic Consultation. Pursuant to the Programmatic, Caltrans will implement the following measures:

2. Restore temporary habitat disturbance (Level 1):

    a. Caltrans shall restore the 3.0 acres of snake habitat that will be temporarily impacted within the NEMDC, and all areas temporarily disturbed as a result of the construction of the auxiliary lanes.

    b. Caltrans will manage and monitor the restoration area for one year after implementing restoration. Monitoring reports will be submitted within one year of restoration.

3. Replacement of permanent habitat loss (Level 3):

    a. Caltrans proposes to compensate for permanent impacts to 0.007 acre of snake habitat within the NEMDC at a 3:1 replacement ratio for a total of 0.021 upland snake habitat, by securing credits equal to 0.021 acre from the Caltrans Beach Lake Mitigation Bank pursuant to the "Agreement on Mitigation Strategy pertaining to Implementation and Operation of the Beach Lake Mitigation Bank". Documentation of the purchase of 0.021 acre of credits shall be submitted by Caltrans to the Service prior to groundbreaking on the proposed project.

    b. Prior to ground-breaking on the proposed project, Caltrans proposes to compensate for permanent impacts to 0.55 acres of snake habitat within 200 feet of the West Drainage Canal at a 3:1 replacement ratio by funding the permanent preservation, management, and monitoring of 1.65 acres of snake habitat at a Service-approved site within the Natomas Basin. Caltrans shall provide the Service written documentation that funds have been expended to secure and record a Service-approved conservation easement for the protection of habitat in perpetuity from future development has been recorded for the 1.65-acre site. The site location, an operating and management plan to manage the site for the benefit of the snake, and a funding source (such as an endowment) for the perpetual management of the site shall be approved by the Service prior to ground breaking on the proposed project.

c. If Caltrans directly secures its own Service approved conservation easement to protect habitat within the Natomas Basin, Caltrans will manage and monitor the replacement habitat site for five years and complete a photo documentation report each year to the Service. Otherwise, the preserve manager will manage and monitor the replacement habitat site for five years and complete a photo document report each year to the Service.

This concludes the Service's review of the proposed Interstate 80 High-Occupancy Vehicle and Auxillary Lane Project outlined in your request. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

If you have any questions regarding the project, please contact Jana Milliken, the Acting Sacramento Valley Branch Chief, of my staff at (916) 414-6645.

Sincerely,

Peter A. Cross

Peter A. Cross
Deputy Assistant Field Supervisor

Enclosures

cc w/o Enclosures:
Todd Gardner, California Department of Fish and Game, Sacramento, California
Chris Collison, California Department of Transportation, Sacramento, California
Scot Mende, City of Sacramento, Sacramento, California
Larry Combs, County of Sutter, Yuba City, California
John Roberts, The Natomas Basin Conservancy, Sacramento, California

Literature Cited

Wylie, G. D., M. L. Casazza, and J. K. Daugherty. 1997. 1996 progress report for the giant garter snake study. Unpublished (preliminary) report. U.S. Geological Survey, Biological Resources Division, Dixon Field Station, Dixon, California. May 1, 1997. 6 pp. + Figures.

Wylie, G. D. and L. L. Martin. 2004. Results of 2004 monitoring for giant garter snakes *(Thamnophis gigas)* for the bank protection project on the left bank of the Colusa Basin Drainage Canal in Reclamation District 108, Sacramento River bank river protection project, phase II. Unpublished report prepared for U.S. Army Corps of Engineers, Environmental Planning Section, Sacramento, California. November 2004. 18 pp.

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
81420-2008-F-0095-R001-2

JUL 28 2010

Mr. Erik J. Schwab
California Department of Transportation
District 3 – Sacramento Area Office
2800 Gateway Oaks Drive, Suite 100
Sacramento, California 95833

Subject: Second Amendment to the Biological Opinion for the Interstate 80 High-Occupancy Vehicle and Auxillary Lane Project in Sacramento County, California

Dear Mr. Schwab:

This corrects two errors in our July 22, 2010, amendment to the January 17, 2008, biological opinion for the Interstate 80 High-Occupancy Vehicle and Auxillary Lane Project. This response is in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

The July 22, 2010, amendment is modified as follows (the modifications are in bold and underlined):

Page 2-3 –Project Description:

There are two aquatic habitat features, Steelhead Creek within the NEMDC and the West Drainage Canal, which are within 200 feet of proposed construction activities. Both Steelhead Creek and the West Drainage Canal provide suitable aquatic habitat for the snake. Areas within 200 feet of suitable aquatic giant garter snake habitat are considered to be suitable upland habitat, per the Snake Programmatic Consultation. Caltrans has determined that 0.55 acres of suitable giant garter snake upland habitat within 200 feet of the West Drainage Canal will be permanently paved from the construction of auxiliary lanes. Caltrans has determined that 0.567 acre of upland and potential aquatic (below the OHWM of **<u>the NEMDC</u>**) habitat in the NEMDC will be permanently affected by the construction of support columns, walls, and placement of RSP.

Page 3 – Conservation Measures:

9. Caltrans proposes to restore in accordance with the *Guidance for Restoration and/or Replacement of Giant Garter Snakes Habitat (*Guidelines; Appendix C of the

Programmatic Consultation) the 3.0 acres of snake habitat that will be temporarily impacted within the NEMDC. Caltrans proposes to compensate for permanent impacts to **0.567** acre of snake habitat within the NEMDC at a 3:1 replacement ratio for a total of 1.701 acre of snake habitat, by securing credits equal to 1.701 acre from the Gilsizer Slough South Giant Garter Snake Conservation Bank. Caltrans proposes to purchase these credits and provide documentation of the proof of purchase of these credits (i.e. credit sales agreements, bills of sale, and purchase receipts) to the Service prior to groundbreaking on the project.

All other contents of the January 17, 2008, biological opinion and the July 22, 2010 amendment remain the same. The project also requires a permit from the U.S. Army Corps of Engineers (Corps). The January 17, 2008, biological opinion, the July 22, 2010 amendment, and this amendment address the effects of the project on federally-listed species, and therefore, satisfies the Corps' requirement to consult with the Service pursuant to section 7(a)(2) of the Act.

REINITIATION–CLOSING STATEMENT

This concludes formal consultation on the project. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, as previously described, or the requirements under the incidental take section are not implemented; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; and/or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have questions regarding this correspondence, please contact Jana Affonso, the Sacramento Valley Branch Chief of my staff, at (916) 414-6645.

Sincerely,

Daniel Russell

FOR Kenneth D. Sanchez
Assistant Field Supervisor

cc:
Ms. Leah Fisher, U.S. Army Corps of Engineers, Sacramento, California
Mr. Patrick Moeszinger, California Department of Fish and Game, Rancho Cordova, California

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825-1846

In reply refer to:
81420-2008-F-0095-R001

22 July 2010

Mr. Erik J. Schwab
California Department of Transportation
District 3 – Sacramento Area Office
2800 Gateway Oaks Drive, Suite 100
Sacramento, California 95833

Subject: Amendment to the Biological Opinion for the Interstate 80 High-Occupancy Vehicle and Auxillary Lane Project in Sacramento County, California

Dear Mr. Schwab:

This letter is in response to the Service's July 1, 2010, receipt of your June 30, 2010, request to amend the January 17, 2008, biological opinion for the Interstate 80 High-Occupancy Vehicle and Auxillary Lane Project (project). The California Department of Transportation (Caltrans) proposes additional work on the project to include new rock slope protection (RSP) and the purchase of additional conservation bank credits to minimize the effect of the additional habitat modification. This response is in accordance with section 7(a)(2) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*) (Act).

Therefore, the January 17, 2008, biological opinion is now amended as follows:

Page 3 - Add the following to the end of the Consultation History:

July 1, 2010: The Service received the June 30, 2010, letter from Caltrans requesting reinitation of section 7 consultation for the project.

Page 3 – In the Project Description, Replace:

The proposed project includes construction of eight (8) new 5-foot by 3.5-foot columns within the Natomas East Main Drainage Canal (NEMDC) to support the new HOV lanes across the bridge. This portion of the proposed project also includes joining together the two existing overcrossing structures to accommodate these new lanes. Six (6) infill walls will be constructed between 3 pairs of existing columns for seismic stability. These columns and walls will be constructed outside of Steelhead Creek, which flows through the NEMDC, and construction will occur during the dry season to minimize stormwater runoff from flowing into Steelhead Creek. This work will result in 0.007 acre of permanent disturbance, and temporarily disturb approximately 3.0 acres of giant garter snake upland habitat. All work associated with the proposed project within the NEMDC will take two seasons (May 1 – October 1) to complete.

With:

The proposed project includes construction of eight (8) new 5-foot by 3.5-foot columns within the Natomas East Main Drainage Canal (NEMDC) to support the new HOV lanes across the bridge. This portion of the proposed project also includes joining together the two existing overcrossing structures to accommodate these new lanes. Six (6) infill walls will be constructed between 3 pairs of existing columns for seismic stability. These columns and walls will be constructed outside of Steelhead Creek, which flows through the NEMDC, and construction will occur during the dry season to minimize stormwater runoff from flowing into Steelhead Creek.

Rock slope protection (RSP) will be placed on the levee slope within the NEMDC to protect the levees from pier and bank scour. Vegetation and the top 6 inches of soil will be removed for the placement of RSP, which will be 2 feet 7 inches deep. 0.11 acre of RSP will be placed below the Ordinary High Water Mark (OHWM) in the NEMDC; 0.45 acre will be placed above the OHWM.

This work will result in 0.567 acre of permanent disturbance, and temporarily disturb approximately 3.0 acres of giant garter snake upland habitat. All work associated with the proposed project within the NEMDC will take two seasons (May 1 – October 1) to complete.

Page 3 – In the Project Description, Replace:

Caltrans does not propose to conduct work within aquatic giant garter snake habitat. However, there are two aquatic habitat features, the NEMDC and the West Drainage Canal, that are within 200 feet of proposed construction activities. Areas within 200 feet of suitable aquatic giant garter snake habitat are considered to be suitable upland habitat, per the Snake Programmatic Consultation. Caltrans has determined that 0.55 acres of suitable giant garter snake upland habitat within 200 feet of the West Drainage Canal will be permanently paved from the construction of auxiliary lanes, and 0.007 acre within 200 feet of the NEMDC will be permanently affected by the construction of support columns and walls.

With:

There are two aquatic habitat features, Steelhead Creek within the NEMDC and the West Drainage Canal, which are within 200 feet of proposed construction activities. Both Steelhead Creek and the West Drainage Canal provide suitable aquatic habitat for the snake. Areas within 200 feet of suitable aquatic giant garter snake habitat are considered to be suitable upland habitat, per the Snake Programmatic Consultation. Caltrans has determined that 0.55 acres of suitable giant garter snake upland habitat within 200 feet of the West Drainage Canal will be permanently paved from the construction of auxiliary lanes. Caltrans has determined that 0.567 acre of upland

and potential aquatic (below the OHWM of Steelhead Creek) habitat in the NEMDC will be permanently affected by the construction of support columns, walls, and placement of RSP.

Page 4 thru 5 – In the Conservation Measures, Replace:

9. Caltrans proposes to restore in accordance with the *Guidance for Restoration and/or Replacement of Giant Garter Snakes Habitat* (Guidelines; Appendix C of the Programmatic Consultation) the 3.0 acres of snake habitat that will be temporarily impacted within the NEMDC. Caltrans proposes to compensate for permanent impacts to 0.007 acre of snake habitat within the NEMDC at a 3:1 replacement ratio for a total of 0.021 acre of upland snake habitat, by securing credits equal to 0.021 acre from the Caltrans Beach Lake Mitigation Bank pursuant to the "Agreement on Mitigation Strategy pertaining to Implementation and Operation of the Beach Lake Mitigation Bank".

With:

9. Caltrans proposes to restore in accordance with the *Guidance for Restoration and/or Replacement of Giant Garter Snakes Habitat* (Guidelines; Appendix C of the Programmatic Consultation) the 3.0 acres of snake habitat that will be temporarily impacted within the NEMDC. Caltrans proposes to compensate for permanent impacts to 1.701 acre of snake habitat within the NEMDC at a 3:1 replacement ratio for a total of 1.701 acre of snake habitat, by securing credits equal to 1.701 acre from the Gilsizer Slough South Giant Garter Snake Conservation Bank. Caltrans proposes to purchase these credits and provide documentation of the proof of purchase of these credits (i.e. credit sales agreements, bills of sale, and purchase receipts) to the Service prior to groundbreaking on the project.

All other contents of the January 17, 2008, biological opinion remain the same. The project also requires a permit from the U.S. Army Corps of Engineers (Corps). The January 17, 2008, biological opinion and this amendment addresses the effects of the project on federally-listed species, and therefore, satisfies the Corps' requirement to consult with the Service pursuant to section 7(a)(2) of the Act.

REINITIATION–CLOSING STATEMENT

This concludes formal consultation on the project. As provided in 50 CFR §402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded, as previously described, or the requirements under the incidental take section are not implemented; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat that was not considered in this opinion; and/or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending re-initiation.

If you have questions regarding this correspondence, please contact Jana Affonso, the Sacramento Valley Branch Chief of my staff, at (916) 414-6645.

Sincerely,

for Susan K. Moore
Field Supervisor

cc:
Ms. Leah Fisher, U.S. Army Corps of Engineers, Sacramento, California
Mr. Patrick Moeszinger, California Department of Fish and Game, Rancho Cordova, California

STATE OF CALIFORNIA
THE RESOURCES AGENCY
THE CENTRAL VALLEY FLOOD PROTECTION BOARD

PERMIT NO. 18614 BD

This Permit is issued to:

California Department of Transportation
703 B Street
Attention: Winder Bajwa
Marysville, California 95901

To widen the median of the existing bridge by 42-feet and add 7 pairs of 3-foot-diameter piers along the same alignment as the existing piers, construct 12' x 12' x 3' footings, 9' deep H piles, 2 abutments, 1.5-foot thick in-fill walls between piers across the channel, and place rock slope protection (RSP) along the slopes of the Natomas East Main Drainage Canal project levees. The project is located in North Sacramento at I-80. (Section 18, T9N, R5E, MDB&M, Reclamation District 1000 and American River FCD, Natomas East Main Drainage Canal, Sacramento County).

NOTE: Special Conditions have been incorporated herein which may place limitations on and/or require modification of your proposed project as described above.

(SEAL)

Dated: 7/27/10

LJ Marino for Jay Punia
Executive Officer

GENERAL CONDITIONS:

ONE: This permit is issued under the provisions of Sections 8700 – 8723 of the Water Code.

TWO: Only work described in the subject application is authorized hereby.

THREE: This permit does not grant a right to use or construct works on land owned by the Sacramento and San Joaquin Drainage District or on any other land.

FOUR: The approved work shall be accomplished under the direction and supervision of the State Department of Water Resources, and the permittee shall conform to all requirements of the Department and The Central Valley Flood Protection Board.

FIVE: Unless the work herein contemplated shall have been commenced within one year after issuance of this permit, the Board reserves the right to change any conditions in this permit as may be consistent with current flood control standards and policies of The Central Valley Flood Protection Board.

SIX: This permit shall remain in effect until revoked. In the event any conditions in this permit are not complied with, it may be revoked on 15 days' notice.

SEVEN: It is understood and agreed to by the permittee that the start of any work under this permit shall constitute an acceptance of the conditions in this permit and an agreement to perform work in accordance therewith.

EIGHT: This permit does not establish any precedent with respect to any other application received by The Central Valley Flood Protection Board.

NINE: The permittee shall, when required by law, secure the written order or consent from all other public agencies having jurisdiction.

TEN: The permittee is responsible for all personal liability and property damage which may arise out of failure on the permittee's part to perform the obligations under this permit. If any claim of liability is made against the State of California, or any departments thereof, the United States of America, a local district or other maintaining agencies and the officers, agents or employees thereof, the permittee shall defend and shall hold each of them harmless from each claim.

ELEVEN: The permittee shall exercise reasonable care to operate and maintain any work authorized herein to preclude injury to or damage to any works necessary to any plan of flood control adopted by the Board or the Legislature, or interfere with the successful execution, functioning or operation of any plan of flood control adopted by the Board or the Legislature.

TWELVE: Should any of the work not conform to the conditions of this permit, the permittee, upon order of The Central Valley Flood Protection Board, shall in the manner prescribed by the Board be responsible for the cost and expense to remove, alter, relocate, or reconstruct all or any part of the work herein approved.

SPECIAL CONDITIONS FOR PERMIT NO. 18614 BD

THIRTEEN: All work approved by this permit shall be in accordance with the submitted drawings and specifications except as modified by special permit conditions herein. No further work, other than that approved by this permit, shall be done in the area without prior approval of the Central Valley Flood Protection Board.

FOURTEEN: There shall be no plantings within the project area under this permit, except that of native grasses, which may be required for slope protection.

FIFTEEN: The permittee is responsible for all liability associated with construction, operation, and maintenance of the permitted facilities and shall defend and hold the Central Valley Flood Protection Board and the State of California; including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages arising from the project undertaken pursuant to this permit, all to the extent allowed by law. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SIXTEEN: The permittee shall defend, indemnify, and hold the Central Valley Flood Protection Board and the State of California, including its agencies, departments, boards, commissions, and their respective officers, agents, employees, successors and assigns (collectively, the "State"), safe and harmless, of and from all claims and damages related to the Central Valley Flood Protection Board's approval of this permit, including but not limited to claims related to the California Environmental Quality Act. The State expressly reserves the right to supplement or take over its defense, in its sole discretion.

SEVENTEEN: The Central Valley Flood Protection Board, Department of Water Resources, Reclamation District No. 1000, and the American River Flood Control District shall not be held liable for damages to the permitted encroachment(s) resulting from releases of water from reservoirs, flood fight, operation, maintenance, inspection, or emergency repair.

EIGHTEEN: No construction work of any kind shall be done during the flood season from November 1 to April 15 without prior approval of the Central Valley Flood Protection Board.

NINETEEN: Prior to start of any demolition and/or construction activities within the floodway, the applicant shall provide the Central Valley Flood Protection Board with two sets of layout plans for any and all temporary, in channel cofferdam(s), gravel work pad(s), work trestle(s), scaffolding, piles and/or other appurtenances that are to remain in the floodway during the flood season from November 1 through April 15.

TWENTY: Debris that may accumulate on the permitted encroachment(s) and/or any temporary falsework within the floodway shall be cleared off and disposed of outside the floodway after each period of high water.

TWENTY-ONE: The permittee shall contact the Department of Water Resources by telephone, (916) 574-0609, and submit the enclosed postcard to schedule a preconstruction conference. Failure to do so at least 10 working days prior to start of work may result in delay of the project.

TWENTY-TWO: Temporary staging, formwork, stockpiled material, equipment, and temporary buildings shall not remain in the floodway during the flood season from November 1 to April 15.

TWENTY-THREE: Cleared trees and brush shall be completely burned or removed from the floodway, and downed trees or brush shall not remain in the floodway during the flood season from November 1 to April 15.

TWENTY-FOUR: Fill material shall be placed only within the area indicated on the approved plans.

TWENTY-FIVE: Backfill material for excavations shall be placed in 4- to 6-inch layers and compacted to at least the density of the adjacent, firm, undisturbed material.

TWENTY-SIX: Density tests by a certified materials laboratory will be required to verify compaction of backfill within the floodway.

TWENTY-SEVEN: The soffit of the bridge shall provide a minimum freeboard of 3-feet above the design flood elevation.

TWENTY-EIGHT: Revetment shall be uniformly placed and properly transitioned into the bank, levee slope, or adjacent revetment and in a manner which avoids segregation.

TWENTY-NINE: Revetment shall be quarry stone and at least meet the following grading:

Quarry Stone

Stone Size Percent Passing

15 inches;	100
8 inches;	80-95
6 inches;	45-80
4 inches;	15-45
2 inches;	0-15

THIRTY: The revetment shall not contain any reinforcing steel, floatable, or objectionable material. Asphalt or other petroleum-based products may not be used as fill or erosion protection on the levee section or within the floodway.

THIRTY-ONE: The recommended minimum thickness of revetment, measured perpendicular to the bank or levee slope, is 18 inches below the usual water surface and 12 inches above the usual water surface.

THIRTY-TWO: All debris generated by this project shall be disposed of outside the floodway.

THIRTY-THREE: The work area shall be restored to the condition that existed prior to start of work.

THIRTY-FOUR: The permittee shall submit as-built drawings to the Department of Water Resources' Flood Project Inspection Section upon completion of the project.

THIRTY-FIVE: If the project result(s) in an adverse hydraulic impact, the permittee shall provide appropriate mitigation measures, to be approved by the Central Valley Flood Protection Board, prior to implementation of mitigation measures.

THIRTY-SIX: In the event that levee or bank erosion injurious to the adopted plan of flood control occurs at or adjacent to the permitted encroachment(s), the permittee shall repair the eroded area and propose measures, to be approved by the Central Valley Flood Protection Board, to prevent further erosion.

THIRTY-SEVEN: The permittee shall maintain the permitted encroachment(s) and the project works within the utilized area in the manner required and as requested by the authorized representative of the Department of Water Resources or any other agency responsible for maintenance.

THIRTY-EIGHT: The permitted encroachment(s) shall not interfere with operation and maintenance of the flood control project. If the permitted encroachment(s) are determined by any agency responsible for operation or maintenance of the flood control project to interfere, the permittee shall be required, at permittee's cost and expense, to modify or remove the permitted encroachment(s) under direction of the Central Valley Flood Protection Board or Department of Water Resources. If the permittee does not comply, the Central Valley Flood Protection Board may modify or remove the encroachment(s) at the permittee's expense.

THIRTY-NINE: The permittee may be required, at permittee's cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted encroachment(s) if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if damaged by any cause. If the permittee does not comply, the Central

Valley Flood Protection Board may remove the encroachment(s) at the permittee's expense.

FORTY: If the project, or any portion thereof, is to be abandoned in the future, the permittee or successor shall abandon the project under direction of the Central Valley Flood Protection Board and Department of Water Resources, at the permittee's or successor's cost and expense.

FORTY-ONE: The permittee shall comply with all conditions set forth in the letter from the U.S. Army Corps of Engineers when it is received, which shall be attached to this permit as Exhibit A and is incorporated by reference.

FORTY-TWO: The permittee shall comply with all conditions set forth in the letter from Reclamation District 1000 dated June 28, 2010, which is attached to this permit as Exhibit B and is incorporated by reference.

FORTY-THREE: The permittee shall comply with all conditions set forth in the letter from the American River Flood Control District dated June 11, 2010, which is attached to this permit as Exhibit C and is incorporated by reference.

EXHIBIT A

DEPARTMENT OF THE ARMY
U.S. Army Engineer District, Sacramento
Corps of Engineers
1325 J Street
Sacramento, California 95814-2922

REPLY TO
ATTENTION OF

Flood Protection and Navigation Section (18614)

Mr. Jay Punia, Executive Officer
Central Valley Flood Protection Board
3310 El Camino Avenue, Room 151
Sacramento, California 95821

JUL 22 2010

Dear Mr. Punia:

We have reviewed a permit application by the California Department of Transportation (application number 18614). This project includes widening the median over the Natomas East Main Drainage Canal. The existing Interstate 80 bridge will be widened by 42 feet towards the center by installing 7 pairs of 3 foot diameter piers along the same alignment as the existing piers, constructing 12 foot by 12 foot by 3 foot footings, installing H piles 9 feet deep, installing 2 abutments, installing 1.5 foot thick infill walls between the existing piers (along the flow), and placing rock bank protection on the waterside slopes of the Natomas East Main Drainage Canal. This project is located in North Sacramento at 38.6413°N 121.4726°W NAD83, Sacramento County, California.

The District Engineer has no objection to approval of this application by your Board from a flood control standpoint, subject to the following conditions:

a. That during the flood season, November 1 to April 15, no work shall be performed in the levee sections and no equipment or falsework shall remain in the floodway.

b. That the piles shall be installed using predrilled holes in the levee embankment.

c. That the voids remaining after the piles have been installed shall be grouted with cement bentonite.

d. That in the event trees and brush are cleared, they shall be properly disposed of either by complete burning or complete removal outside the limits of the project right-of-way.

e. That all cleared vegetation shall be properly grubbed. All roots greater than 1/2 inch in diameter shall be completely removed and the levee embankment returned to existing lines and grade.

f. That drainage from the proposed bridge widening shall not direct water toward the levees without ensuring adequate erosion protection.

g. That in the event erosion occurs at the site, the applicant shall repair the eroded areas and place adequate bank protection on the natural bank.

h. That the proposed (pile bents/piers) for the bridge shall be parallel to the direction of flow.

i. That the proposed bank protection shall be placed uniformly and properly transitioned into the natural bank.

j. That the proposed riprap shall be placed on a layer of bedding sand.

k. That the levee shall be monitored for any deformation during construction. Any movement shall be reported to the local maintaining agency, the Central Valley Flood Protection Board and this office and repaired at the applicant's expense to the satisfaction of the Corps.

l. That the proposed work shall not interfere with the integrity or hydraulic capacity of the flood damage reduction project; easement access; or maintenance, inspection, and flood fighting procedures.

m. That access shall be established to allow for continuous patrolling of the levee during periods of high water and the crest of the levee shall remain free of obstructions to truck or inspection traffic for floodfighting or maintenance.

The Board should consider requiring the applicant to modify the bridge if changes are required to increase the level of flood protection in this area.

A Section 404 permit (SPK-2007-00309) has been issued for this work.

A copy of this letter is being furnished to the acting chief of Flood Project Integrity and Inspection Branch, 3310 El Camino Avenue, Suite LL30, Sacramento, California 95821.

Sincerely,

Michael D. Mahoney

Michael D. Mahoney, P.E.
Chief, Construction-Operations Division

EXHIBIT B

RD1000

RECLAMATION
DISTRICT 1000

RECEIVED

June 28, 2010

Dan Fua
Central Valley Flood Protection Board
3310 W. El Camino Avenue
Sacramento, CA

Subject: Encroachment Permit--Caltrans I-80 HOV Lanes Crossing Natomas East Main Drain Canal

Dear Mr. Fua:

Attached is the endorsement by Reclamation District No. 1000 for the Caltrans encroachment permit to construct new HOV lanes on I-80 across the Natomas East Main Drain Canal (NEMDC) and to connect the piers within the floodway as part of a seismic retrofit. Our District has been coordinating with representatives from the Caltrans, Americn River Flood Control District, Central Valley Flood Protection Board and Corps of Engineers on the specific design details and hydraulic analysis.

Attached to the permit are conditions proposed by our District. If you have any questions please contact me at 916-922-1449 or via email at pdevereux@rd1000.org. Thank you for working with our District on this complex permit so we all were satisfied with the resulting design. I think we can use this as a template on how to deal with other similar complex encroachment permit applications.

Sincerely,

Paul T. Devereux
General Manager/District Engineer

cc Marla Miles (Caltrans)

RD1000

RECLAMATION
DISTRICT 1000

Permit Conditions

Permit Application No. Unnumbered
Location: Natomas East Main Drain Canal west levee
Applicant: Caltrans
Description: HOV Lanes I-80 and seismic pier retrofit

CONDITIONS:

1. Maintenance of all encroaching structures, facilities, vegetation or any other items or matters approved under this permit shall remain the responsibility of the Permittee.

2. Permittee may be required, at the Permittee's sole cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted work if such removal, alteration, relocation or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if the encroaching facilities interferes with the District's ability to operate and maintain its flood control facilities or if the encroaching facilities are damaged by any cause.

3. Permittee shall obtain all necessary permits and regulatory approvals for the proposed work

4. Permittee shall notify the District one week in advance of the start of construction.

5. All work within the channel and/or on the levee must be done between April 15 and November 1 unless otherwise approved by the District and the Flood Protection Board.

6. Permittee may not use the levee crown for staging construction or storing materials without specific approval by the District. If approved by the District, the levee crown shall be fully restored to its pre-project condition to the satisfaction of the District. In addition, if adverse weather conditions are forecast or other emergency condition arises, the Permittee shall immediately remove any equipment or materials stored on the levee and restore the levee surface for all-weather access to the satisfaction of the District.

7. Permittee shall remain responsible for any damages to the flood control system caused by the permitted encroachment including, but not limited to, erosion on the waterside levee slope. Any such damage shall be repaired prior to the next flood season to the satisfaction of the District.

8. Rock slope protection (RSP) shall be constructed per the revised drawing dated May 25, 2010.

9. Caltrans shall remain responsible for maintaining the integrity of the rock slope protection (RSP) placed on the levee slope during this project. Annual inspections (unless otherwise agreed) shall be made by Caltrans, RD 1000 and CVFPB representatives prior to each flood season. Repairs to the RSP shall be made to the satisfaction of RD 1000 and CVFPB.

10. Surface drainage from the bridge decks shall be collected and discharged in a manner which does not adversely affect the levee system or its operation and maintenance by the District. Specifically, no vertical discharge of the drainage will be allowed on or adjacent to the levee.

11. The District reserves the right to request modifications to the project during construction as field conditions warrant.

AMERICAN RIVER FLOOD CONTROL DISTRICT

Permit Conditions

Permit Application No.: (to be designated by the Central Valley Flood Protection Board)

Location: Steelhead Creek East Levee at Interstate-80 crossing

Applicant: California Department of Transportation (CalTrans)

Description: Widen the existing I-80 Bridge Crossing of the Natomas East Main Drainage Canal (Steelhead Creek) by adding a center span of bridge deck. The work will consist of adding 782-feet of new bridge deck and 7 new 2 column bents in the floodway.

CONDITIONS:

1. Maintenance of all encroaching facilities under this permit shall remain the responsibility of permittee.

2. Permittee shall obtain all necessary permits and regulatory approvals for the proposed work.

3. Permittee may be required, at permittee's sole cost and expense, to remove, alter, relocate, or reconstruct all or any part of the permitted work if removal, alteration, relocation, or reconstruction is necessary as part of or in conjunction with any present or future flood control plan or project or if encroaching facilities are damaged by any cause.

4. Work shall be done outside of the flood season of November 1 to April 15 unless otherwise approved by the District and Central Valley Flood Protection Board.

5. Permittee shall notify the District one week in advance of the start of construction.

6. Permittee shall allow access of ARFCD levee maintenance personnel and equipment during the construction period.

7. That temporary staging, material stockpiles, and equipment shall not be placed or allowed to remain in the floodway during the flood season from November 1 to April 15.

voice 916-929-4006 fax 916-929-4160

165 Commerce Circle, Suite D,
Sacramento, California 95815

8. Roadway drainage shall not be directed to flow water on the levee section without adequate protection from erosion.

9. The District reserves the right to review all final plans and specifications and request modifications to the project during construction as field conditions warrant.

10. Permittee may not use the levee crown for staging construction or storing materials without specific approval by the District. If approved by the District, the levee crown shall be fully restored to its pre-project condition to the satisfaction of the District. In addition, if adverse weather conditions are forecast or other emergency condition arises, the Permittee shall immediately remove any equipment or materials stored on the levee and restore the levee surface for all-weather access to the satisfaction of the District.

11. In the event that erosion occurs at the project site, the applicant shall repair the eroded areas and place adequate Best Management Practice features on the levee sections to prevent further erosion.

12. Levee sections, overflow areas, and channel shall be restored to at least the same condition that existed prior to construction.

AERIALLY DEPOSITED LEAD SITE INVESTIGATION REPORT

Interstate 80 Post Mile 0.3 to 10.4
Sacramento County, California

PREPARED FOR:

CALIFORNIA DEPARTMENT OF TRANSPORTATION – DISTRICT 3
ENVIRONMENTAL ENGINEERING OFFICE
703 B STREET, P.O. BOX 911
MARYSVILLE, CALIFORNIA 95901

Caltrans

PREPARED BY:

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DRIVE, SUITE 800
RANCHO CORDOVA, CALIFORNIA 95742

GEOCON

GEOCON PROJECT NO. S9300-06-135
TASK ORDER NO. 135, EAs 03-379701 & 03-0A9311

JULY 2010

Project No. S9300-06-135
July 26, 2010

Mr. Rajive Chadha
California Department of Transportation – District 3
Environmental Engineering Office
P.O. Box 911
Marysville, California 95901

Subject: INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA
CONTRACT NO. 03A1368, TASK ORDER NO. 135, EAs 03-379701 AND 03-0A9311
AERIALLY DEPOSITED LEAD SITE INVESTIGATION REPORT

Dear Mr. Chadha:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order Number 135, and Expense Authorizations 03-379701 and 03-0A9311, Geocon Consultants, Inc. has performed environmental engineering services for the subject project. The Site consists of Caltrans right-of-way along Interstate 80 from Post Mile 0.3 to 10.4 in Sacramento County, California. The accompanying report summarizes the services performed, including the advancement of 120 direct-push and 52 hand-auger borings for shallow soil sampling and laboratory testing.

The contents of this report reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Please contact us if there are any questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Gemma G. Reblando
Project Geologist

John E. Juhrend, PE, CEG
Project Manager

REGISTERED PROFESSIONAL ENGINEER
JOHN JUHREND
No. 46681
Exp. 06/30/11
CIVIL
STATE OF CALIFORNIA

GGR:JEJ:krh

(3 + 5 CDs) Addressee

TABLE OF CONTENTS

APPENDICES

AERIALLY DEPOSITED LEAD
SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This Aerially Deposited Lead (ADL) Site Investigation Report for the Interstate 80 (I-80) Post Mile (PM) 0.3 to 10.4 project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order (TO) Number 135, and Expense Authorizations (EAs) 03-379701 and 03-0A9311.

1.1 Project Description and Proposed Improvements

The project area consists of Caltrans right-of-way shoulder and proposed soundwall areas along the eastbound (EB) and westbound (WB) side of I-80 from PM 0.3 to 10.4 (the Site) in Sacramento County, California. Caltrans proposes roadway widening improvements which will include shallow soil excavation. The approximate project location is depicted on the Vicinity Map, Figure 1, and Site Plans, Figures 2-1 through 2-36.

1.2 General Objectives

The purpose of the scope of services outlined in TO No. 135 was to evaluate whether impacts due to ADL from motor vehicle exhaust exist in the surface and near surface soils within the project boundaries. The investigative results will be used by Caltrans to inform the construction contractor(s) if lead-impacted soil is present within the project boundaries for construction worker health and safety, soil reuse evaluation and waste management/disposal purposes.

2.0 BACKGROUND

2.1 Potential Lead Soil Impacts

Ongoing testing by Caltrans throughout California has indicated that ADL exists along major freeway routes due to emissions from vehicles powered by leaded gasoline.

2.2 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as "California hazardous" for handling and disposal purposes are contained in the California Code of Regulations (CCR), Title 22, Division 4.5, Chapter 11, Article 3, § 66261.24. Criteria to classify a waste as "Resource, Conservation, and Recovery Act (RCRA) hazardous" are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard

Waste Extraction Test (WET). A waste may have the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value, since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP). The TTLC value for lead is 1,000 milligrams per kilogram (mg/kg). The STLC and TCLP values for lead are both 5.0 milligrams per liter (mg/l).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or corrosivity. Waste that is classified as either California-hazardous or RCRA-hazardous requires management as a hazardous waste.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. Soil that contains lead above hazardous waste thresholds and is left in-place would not be necessarily classified by DTSC as a "waste." The DTSC has provided site-specific determinations that "movement of wastes within an area of contamination does not constitute "land disposal" and, thus, does not trigger hazardous waste disposal requirements." Therefore, lead-impacted soil that is scarified in-place, moisture-conditioned, and recompacted during roadway improvement activities might not be considered a "waste." DTSC should be consulted to confirm waste classification. It is noted that in addition to DTSC regulations, health and safety requirements and other local agency requirements may also apply to the handling and disposal of lead-impacted soil.

2.3 DTSC Variance

The DTSC issued a statewide Variance effective July 1, 2009, regarding the reuse of ADL-impacted soils within Caltrans right-of-way. Under the Variance, soil that is classified as a non-RCRA hazardous waste, based primarily on ADL content, may be suitable for reuse within Caltrans right-of-way. ADL soil that is classified as a RCRA hazardous waste is not eligible for reuse under the Variance and must be disposed of as a RCRA hazardous waste (Caltrans Type Z3).

ADL soil reused under the Variance must always be at least 5.0 feet above the highest groundwater elevation and, depending on lead concentrations, must be covered with at least one foot of non-hazardous soil or a pavement structure. The ADL soil may not be placed in areas where it might contact groundwater or surface water (such as streams and rivers), and must be buried in locations that are protected from erosion that may result from storm water run-on and run-off.

Review of the statewide Variance indicates the following conditions regarding the reuse and management of ADL-impacted soil as fill material for construction and maintenance operations. If ADL soil meets the Variance criteria but is not intended to be reused within Caltrans right-of-way, then the excavated soil must be disposed of as a California hazardous waste (Caltrans Type Z2). A copy of the DTSC Variance is presented in Appendix A.

Caltrans Type Y1

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a soluble lead concentration (based on a modified WET using deionized water as the extractant [DI-WET]) less than or equal to 1.5 mg/l, and a pH value greater than or equal to 5.5 may be reused within the same Caltrans corridor and must be covered with at least one foot of non-hazardous soil.

Caltrans Type Y2

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a DI-WET soluble lead concentration less than or equal to 1.5 mg/l, and a pH value greater than 5 and less than 5.5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

ADL soil exhibiting a total lead concentration less than or equal to 1,411 mg/kg, a DI-WET soluble lead concentration greater than 1.5 mg/l and less than or equal to 150 mg/l, and a pH value greater than 5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

ADL soil exhibiting a total lead concentration greater than 1,411 mg/kg and less than or equal to 3,397 mg/kg, a DI-WET (using deionized water as the extractant) soluble lead concentration less than or equal to 150 mg/l, and a pH value greater than 5 may be reused within the same Caltrans corridor and must be covered and protected from infiltration by a pavement structure.

Caltrans Type Z2

ADL soil exhibiting a total lead concentration greater than 3,397 mg/kg, a DI-WET soluble lead concentration greater than 150 mg/l, or a pH value less than or equal to 5 is not eligible for reuse under the Variance and must be disposed of as a California hazardous waste.

Caltrans Type Z3

ADL soil exhibiting a TCLP soluble lead concentration greater than or equal to 5.0 mg/l is not eligible for reuse under the Variance and must be disposed of as a RCRA hazardous waste.

2.4 Previous Lead Investigation

We conducted an ADL survey along the median of I-80 (Caltrans Contract 03A0937, TO No. 8, EA 03-379700) on July 11 through 13, 2007. Borings B11 through B69 and B72 through B130 were advanced in the median. Soil samples were collected from depth intervals of 0.0 to 1.0 foot, 1.0 to 2.0 feet and 2.0 to 3.0 feet. Per Caltrans' request, discrete samples collected from depth intervals 0.0 to 1.0 foot, 1.0 to 2.0 feet and 2.0 to 3.0 feet from borings located in the same general area were composited by the analytical laboratory and analyzed for total lead. Total lead was detected in the composite soil samples collected from the I-80 median at concentrations ranging from 1.87 to 93.8 mg/kg. The results of the ADL survey are presented in the *Aerially Deposited Lead, Heavy Metals, Petroleum Hydrocarbons and Bridge Site Investigation Report, Interstate 80, Post Mile 0.3 to 10.4* (Geocon, March 2008). The soil data from the previous ADL investigation are presented in Appendix B.

3.0 SCOPE OF SERVICES

We performed the following scope of services as requested by Caltrans in TO No. 135:

3.1 Pre-field Activities

- Conducted a pre-work site visit on June 28, 2010, to discuss the TO scope of services. Caltrans TO Manager Rajive Chadha and Geocon representative Mike O'Brien attended the meeting. The purpose of the pre-work site visit was to identify and observe the project boundaries and conditions. The project limits were further outlined in white paint for subsequent utility clearance.
- Utilized the *Health and Safety Plan* from a previous task order (TO No. 128, Caltrans Contract 03A1368) dated April 6, 2010, to provide guidelines on the use of personal protective equipment during the field activities.
- Provided 48-hour notification to Underground Service Alert prior to job site mobilization.
- Retained the services of Advanced Technology Laboratories (ATL) to perform the chemical analysis of soil samples.

3.2 Field Activities

The field activities consisted of collecting soil samples along the EB and WB shoulder, onramp and proposed sound wall areas of I-80. Between July 6 and 12, 2010, 694 soil samples were collected from 120 direct-push and 52 hand-auger borings at the Caltrans designated soil sampling locations.

4.0 INVESTIGATIVE METHODS

4.1 Boring Location Rationale

The soil borings were located in planned excavation areas designated by Caltrans as described below. The approximate soil boring locations are depicted on Figures 2-1 through 2-36.

- Borings EB1 through EB29, EB49 through EB54, HAEB55, and EB56 through EB74 were advanced along the shoulder of EB I-80.
- Borings WB30 through WB48, WB75 through WB94, HAWB95, and WB96 through WB114 were advanced along the shoulder of WB I-80.
- Borings WBM125, WBM126, WBM137 through WBM144, and EBM127 through EBM136 were advanced within the Sacramento Regional Transit Light Rail property between EB and WB I-80.
- Borings LV115 through LV122, HALV123 and HALV124 were advanced along the EB I-80 onramp at Longview Drive.
- Borings 2SW155 through 2SW160 were advanced along the proposed sound wall #2 between Stations 585+00 and 595+00 on EB I-80.
- Borings 3SW161 through 3SW172 were advanced along the proposed sound wall #3 between Stations 596+00 and 622+00 on EB I-80.
- Borings 4SW145 through 4SW154 were advanced along the proposed sound wall #4 between Stations 602+00 and 621+00 on WB I-80.

The coordinates of each boring location were determined using a differential global positioning system (GPS) with the exception of borings 2SW157 and 3SW165. The coordinates of these borings could not be obtained due to failed satellite connection. The GPS was utilized during the field activities to locate the horizontal position of each location with an error of no more than 3.3 feet. The latitude and longitude of the boring locations are summarized on Table 1.

4.2 Soil Sampling Procedures

A total of 694 soil samples were collected from 120 direct-push and 52 hand-auger borings advanced at the Site. The soil borings advanced along the shoulders and at the Longview Drive onramp were advanced to an approximate depth of 2.0 feet. The soil samples were collected at general depth intervals of 0.0 to 0.5 foot, 0.5 to 1.0 foot, 1.0 to 1.5 feet and 1.5 to 2.0 feet. Selected soil borings advanced at the Longview Drive onramp were advanced to an approximate depth of 5.0 feet. The soil samples were collected at general depth intervals of 0.0 to 1.0 foot, 1.0 to 2.0 feet, 2.0 to 3.0 feet, 3.0 to 4.0 feet and 4.0 to 5.0 feet. The soil borings advanced in the proposed sound wall areas were advanced to an approximate sampling depth of 3.0 feet. The soil samples were collected at general depth intervals of 0.0 to 0.5 foot, 0.5 to 1.0 foot, 1.0 to 2.0 feet and 2.0 to 3.0 feet.

Soil samples were collected in cellulose thermoplastic (acetate) liners driven by the direct-push rig. The acetate liners were cut open and the sample from a particular interval was transferred to a Ziploc® re-sealable plastic bag. Soil samples collected using a hand-auger were transferred directly from the hand-auger to a Ziploc® re-sealable plastic bag. The soil samples were field homogenized within the sample bags and subsequently labeled, placed in an ice chest, and delivered to ATL for analytical testing under chain-of-custody (COC) documentation.

Quality assurance/quality control (QA/QC) procedures were performed during the field exploration activities. These procedures included decontamination of sampling equipment before each boring was advanced and providing COC documentation for each sample submitted to the laboratory. The soil sampling equipment was cleansed between each boring by washing the equipment with an Alconox™ solution followed by a double rinse with deionized water. The field sampling activities were performed under the supervision of Geocon's field manager.

The borings were backfilled with the excess soil cuttings. The decontamination water was discharged to the ground surface away from surface water bodies or storm drain inlets.

4.3 Traffic Control

Caltrans provided traffic control, including the use of an attenuator truck, based on the proximity of the work zone to the active traffic lanes.

4.4 Laboratory Analyses

The soil samples collected within the project boundaries were submitted to ATL for the following analyses under expedited turn-around-time (TAT). The laboratory was instructed to homogenize the soil samples prior to analysis in accordance with Contract 03A1368 requirements.

- Six hundred ninety-four soil samples were analyzed for total lead following United States Environmental Protection Agency (EPA) Test Method 6010B under 48-hour or 24-hour TAT.
- Eighty soil samples were further analyzed for WET soluble lead following EPA Test Method 7420 under 72-hour TAT.
- Eighty soil samples were further analyzed for DI-WET soluble lead following EPA Test Method 7420 under 72-hour TAT.
- Ten soil samples were analyzed for TCLP soluble lead following EPA Test Methods 1311 and 7420 under 72-hour TAT.
- Eighty soil samples were analyzed for soil pH following EPA Test Method 9045 under 72-hour TAT.

4.5 Quality Assurance/Quality Control

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix, whichever was more frequent, with the spike made at ten times the reporting limit or at the analyte level.

Prior to submitting the soil samples to the laboratory, the COC documentation was reviewed for accuracy and completeness. Reproductions of the laboratory reports and COC documentation are presented in Appendix C.

5.0 FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

5.1 Soil Conditions

Soil encountered during the excavation of borings was generally comprised of silty clay and silty sand to the maximum sampling depth of approximately 5.0 feet. Groundwater was not encountered in the soil borings.

5.2 ADL Soil Analytical Results

Total lead was detected in 533 of the 694 soil samples collected at concentrations ranging from 5.0 to 1,100 mg/kg. Eighty of the 694 soil samples had reported total lead concentrations greater than or equal to 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l) and were further analyzed for WET, DI-WET and TCLP soluble lead per Caltrans' direction.

WET soluble lead was reported for 78 of the 80 soil samples analyzed at concentrations ranging from 0.64 to 66 mg/l. Forty-three of the 80 soil samples had WET soluble lead concentrations greater than the STLC value for lead of 5.0 mg/l. DI-WET soluble lead was only reported for four of the 80 soil samples analyzed at concentrations ranging from 0.31 to 0.58 mg/l.

TCLP soluble lead was reported for each of the ten soil samples analyzed at concentrations ranging from 0.26 to 4.1 mg/l.

Soil pH values ranged from 6.0 to 8.7.

A summary of the soil analytical results are presented in Table 1. The laboratory reports and COC documentation are presented in Appendix C.

5.3 Laboratory QA/QC

We reviewed the laboratory QA/QC provided with the laboratory reports. Duplicates, matrix spikes, and matrix spike duplicates were outside criteria for several samples. However, the analytical batch was validated by the laboratory control sample. Based on the laboratory QA/QC data, no additional qualification of the data presented herein is necessary, and the data are of sufficient quality for the purposes of this report.

5.4 Statistical Evaluation for Lead Detected in Soil Samples

The total lead data for the samples collected from the Site under this TO were separated into seven data populations for statistical evaluation as described below. Statistical analysis was also performed utilizing lead data collected from the previous ADL survey.

- Data Population #1 consists of soil samples collected from borings EB1 through EB29, EB49 through EB54, HAEB55, and EB56 through EB74 located along the shoulder of EB I-80.
- Data Population #2 consists of soil samples collected from borings WB30 through WB48, WB75 through WB94, HAWB95, and WB96 through WB114 located along the shoulder of WB I-80.
- Data Population #3 consists of soil samples collected from borings WBM125, WBM126, WBM137 through WBM144, and EBM127 through EBM136 located within the Sacramento Regional Transit Light Rail property between EB and WB I-80.
- Data Population #4 consists of soil samples collected from borings LV115 through LV122, HALV123 and HALV124 located along the EB I-80 onramp at Longview Drive.
- Data Population #5 consists of soil samples collected from borings 2SW155 through 2SW160 located along the proposed Sound Wall #2 between Stations 585+00 and 595+00 on EB I-80.
- Data Population #6 consists of soil samples collected from borings 3SW161 through 3SW172 located along the proposed Sound Wall #3 between Stations 596+00 and 622+00 on EB I-80.
- Data Population #7 consists of soil samples collected from borings 4SW145 through 4SW154 located along the proposed Sound Wall #4 between Stations 602+00 and 621+00 on WB I-80.
- Data Population #8 consists of soil samples collected from borings B11 through B69 and B72 through B130 located along the median of I-80 under previous TO No. 8.

Statistical methods were applied to the total lead data to evaluate: 1) the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth; and 2) if an acceptable correlation between total and soluble lead concentrations exists that would allow the prediction of soluble lead concentrations based on calculated UCLs. The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring*, by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in*

Environmental Applications, by Ashok Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap,* by Bradley Efron and Robert J. Tibshirani.

5.4.1 Calculating the UCLs for the Arithmetic Mean

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques used to calculate the UCLs are discussed in the previously referenced EPA document and in *An Introduction to the Bootstrap.* For those samples in which total lead was not detected at concentrations exceeding the laboratory reporting limit, a value equal to one-half of the reporting limit was used in the UCL calculation. The total lead UCLs were not calculated for sampling intervals with total lead concentrations less than 50 mg/kg (e.g. Sample Population #6). The bootstrap results are presented in Appendix D. The calculated UCLs and statistical results are summarized in the following tables:

Data Population #1 – EB I-80 Outside Shoulder
Borings EB1 through EB29, EB49 through EB54, HAEB55, and EB56 through EB74

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	99.6	105.2	77.7	2.5	780
0.5 to 1.0	17.0	18.0	13.8	2.5	130
1.0 to 1.5	10.7	11.1	9.3	2.5	40
1.5 to 2.0	18.4	20.2	13.0	2.5	220

The total lead mean for Data Population #1 as a whole is 28.4 mg/kg.

Data Population #2 – WB I-80 Outside Shoulder
Borings WB30 through WB48, WB75 through WB94, HAWB95, and WB96 through WB114

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	135.2	142.2	106.2	2.5	1,100
0.5 to 1.0	32.9	35.3	24.2	2.5	340
1.0 to 1.5	10.2	10.6	8.8	2.5	59
1.5 to 2.0	8.6	8.9	7.4	2.5	50

The total lead mean for Data Population #2 as a whole is 41.8 mg/kg.

Data Population #3 – EB and WB I-80 Inside Shoulder
Borings WBM125, WBM126, WBM137 through WBM144, and EBM127 through EBM136

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 0.5	91.2	95.9	72.3	6.1	320
0.5 to 1.0	16.6	17.6	13.4	2.5	48
1.0 to 1.5	8.2	8.5	7.2	2.5	18
1.5 to 2.0	6.9	7.1	6.2	2.5	12

The total lead mean for Data Population #3 as a whole is 24.8 mg/kg.

Data Population #4 – EB I-80 Onramp at Longview Drive
Borings LV115 through LV122, HALV123 and HALV124

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 1.0	32.8	35.8	22.9	2.5	91

The total lead mean for Data Population #4 as a whole is 10.6 mg/kg.

Data Population #5 – Sound Wall #2
Borings 2SW155 through 2SW160

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
1.0 to 2.0	34.2	38.0	18.8	2.5	83

The total lead mean for Data Population #5 as a whole is 13.5 mg/kg.

Data Population #7 – Sound Wall #4
Borings 4SW145 through 4SW154

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
1.0 to 2.0	24.3	26.9	16.7	2.5	64

The total lead mean for Data Population #7 as a whole is 18.1 mg/kg.

Data Population #8 – I-80 Median
Borings B11 through B69 and B72 through B130

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 1.0	44.7	46.1	39.9	9.7	93.8

Statistical results for this data population were calculated using lead data from previous TO No. 8.

The total lead mean for Data Population #8 as a whole is 17.7 mg/kg.

5.4.2 Correlation of Total and Soluble Lead

Total and corresponding WET soluble lead concentrations are bivariate data with a linear structure. This linear structure should allow for the prediction of WET soluble lead concentrations based on the UCLs calculated above in Section 5.4.1.

To estimate the degree of interrelation between total and corresponding WET soluble lead values (x and y, respectively), the *correlation coefficient [r]* is used. The correlation coefficient is a ratio that ranges from +1 to –1. A *correlation coefficient* of +1 indicates a perfect direct relationship between two variables; a *correlation coefficient* of –1 indicates that one variable changes inversely with relation to the other. Between the two extremes is a spectrum of less-than-perfect relationships, including zero, which indicates the lack of any sort of linear relationship at all.

The *correlation coefficients* for Data Populations #1 through #3 were calculated for the (x, y) data points (i.e., soil samples analyzed for both total lead [x] and WET soluble lead [y]). A *correlation coefficient* greater than or equal to 0.8 is an acceptable indicator that a correlation exists. The *correlation coefficients* for Data Population #1 (EB I-80 outside shoulder), Data Population #2 (WB I-80 outside shoulder), and Data Population #3 (EB and WB I-80 inside shoulder) equaled 0.8065, 0.9312 and 0.9414, respectively, which indicate a good correlation between total lead and WET soluble lead data.

For the *correlation coefficient* that indicates a linear relationship between total and WET soluble lead concentrations, it is possible to compute the line of dependence or a best-fit line between the two variables. A least squares method was used to find the equation of a best-fit line (regression line) by forcing the y-intercept equal to zero since that is a known point. The equation of the regression line was determined to be $y = 0.0540(x)$ for Data Population #1 (EB I-80 outside shoulder), $y = 0.0699(x)$ for Data Population #2 (WB I-80 outside shoulder) and, $y = 0.0571(x)$ for Data Population #3 (EB and WB I-80 inside shoulder), where x represents total lead concentrations and y represents predicted WET soluble lead concentrations. These equations were used to estimate the expected WET soluble lead concentrations for the UCLs calculated in Section 5.4.1. Regression analysis results and a scatter plot depicting the (x, y) data points along with the regression lines are presented in Appendix D. The 90% and 95% UCL-predicted WET soluble lead concentrations are presented in Section 6.0.

Regression analysis was not performed for Data Population #4 (EB I-80 onramp at Longview Drive), Data Population #5 (Sound Wall #2), Data Population #6 (Sound Wall #3), Data Population #7 (Sound Wall #4), and Data Population #8 (I-80 Median) since the total lead concentrations or the calculated 90% and 95% total lead UCLs for these data populations are less than 50 mg/kg.

6.0 CONCLUSIONS AND RECOMMENDATIONS

Hazardous waste classification based on the 90% UCL is considered sufficient to satisfy a good faith effort as discussed in SW-846. Risk assessment characterization is typically based on the 95% UCL in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 Documentation for Exposure Assessment. Per Caltrans, 90% UCLs are to be used to evaluate onsite reuse, and 95% UCLs are to be used to evaluate offsite reuse or disposal. In addition, the reuse of excavated soil was evaluated, as applicable, based on the DTSC requirements for the statewide Variance.

Based on the TCLP soluble lead results of less than 5.0 mg/l, soil generated at the Site will not require disposal as a RCRA hazardous waste. If soil within the project limits is scarified in-place, moisture-conditioned, and recompacted during roadway improvement activities, it may not be considered a "waste."

6.1 Data Population #1 – EB I-80 Outside Shoulder

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil along this segment of the EB I-80 shoulder based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 0.5 foot	99.6	**5.4**	105.2	**5.7**	**Hazardous**
Underlying soil (0.5 to 2.0 feet)	15.4	0.8	16.4	0.9	Non-hazardous
0.0 to 1.0 foot	58.3	3.1	61.6	3.3	Non-hazardous
Underlying soil (1.0 to 2.0 feet)	14.6	0.8	15.7	0.8	Non-hazardous
0.0 to 1.5 feet	42.4	2.3	44.8	2.4	Non-hazardous
Underlying soil (1.5 to 2.0 feet)	18.4	1.0	20.2	1.1	Non-hazardous
0.0 to 2.0 feet	36.4	2.0	38.6	2.1	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.054x$

Per Caltrans' design personnel, it is our understanding that excavation as a whole to 1.5 feet (full depth excavation) will be performed per the roadway improvement contract specifications.

Based on the data presented in the table above, if the top 1.0 to 2.0 feet of soil is excavated and managed as a whole, then soil generated from the top 1.0 to 2.0 feet would not be classified as a California-hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the STLC value for lead of 5.0 mg/l. Consequently, the top 1.0 to 2.0 feet of excavated soil could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.2 Data Population #2 – WB I-80 Outside Shoulder

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil along this segment of the WB I-80 shoulder based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 0.5 foot	135.2	**9.5**	142.2	**9.9**	**Hazardous**
Underlying soil (0.5 to 2.0 feet)	17.2	1.2	18.3	1.3	Non-hazardous
0.0 to 1.0 foot	84.1	**5.9**	88.8	**6.2**	**Hazardous**
Underlying soil (1.0 to 2.0 feet)	9.4	0.7	9.8	0.7	Non-hazardous
0.0 to 1.5 feet	59.4	4.2	62.7	4.4	Non-hazardous
Underlying soil (1.5 to 2.0 feet)	8.6	0.6	8.9	0.6	Non-hazardous
0.0 to 2.0 feet	46.7	3.3	49.3	3.4	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0699x$

Per Caltrans design personnel, it is our understanding that excavation as a whole to 1.5 feet (full depth excavation) will be performed per the roadway improvement contract specifications.

Based on the data presented in the table above, if the top 1.5 to 2.0 feet of soil is excavated and managed as a whole, then soil generated from the top 1.5 to 2.0 feet would not be classified as a California-hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the STLC value for lead of 5.0 mg/l. Consequently, the top 1.5 to 2.0 feet of excavated soil could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.3 Data Population #3 – EB and WB I-80 Inside Shoulder

The table below summarizes the excavation scenarios, the UCL-predicted WET soluble lead calculations and the waste classification for excavated soil along this segment of the EB and WB I-80 inside shoulder based on the calculated total lead UCLs and the relationship between total and WET soluble lead.

Excavation Depth	90% UCL Total Lead (mg/kg)	90% UCL Predicted WET Lead (mg/l)	95% UCL Total Lead (mg/kg)	95% UCL Predicted WET Lead (mg/l)	Waste Classification
0.0 to 0.5 foot	91.2	**5.2**	95.9	**5.5**	**Hazardous**
Underlying soil (0.5 to 2.0 feet)	10.6	0.6	11.1	0.6	Non-hazardous
0.0 to 1.0 foot	53.9	3.1	56.8	3.2	Non-hazardous
Underlying soil (1.0 to 2.0 feet)	7.6	0.4	7.8	0.4	Non-hazardous
0.0 to 1.5 feet	38.7	2.2	40.7	2.3	Non-hazardous
Underlying soil (1.5 to 2.0 feet)	6.9	0.4	7.1	0.4	Non-hazardous
0.0 to 2.0 feet	30.7	1.8	32.3	1.8	Non-hazardous

90% UCL applicable for waste classification and onsite reuse; 95% UCL applicable for risk assessment and offsite disposal
Predicted WET lead concentrations were calculated using the equation of the regression line: $y = 0.0571x$

Per Caltrans' design personnel, it is our understanding that excavation as a whole to 1.5 feet (full depth excavation) will be performed per the roadway improvement contract specifications.

Based on the data presented in the table above, if the top 1.0 to 2.0 feet of soil is excavated and managed as a whole, then soil generated from the top 1.0 to 2.0 feet would not be classified as a California-hazardous waste since the 90% and 95% UCL-predicted WET soluble lead concentrations are less than the STLC value for lead of 5.0 mg/l. Consequently, the top 1.0 to 2.0 feet of excavated soil could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.4 Data Population #4 – EB I-80 Onramp at Longview Drive

Soil generated from excavations to a depth of 5.0 feet or shallower along the EB I-80 onramp at Longview Drive would not be classified as a California hazardous waste since the total lead concentrations or the calculated 90% and 95% total lead UCLs are less than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l). Consequently, soil generated from excavations to 5.0 feet or shallower could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.5 Data Population #5 – Sound Wall #2

Soil generated from excavations to a depth of 3.0 feet or shallower along the proposed sound wall #2 on EB I-80 would not be classified as a California hazardous waste since the total lead concentrations or the calculated 90% and 95% total lead UCLs are less than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l). Consequently, soil generated from excavations to 3.0 feet or shallower could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.6 Data Population #6 – Sound Wall #3

Soil generated from excavations to a depth of 3.0 feet or shallower along the proposed sound wall #3 on EB I-80 would not be classified as a California hazardous waste since the total lead concentrations are less than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l). Consequently, soil generated from excavations to 3.0 feet or shallower could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.7 Data Population #7 – Sound Wall #4

Soil generated from excavations to a depth of 3.0 feet or shallower along the proposed sound wall #4 on WB I-80 would not be classified as a California hazardous waste since the total lead concentrations or the calculated 90% and 95% total lead UCLs are less than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l). Consequently, soil generated from excavations to 3.0 feet or shallower could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

6.8 Data Population #8 – I-80 Median

Soil generated from excavations to a depth of 3.0 feet or shallower along this segment of the I-80 median would not be classified as a California hazardous waste since the total lead concentrations or the calculated 90% and 95% total lead UCLs are less than 50 mg/kg (ten times the STLC value for lead of 5.0 mg/l). Consequently, soil generated from excavations to 3.0 feet or shallower could be reused, relinquished to the contractor, or disposed of as non-hazardous soil with respect to lead content.

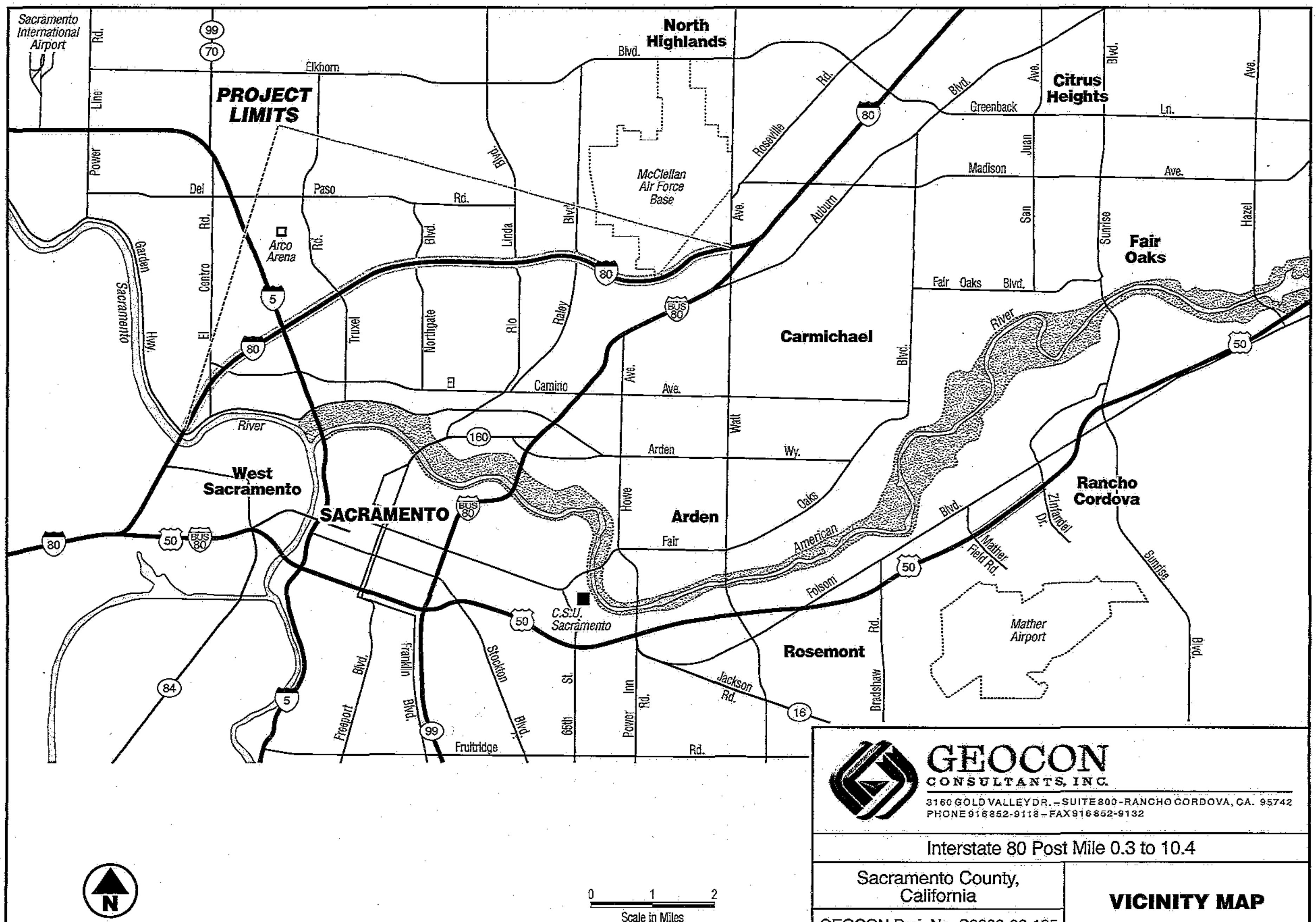
6.9 Worker Protection

Per Caltrans' requirements, the contractor(s) should prepare a project-specific Lead Compliance Plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

7.0 REPORT LIMITATIONS

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report and will require an update to reflect additional information obtained.

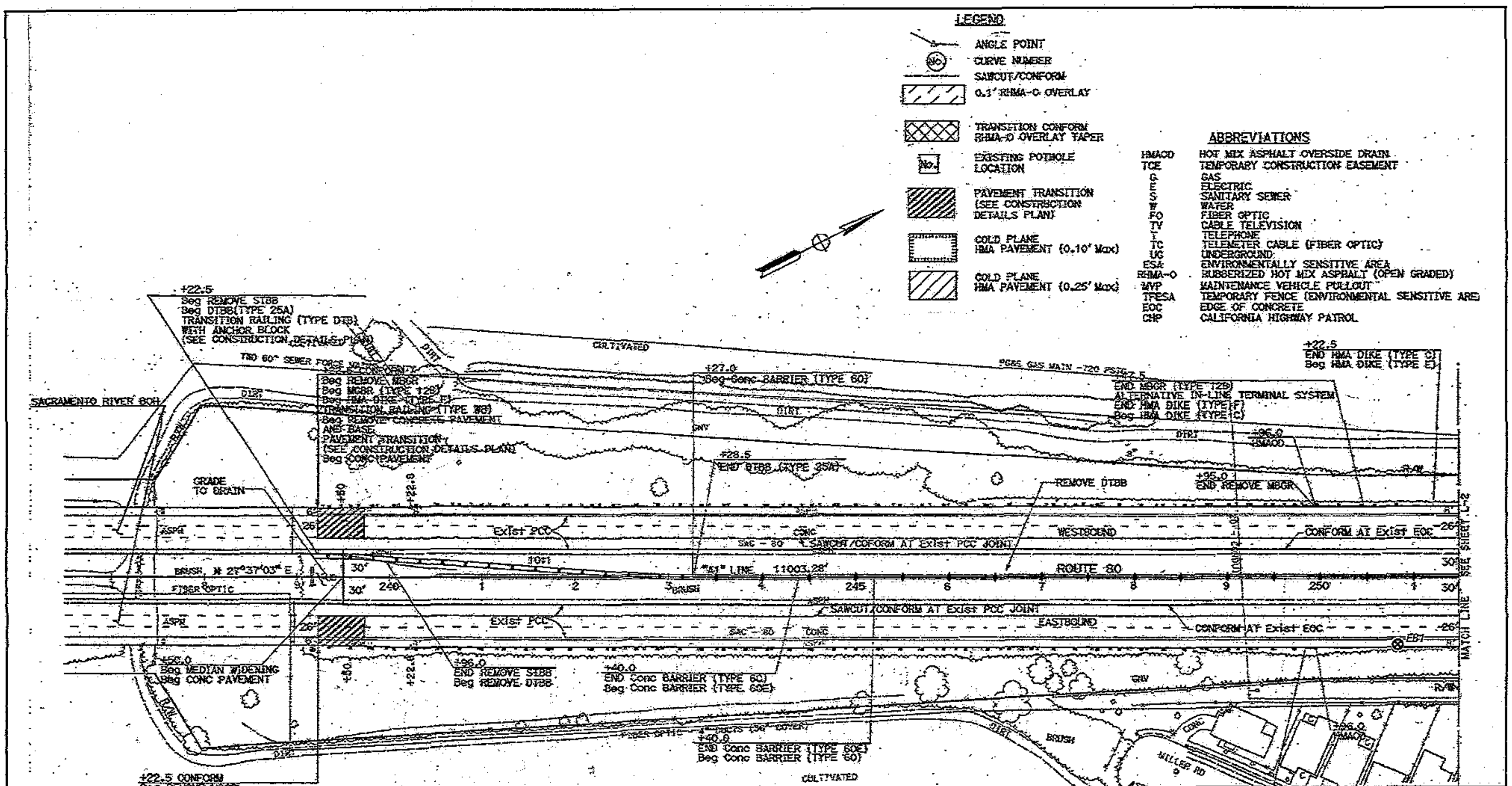
This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. We strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.



GEOCON CONSULTANTS, INC.

3160 GOLD VALLEY DR. – SUITE 800 – RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	VICINITY MAP	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 1



LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100 Scale in Feet

GEOCON CONSULTANTS, INC.

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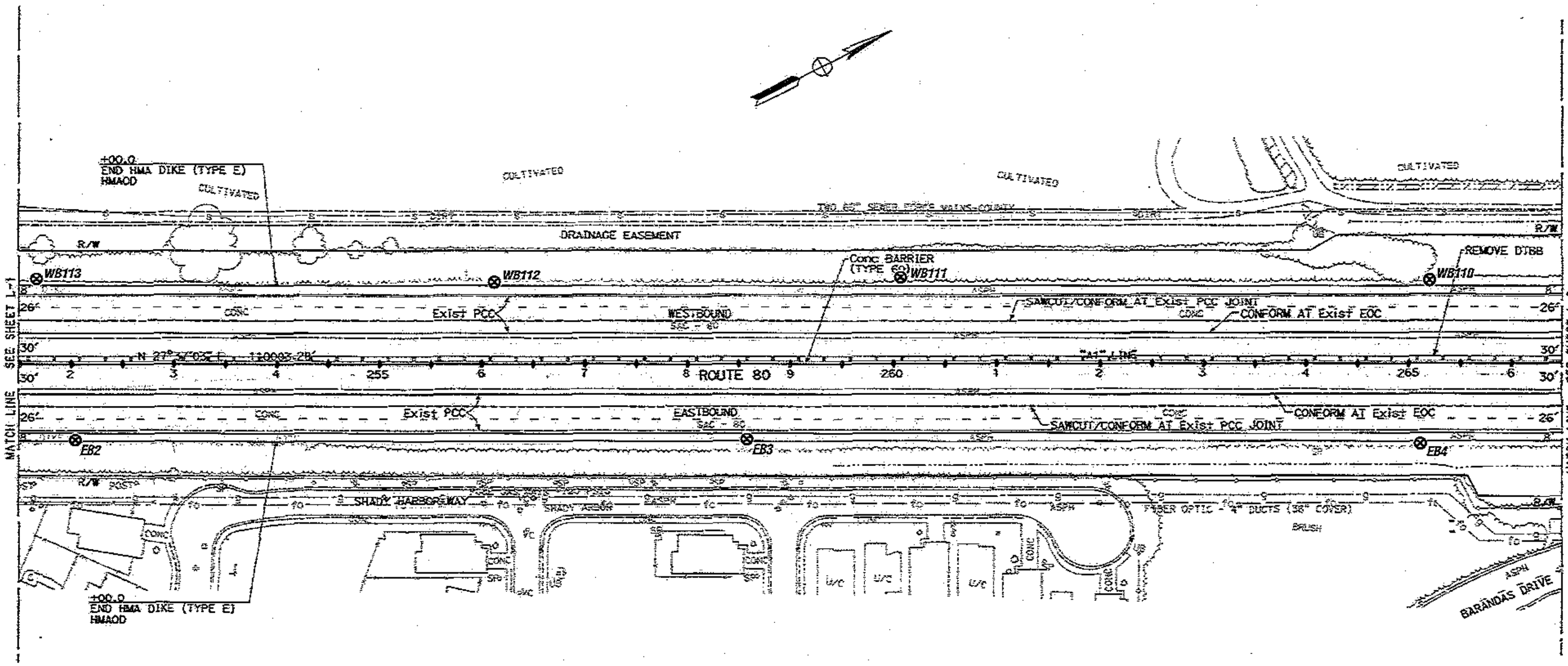
Interstate 80 Post Mile 0.3 to 10.4

Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-1



LEGEND:

EB1⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
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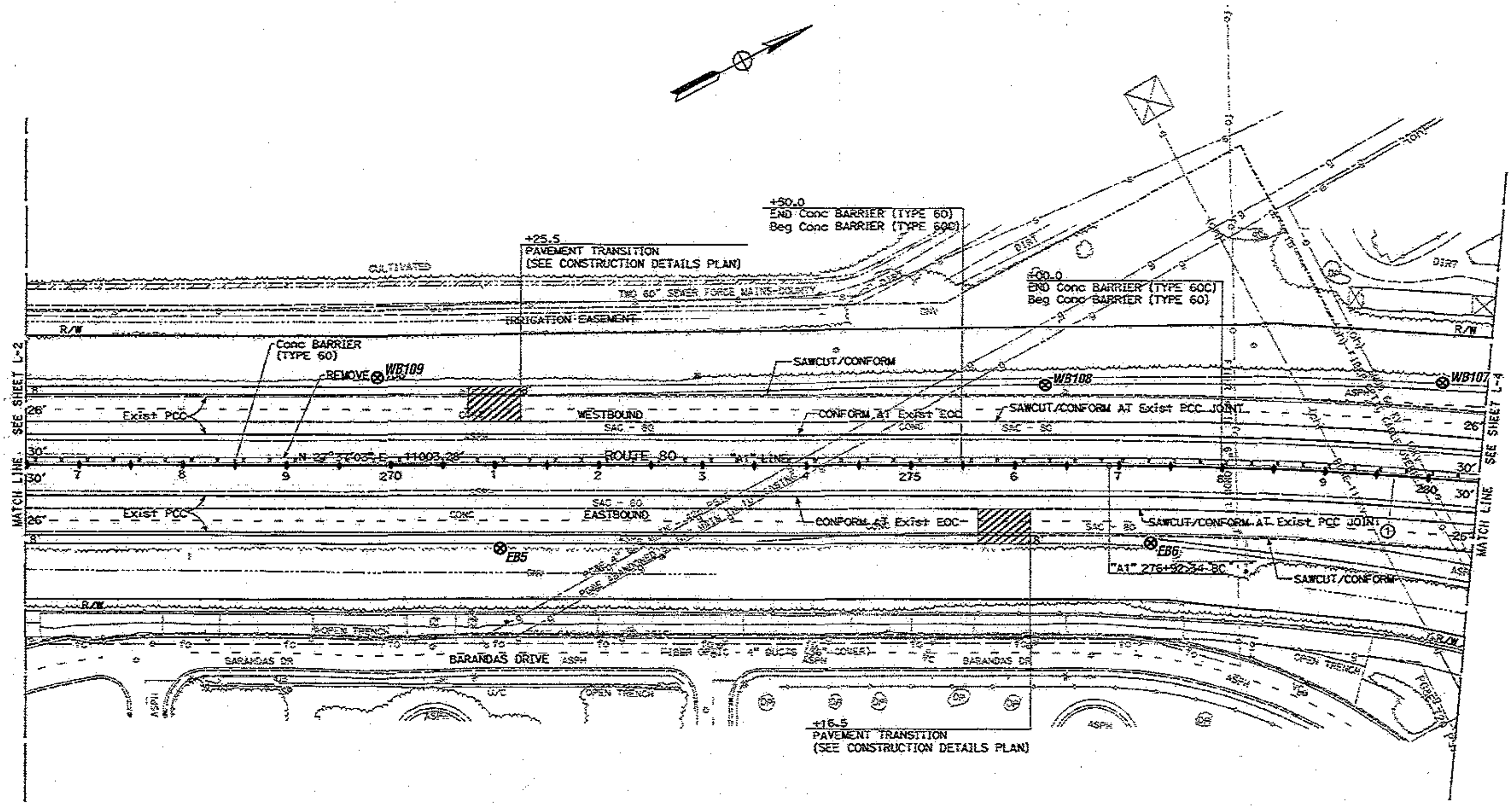
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-2



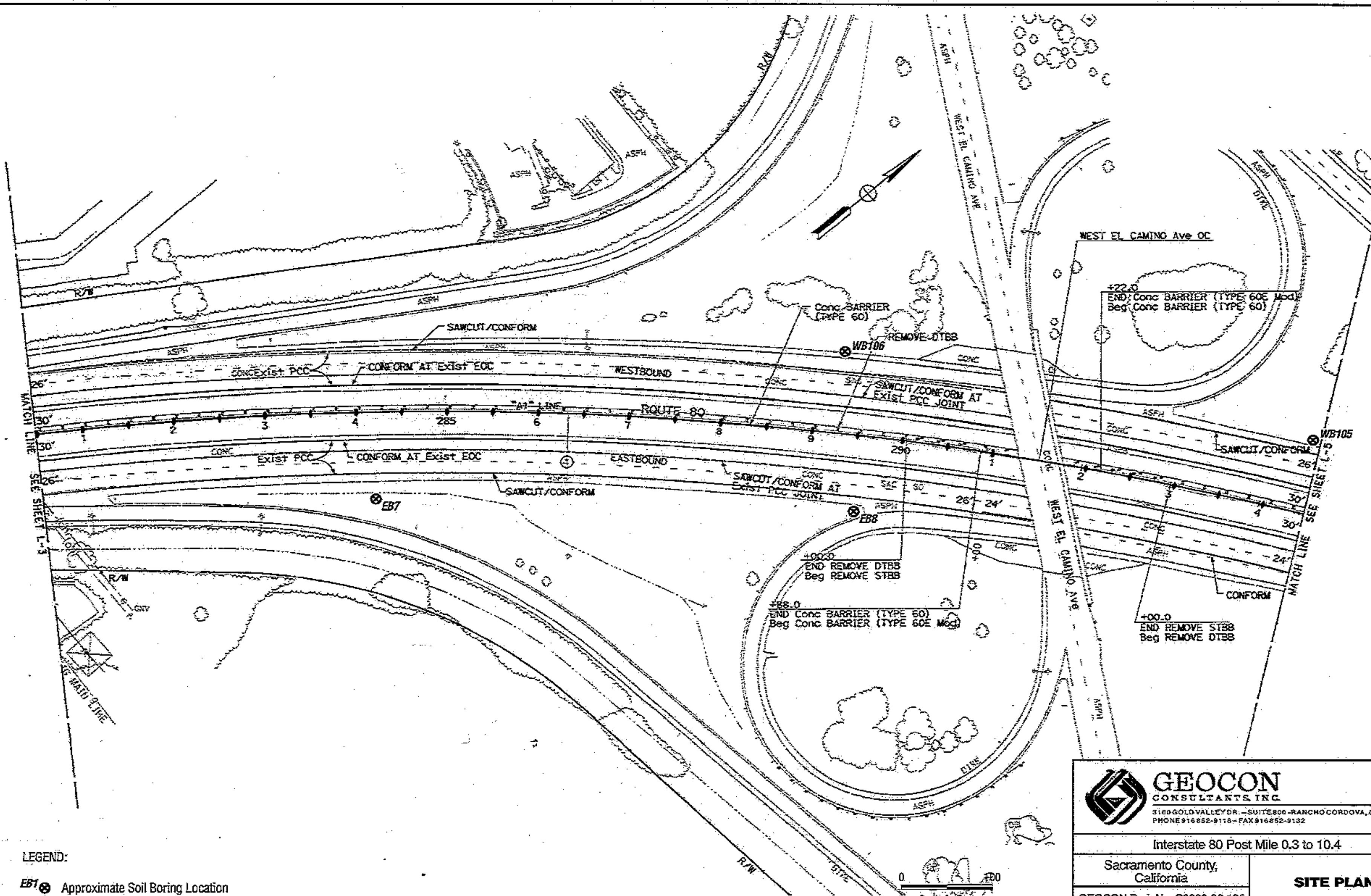
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-3



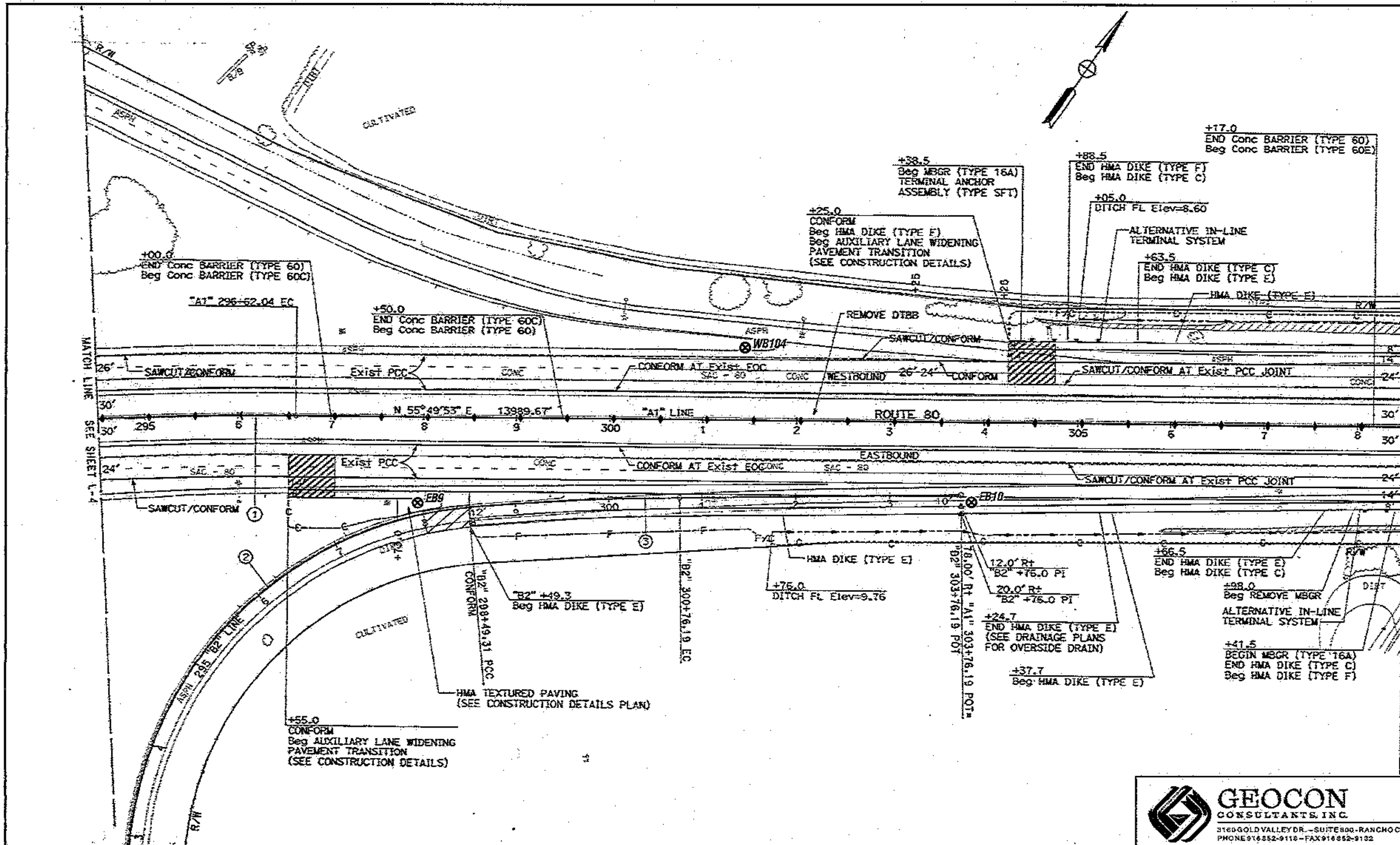
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.

3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-4



LEGEND:

EB1⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.

3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916.852-9118 - FAX 916.852-9132

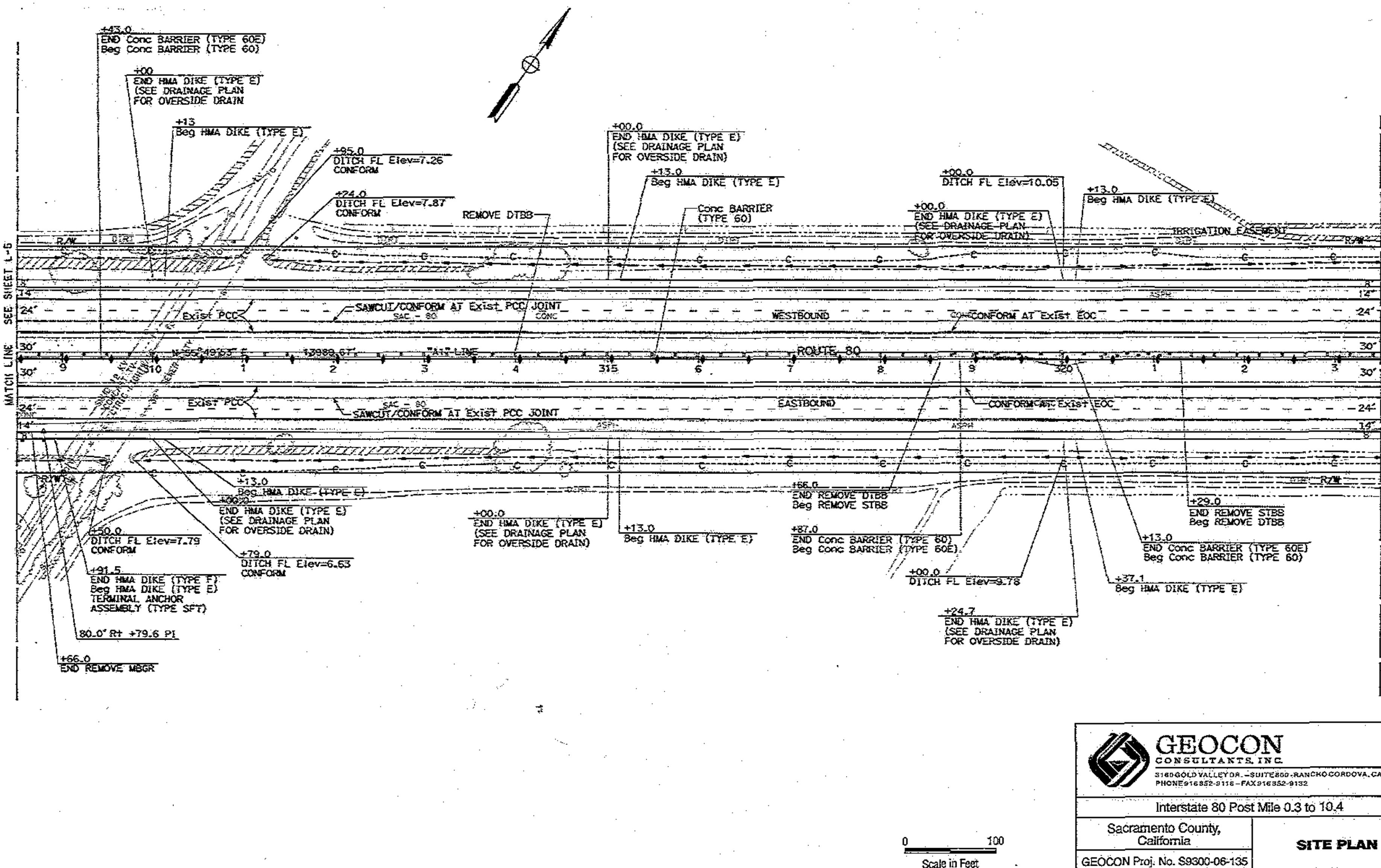
Interstate 80 Post Mile 0.3 to 10.4

Sacramento County, California

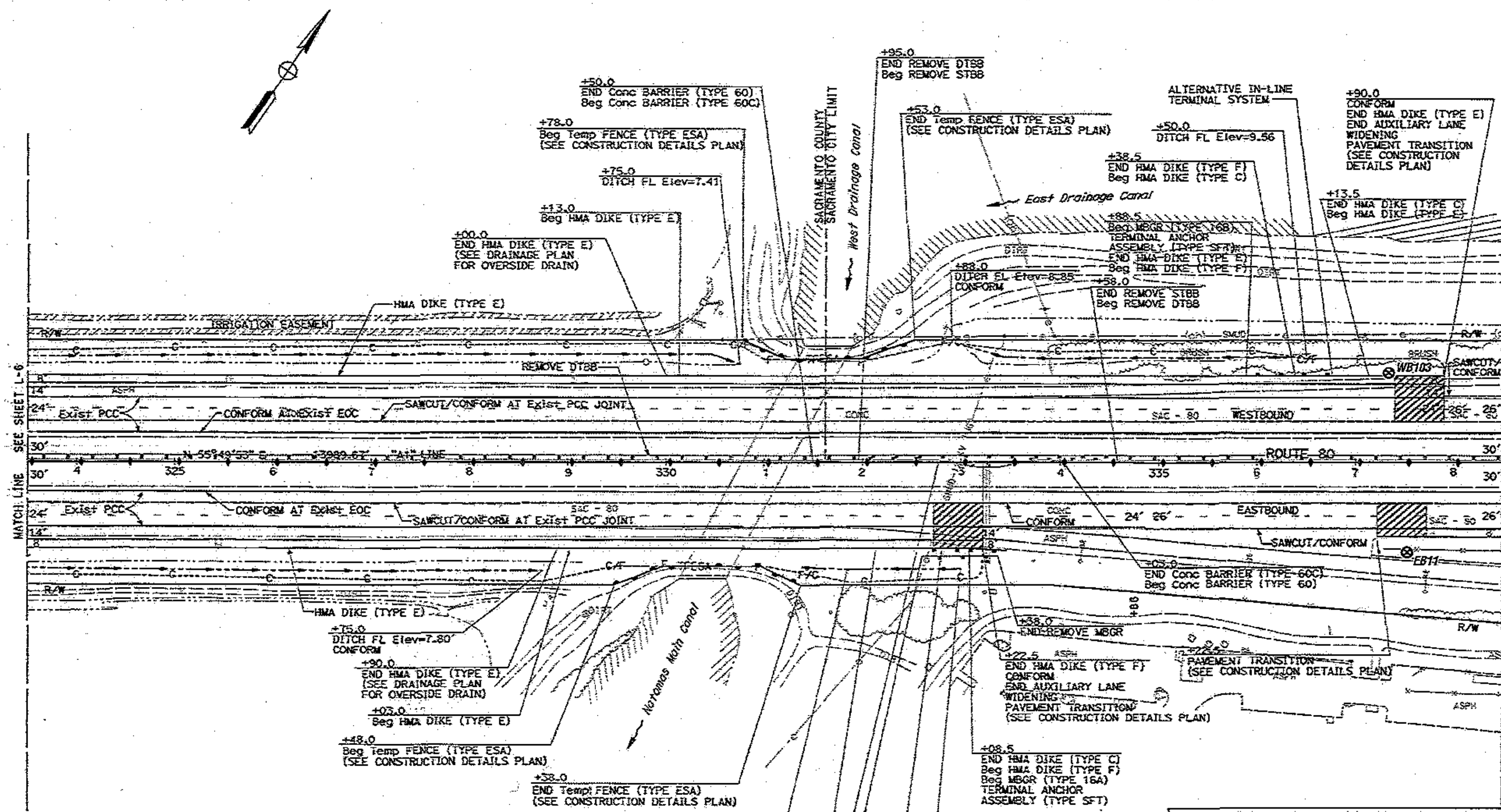
SITE PLAN

GEOCON Proj. No. S9300-06-135

Task Order No. 135 | July 2010 | Figure 2-5



GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916852-9118 - FAX 916852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-6



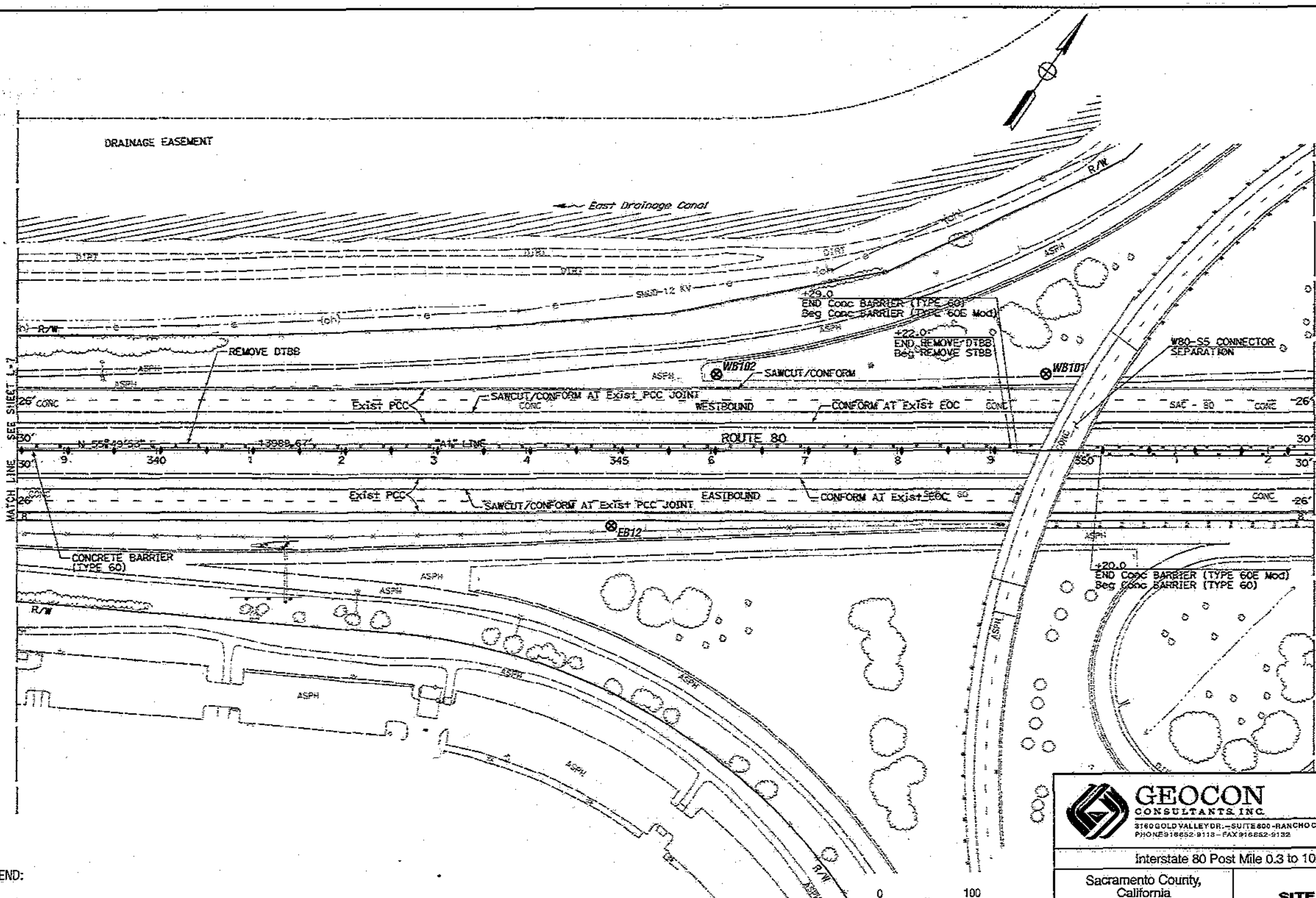
LEGEND:

EB1⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916-852-9118 - FAX 916-852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-7

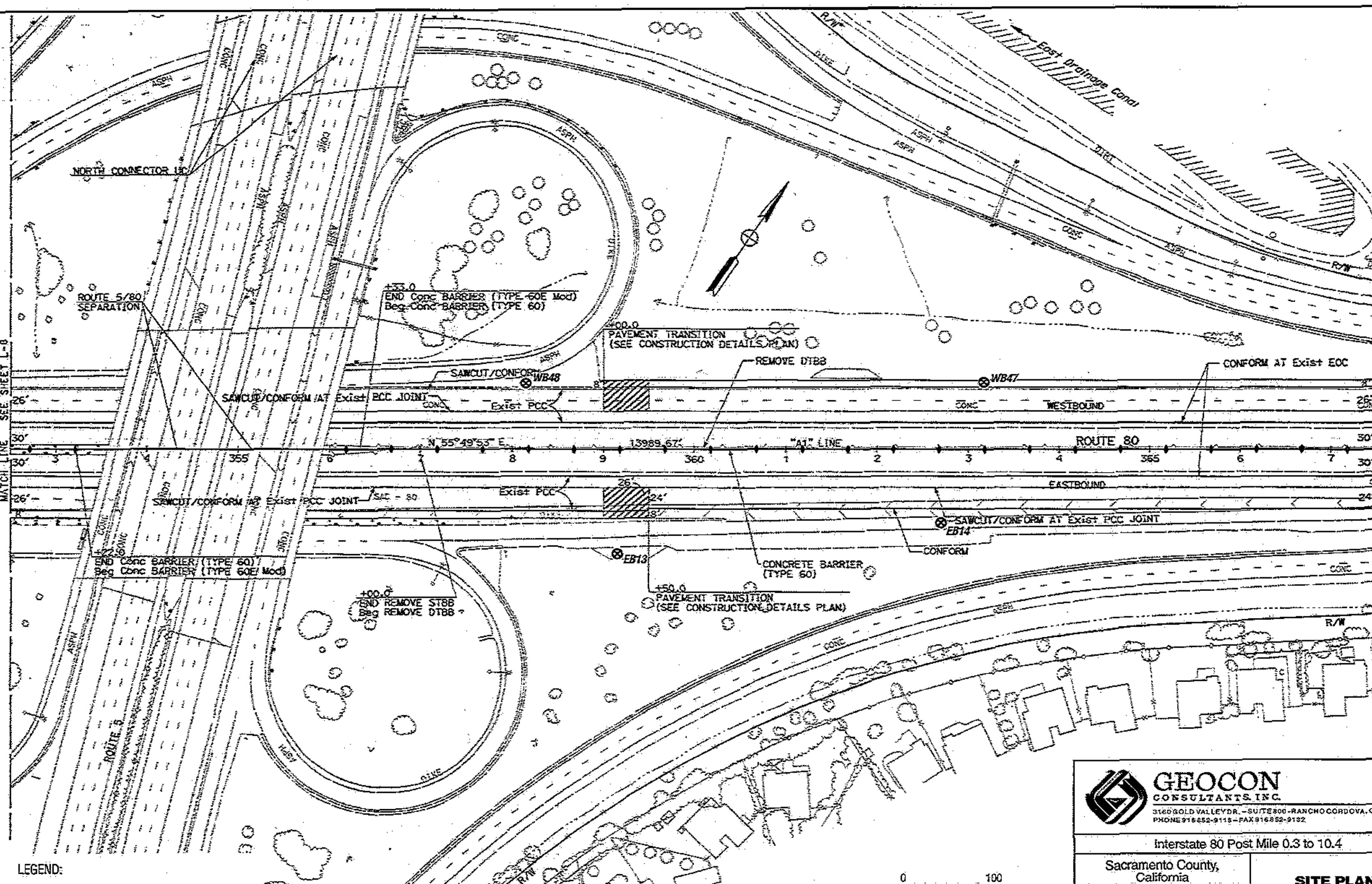


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 – RANCHO CORDOVA, CA. 95742
PHONE 916852-9118 – FAX 916852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-8

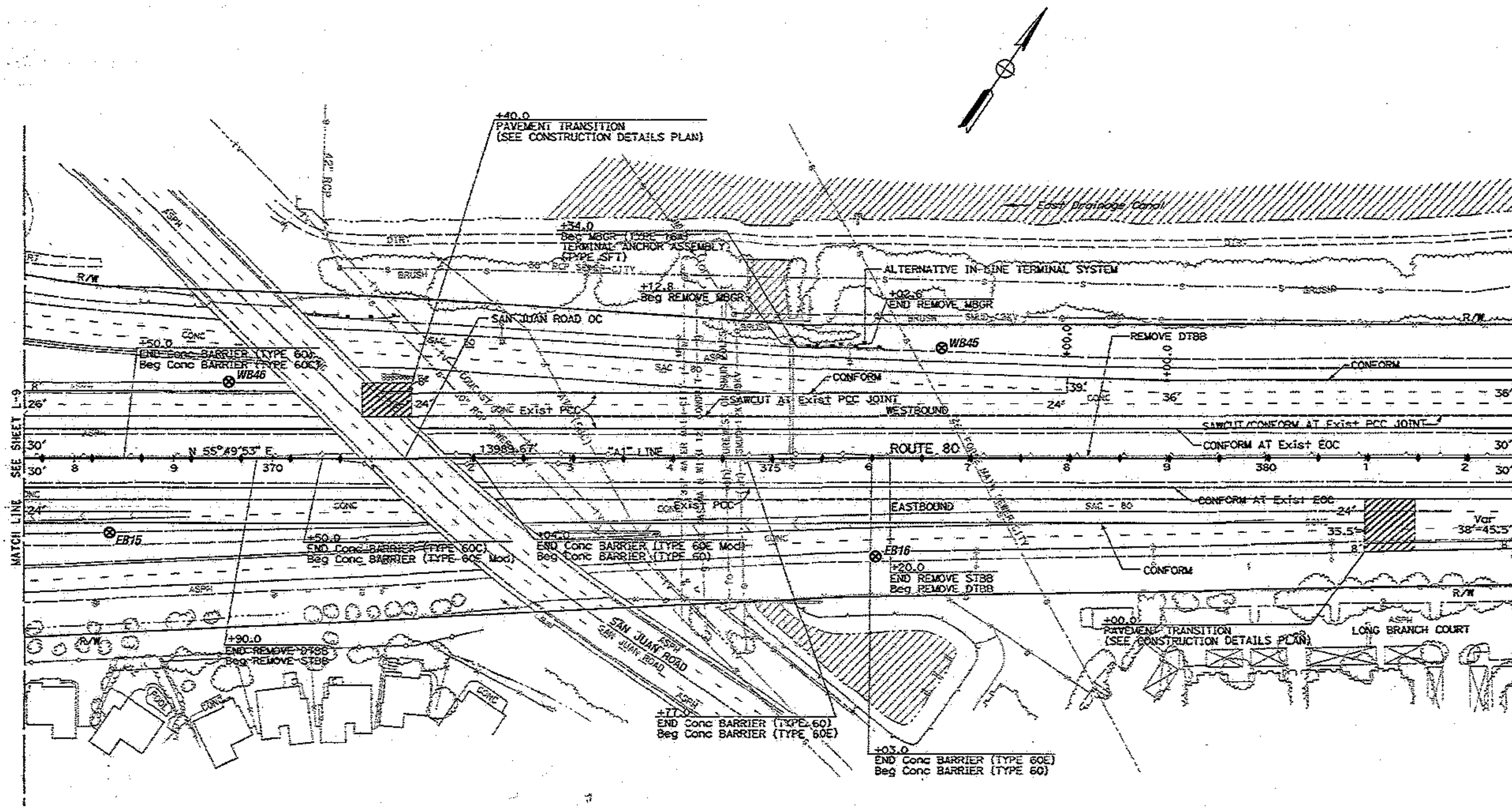


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916.852-9118 - FAX 916.852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-9

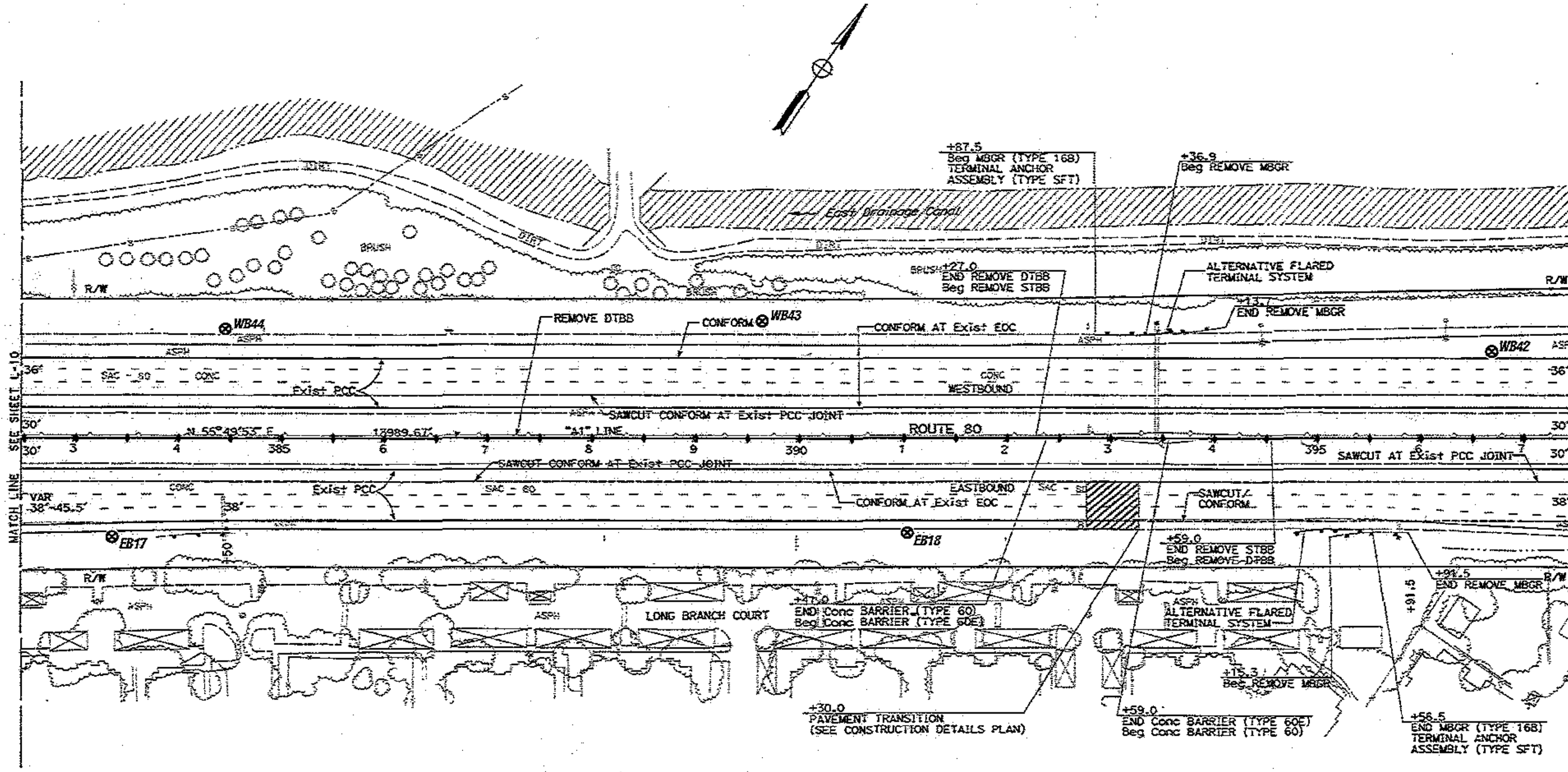


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 – RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-10



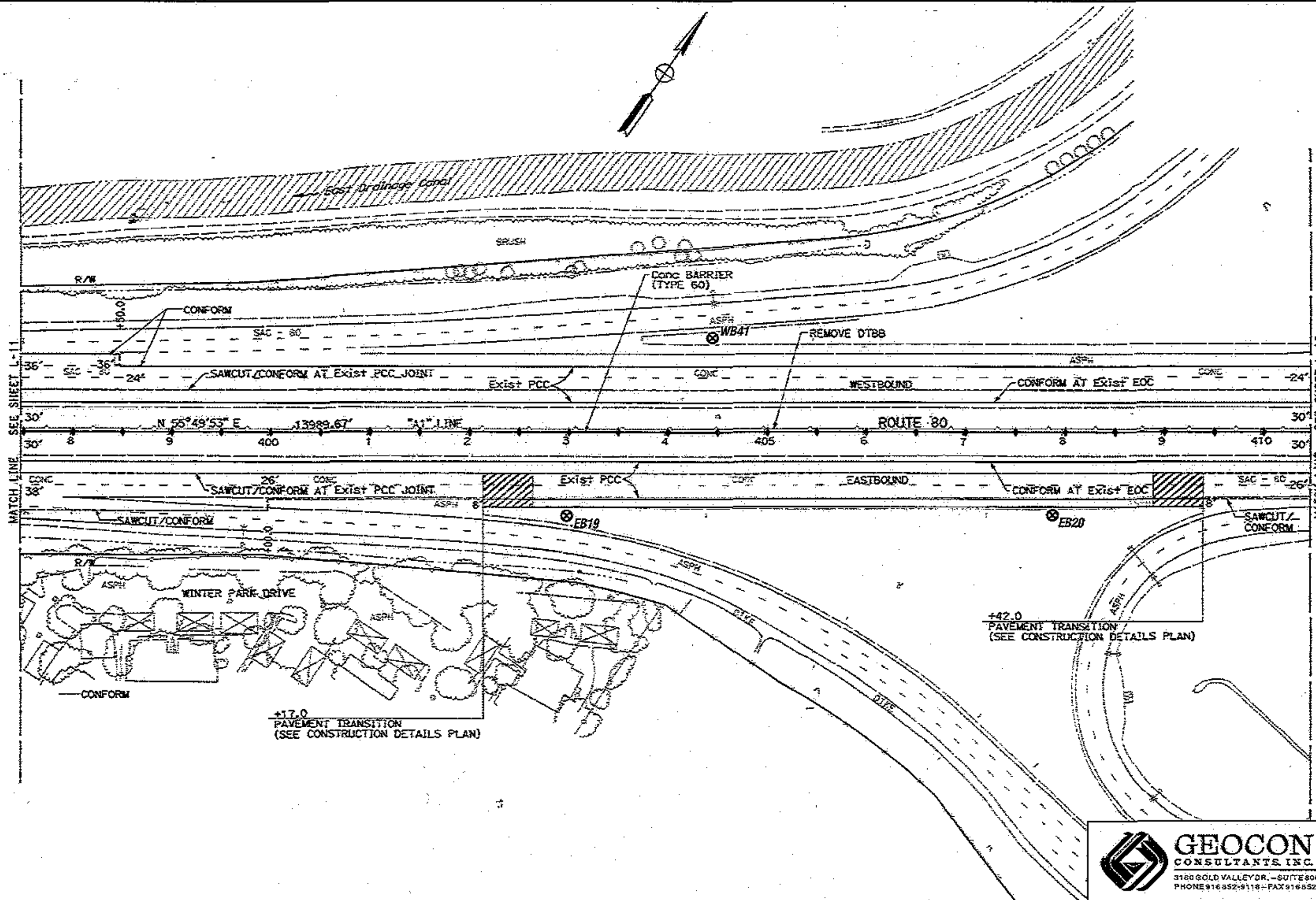
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-11

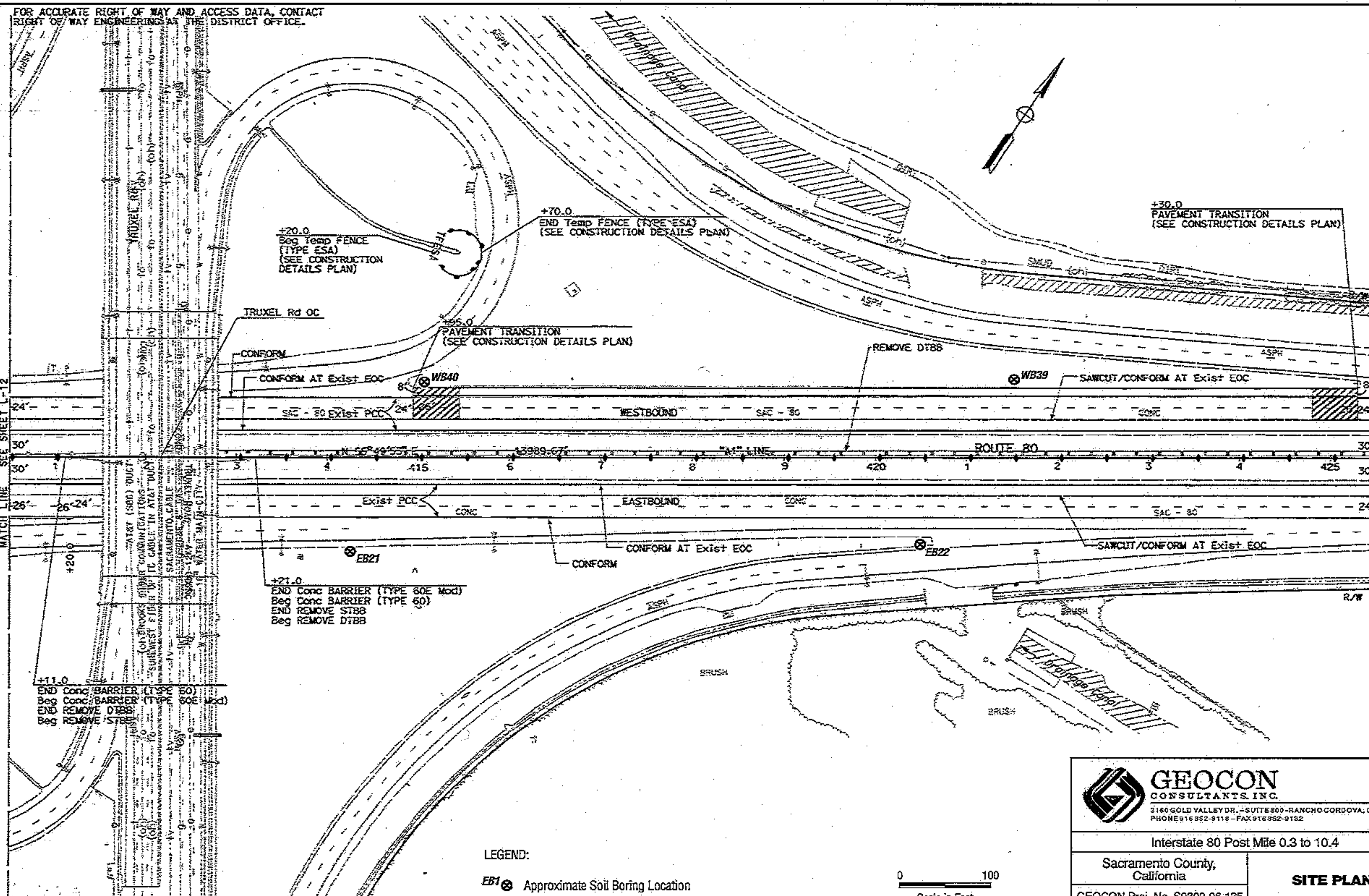


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916.852.9118 - FAX 916.852.9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-12

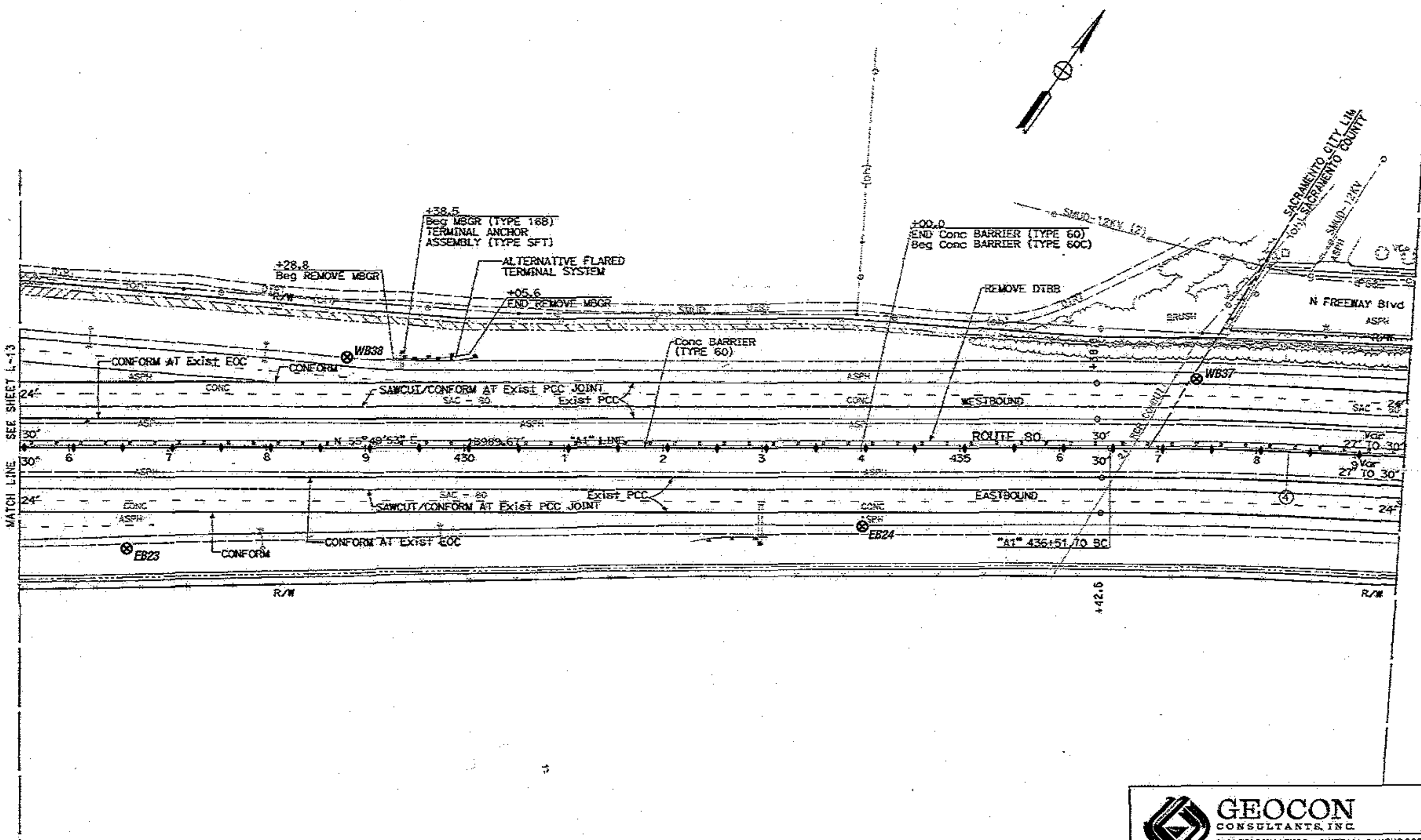


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916 852-9118 - FAX 916 852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-13



GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

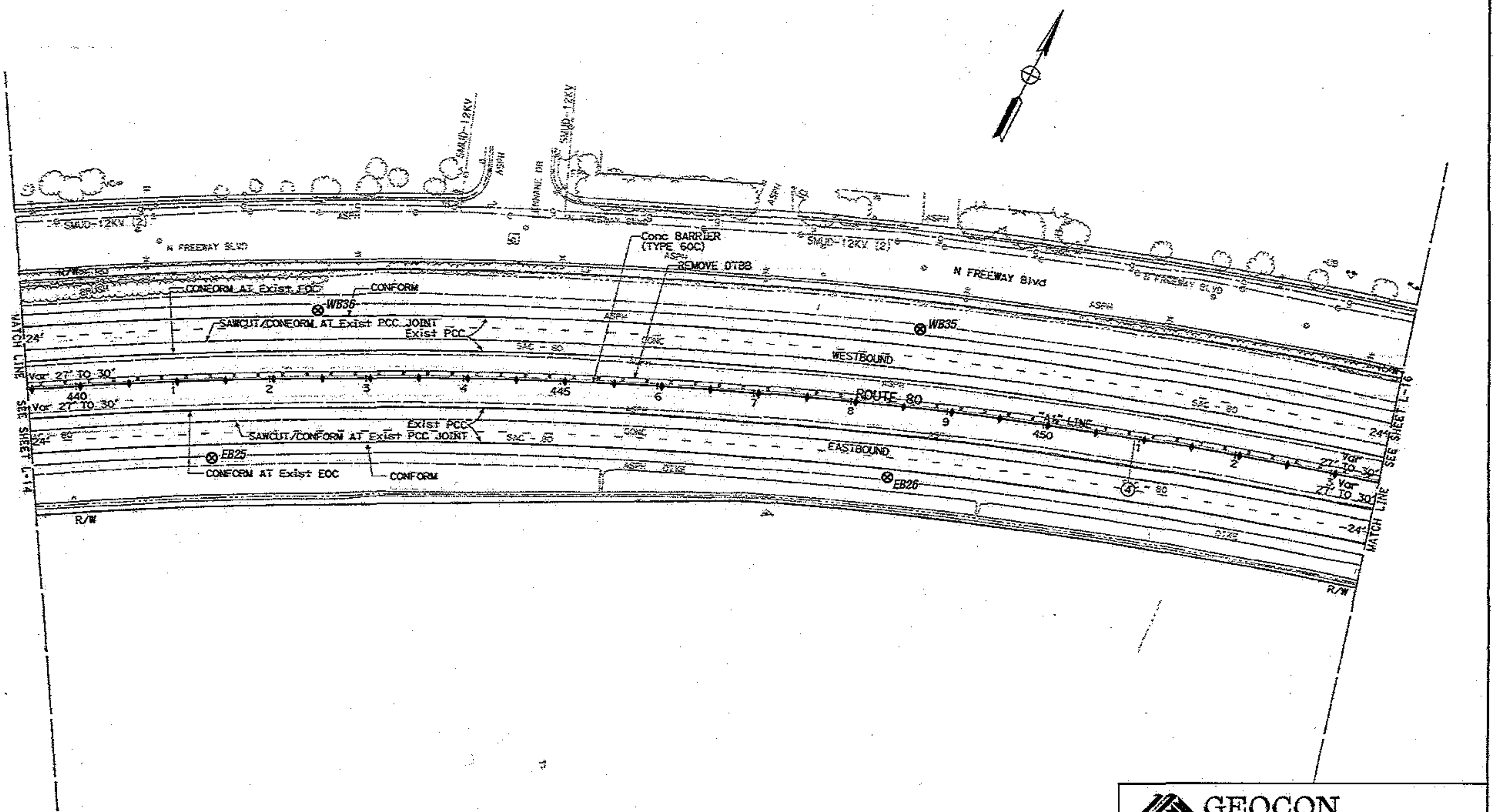
Interstate 80 Post Mile 0.3 to 10.4

Sacramento County, California	**SITE PLAN**
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-14

LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet



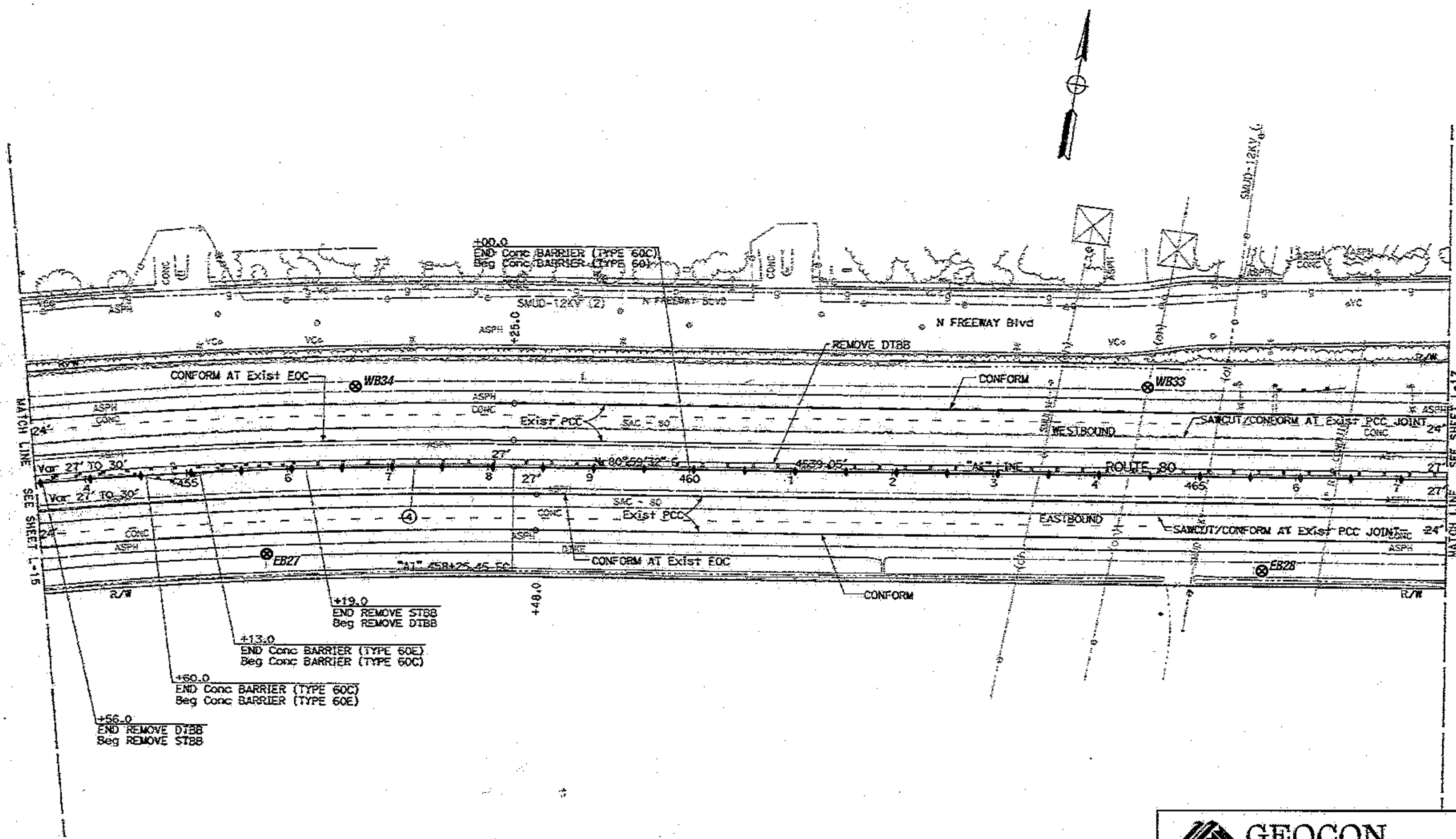
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100 Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	**SITE PLAN**
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-15



LEGEND:

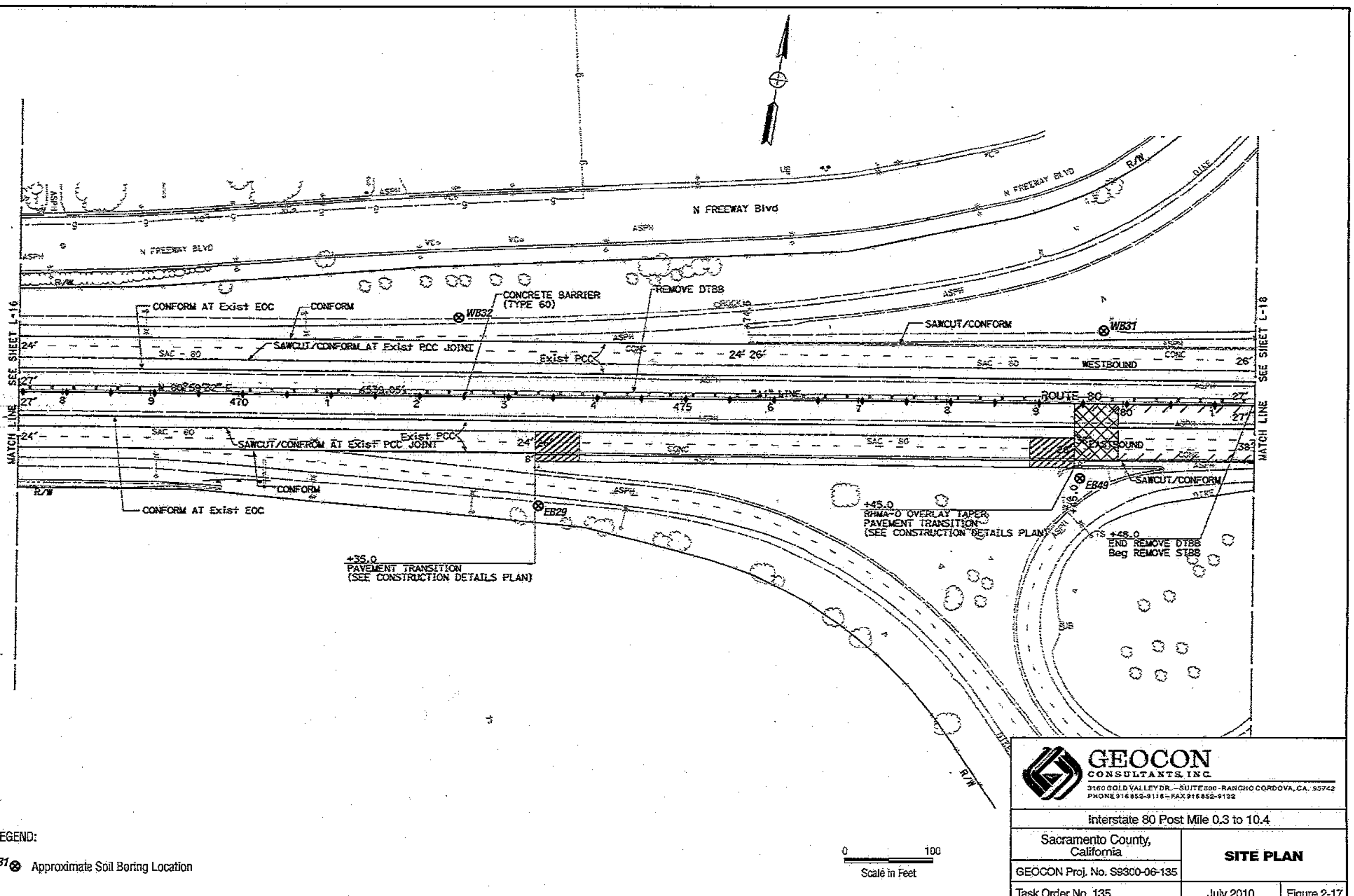
EB1⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4

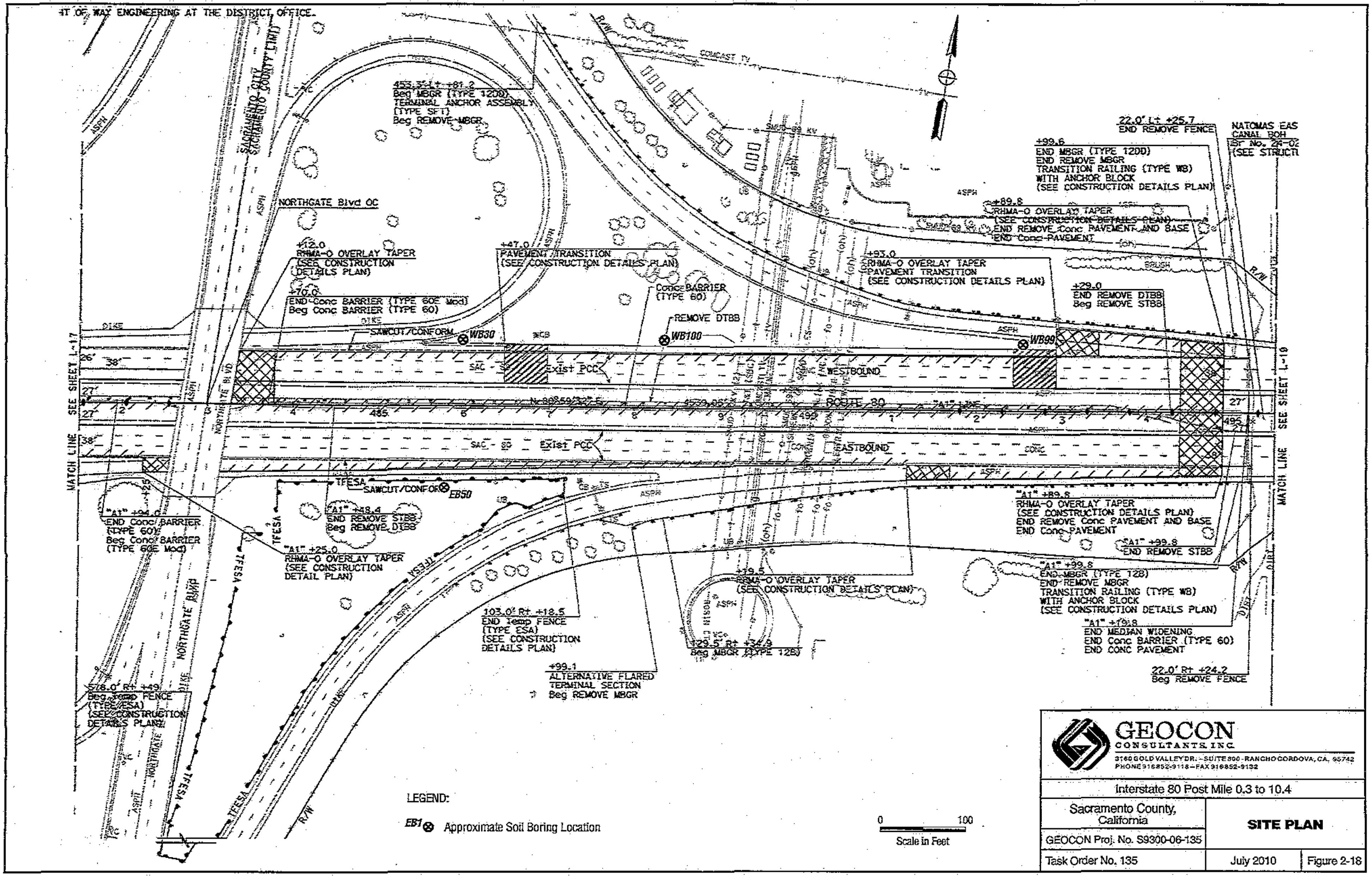
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-16



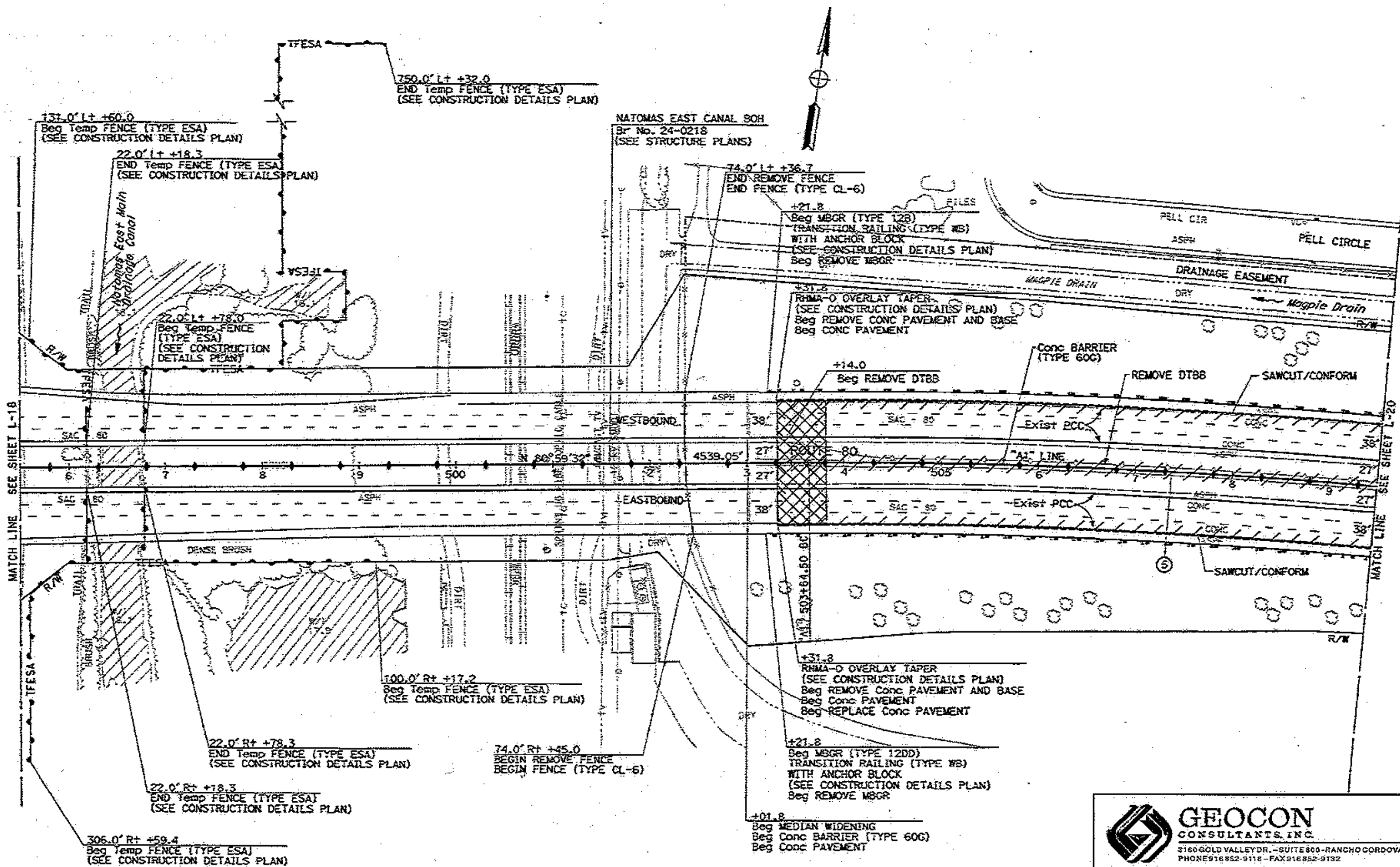
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916.852-9118 - FAX 916.852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	**SITE PLAN**
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-17

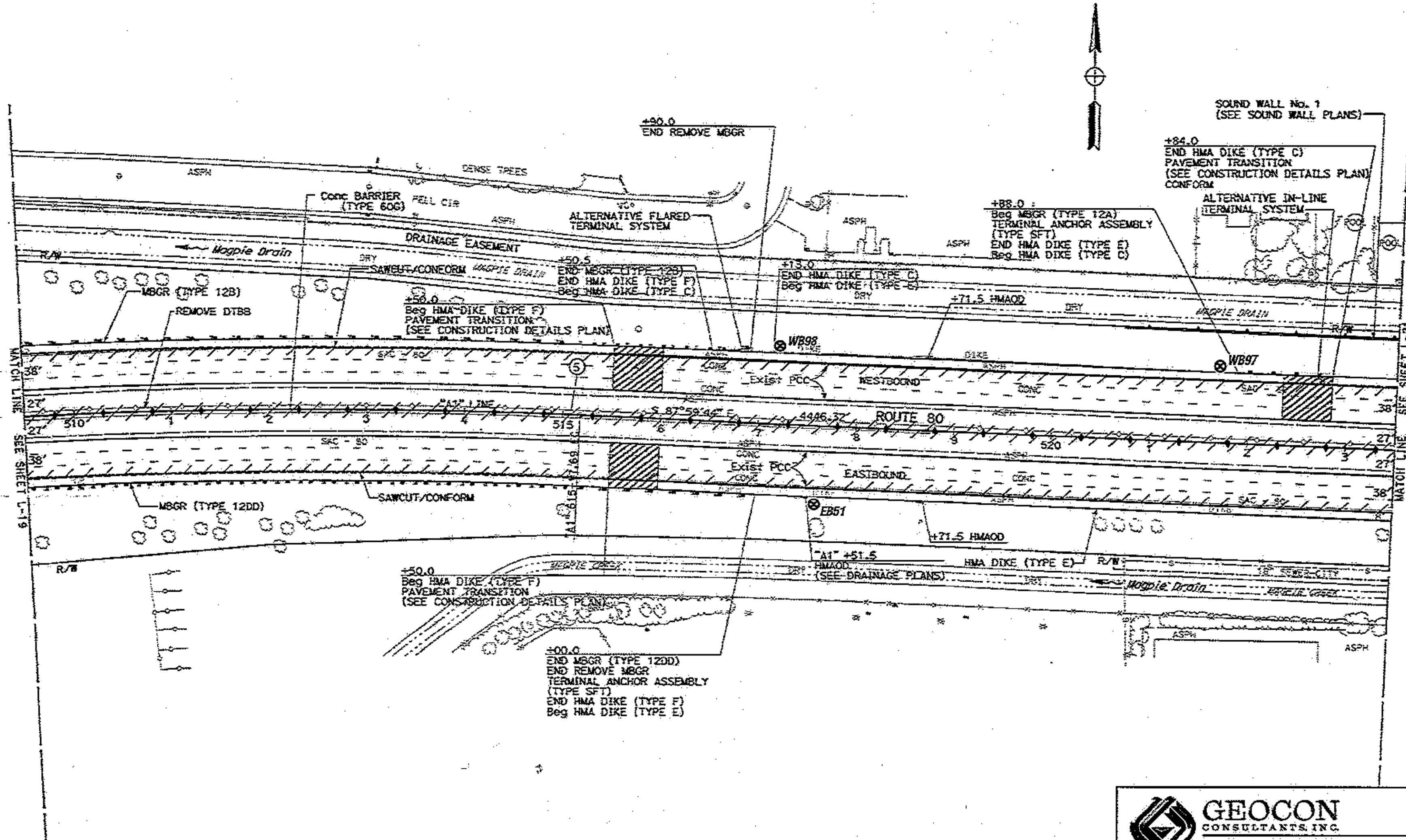


GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916.852-9118 - FAX 916.852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-18



0 100
Scale in Feet

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. – SUITE 800 – RANCHO CORDOVA, CA. 95742 PHONE 916 852-9118 – FAX 916 852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 · Figure 2-19

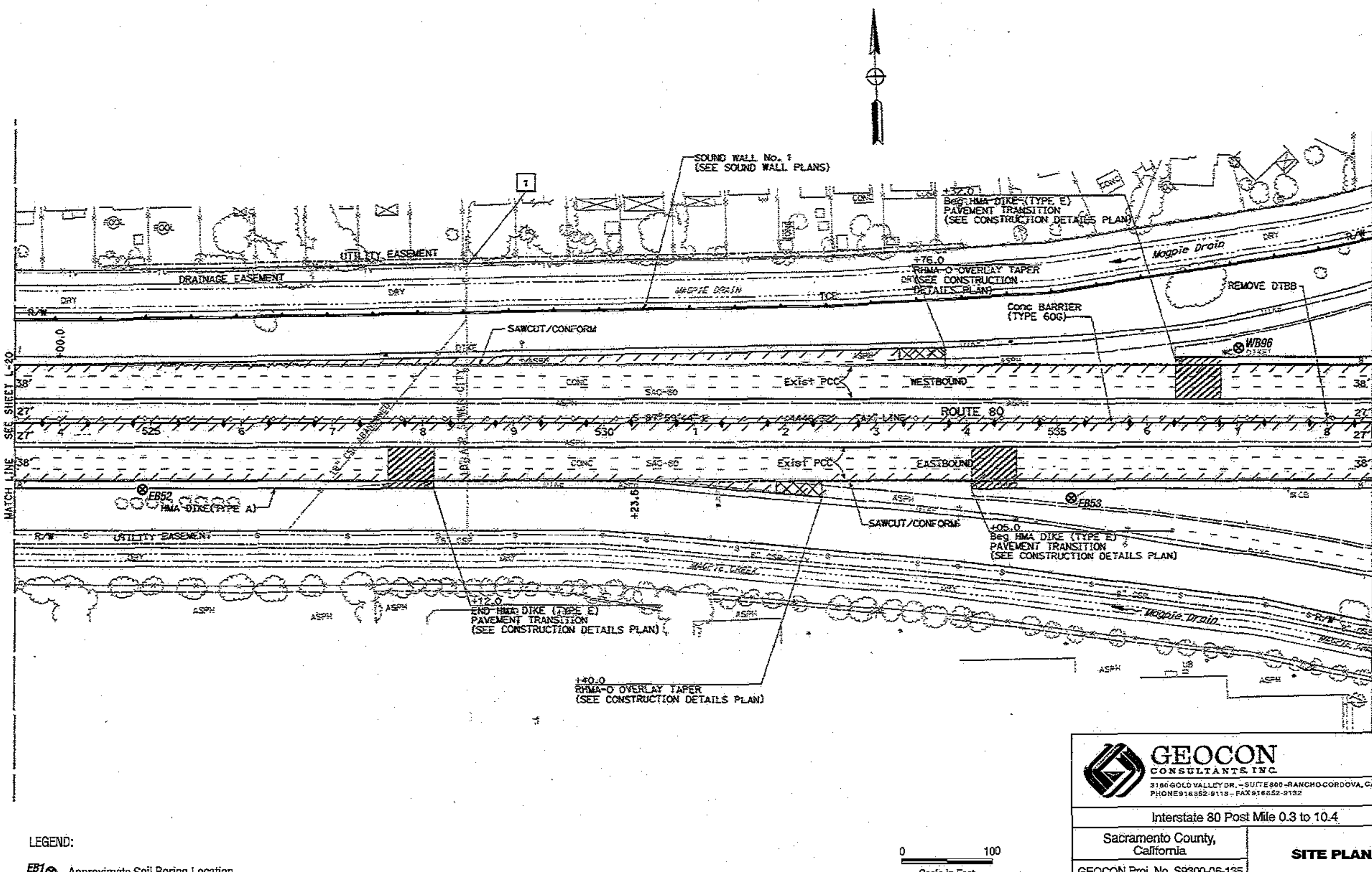


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 — 100 Scale in Feet

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916852-9118 - FAX 916852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-20

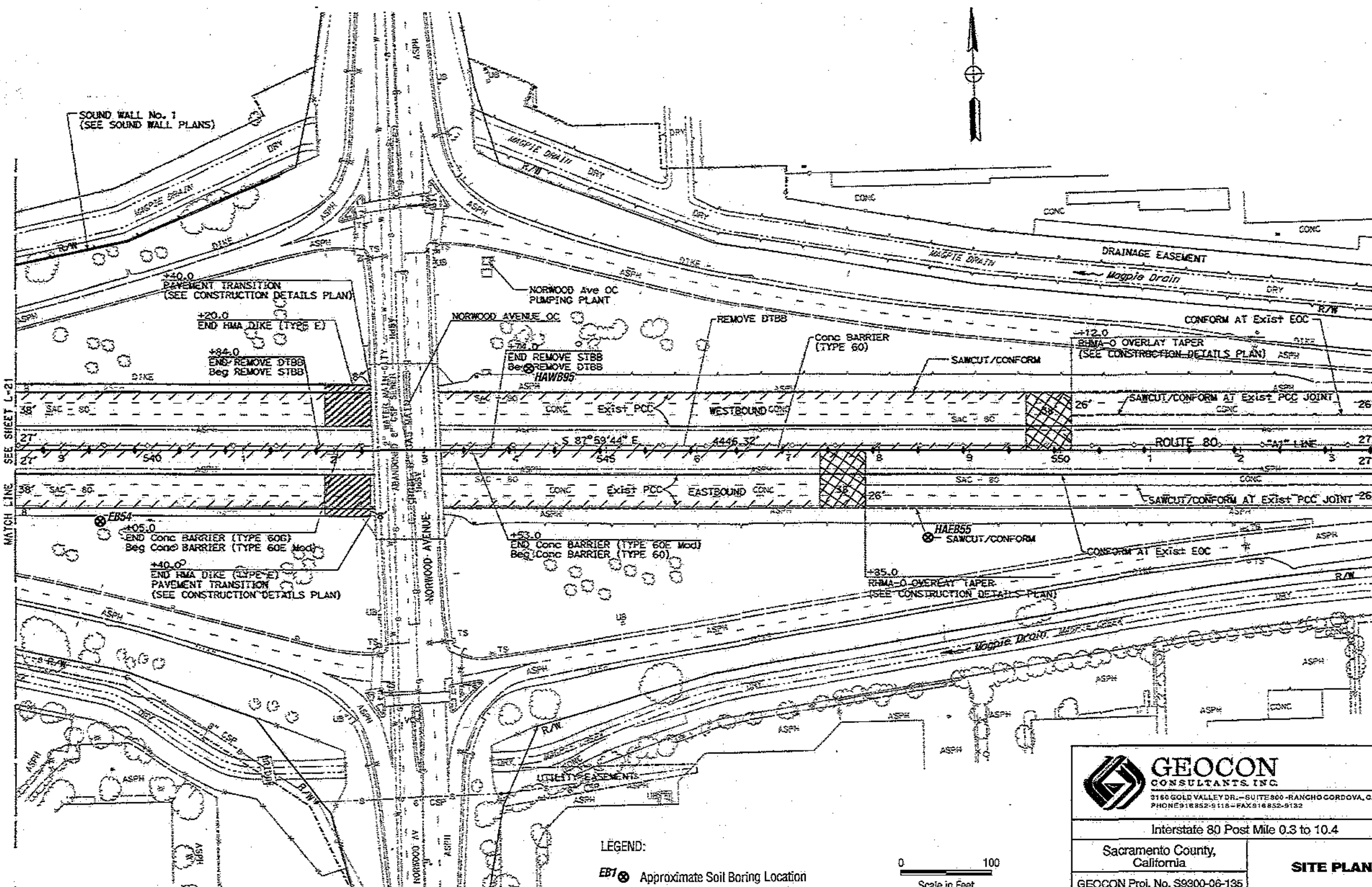


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916.852-9118 - FAX 916.852-9132

Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-21

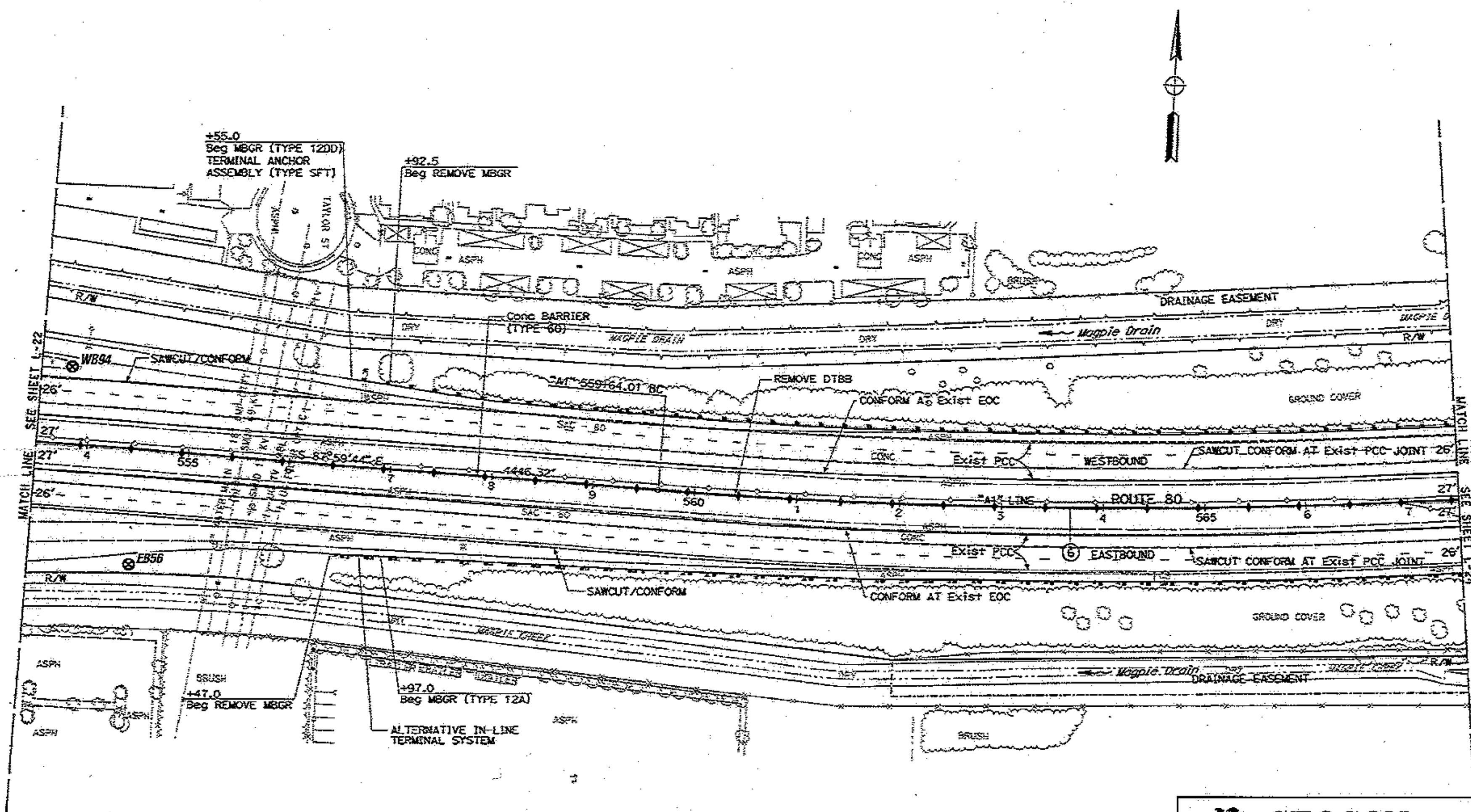


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 — 100
Scale in Feet

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR.–SUITE 800–RANCHO CORDOVA, CA. 95742 PHONE 916 852-9118–FAX 916 852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	**SITE PLAN**
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-22



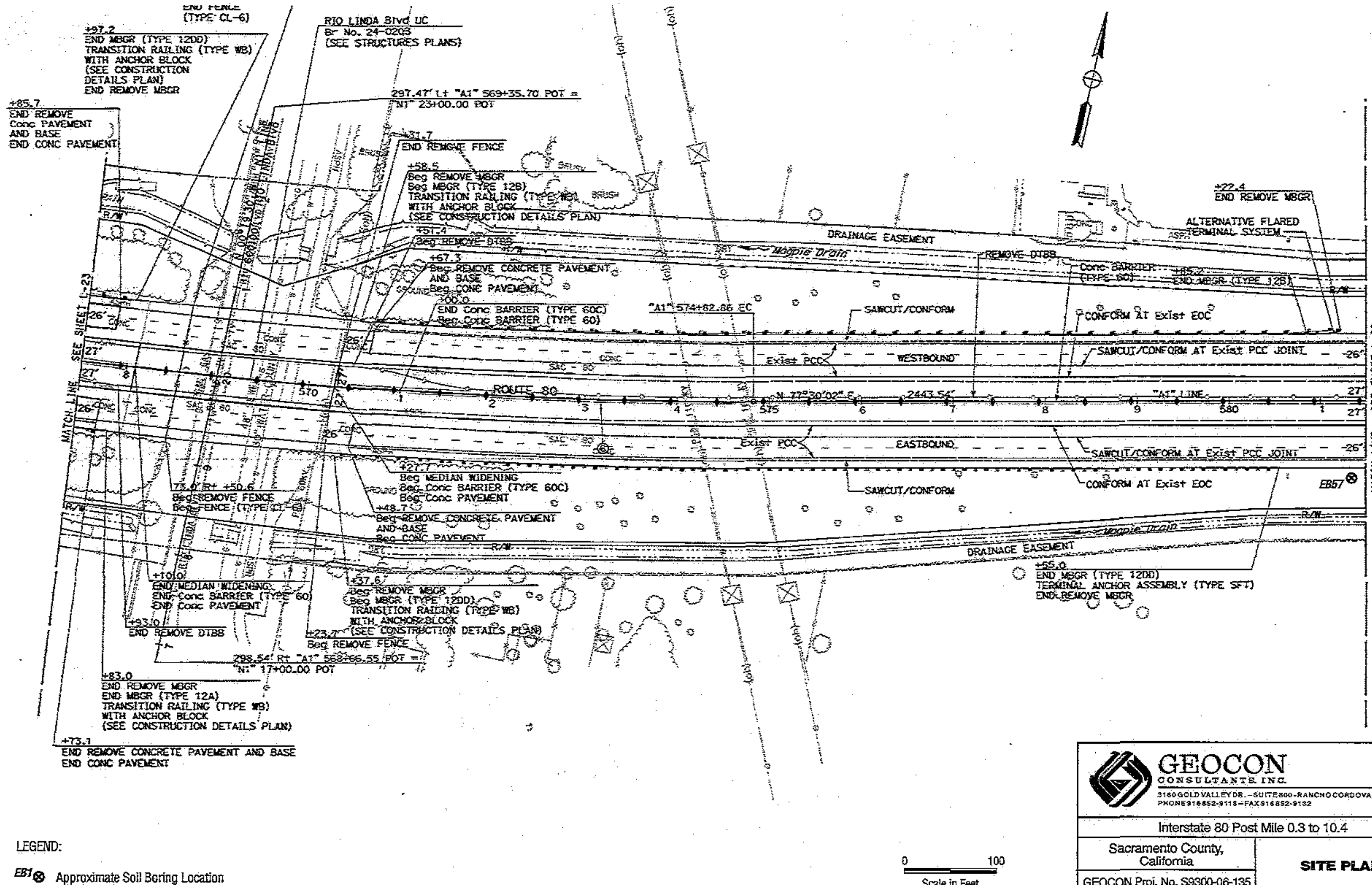
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916-852-9118 - FAX 916-852-9132

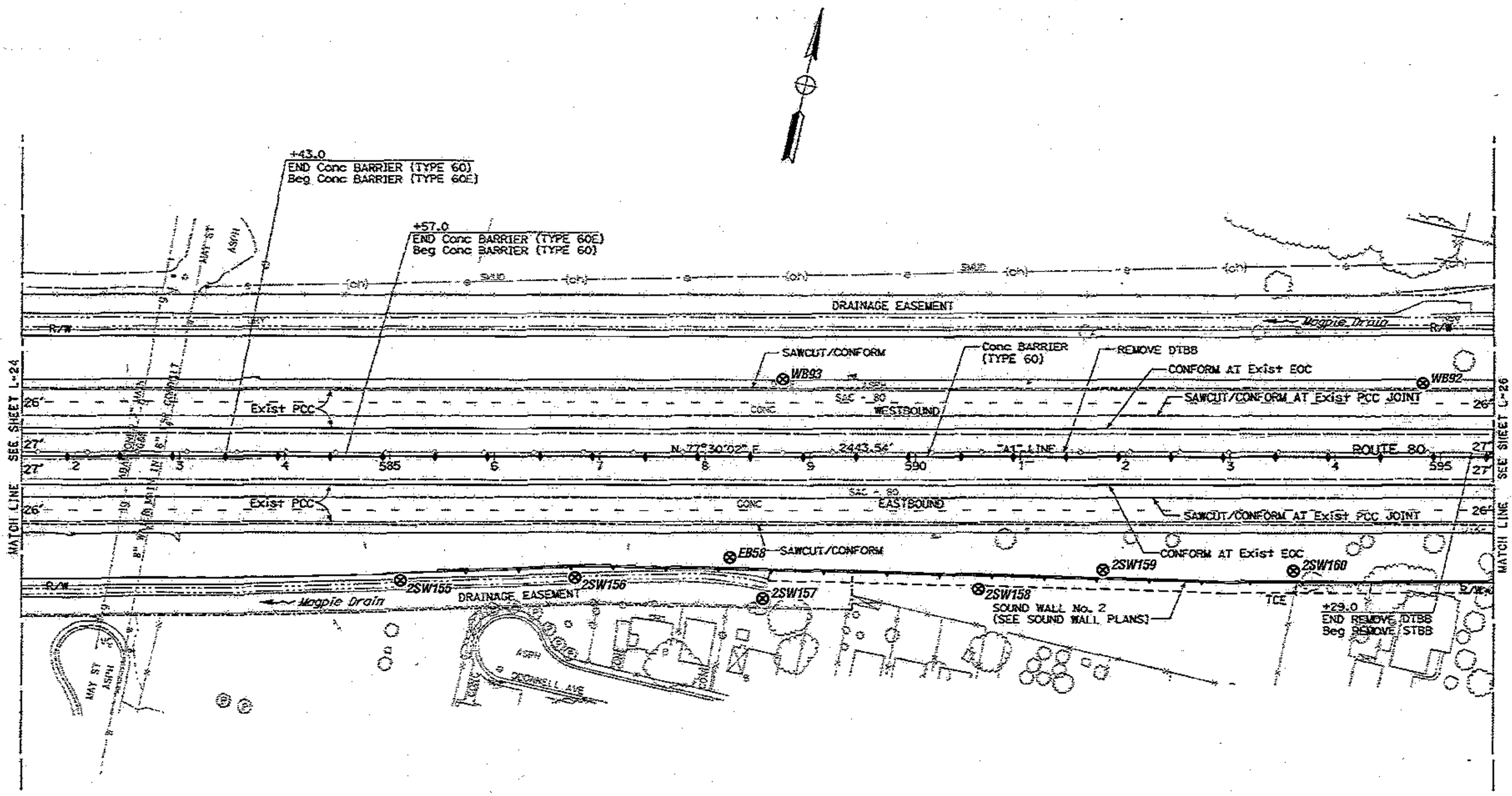
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-23



LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916 852-9118 - FAX 916 852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-24



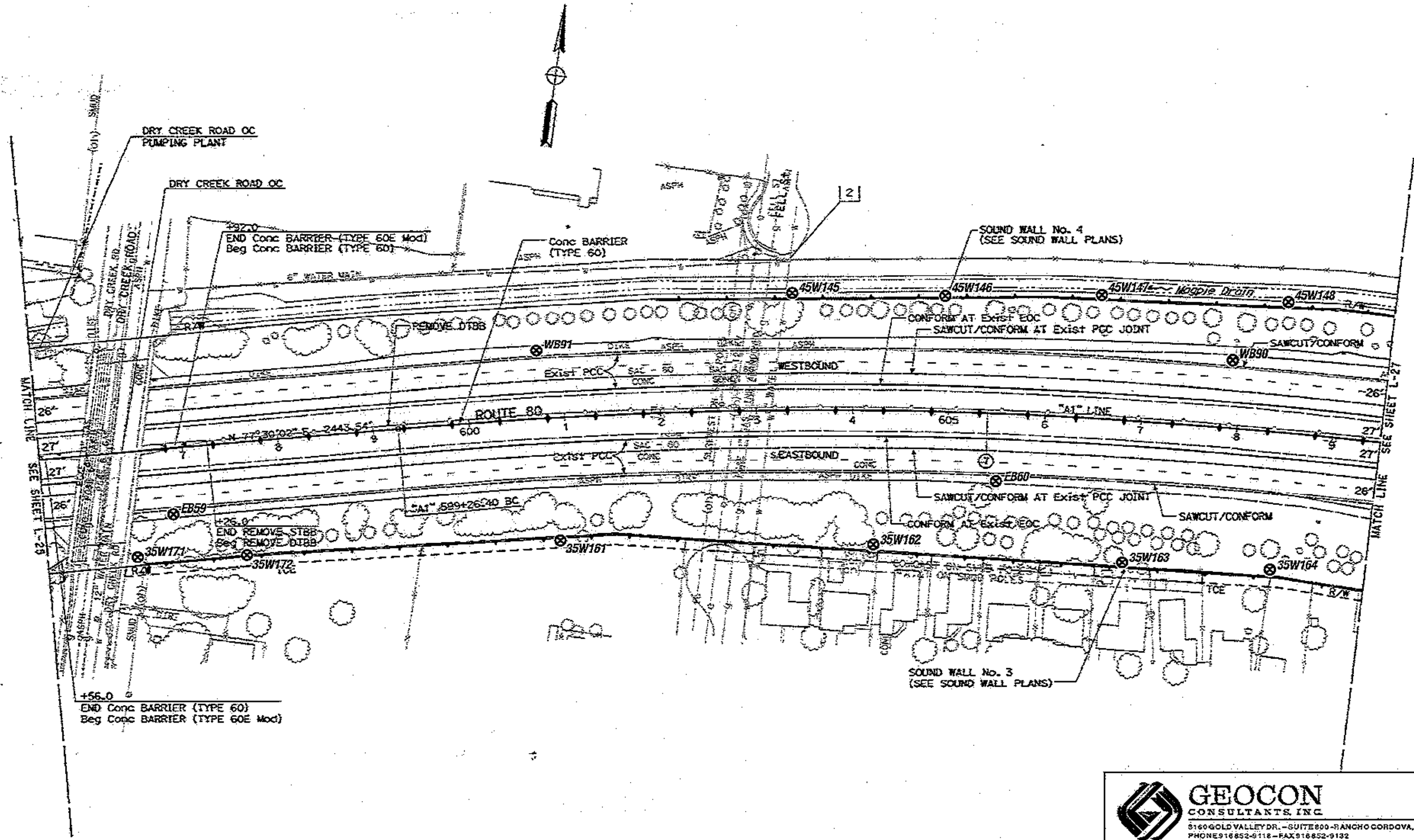
GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-25

0 — 100
Scale in Feet

LEGEND:

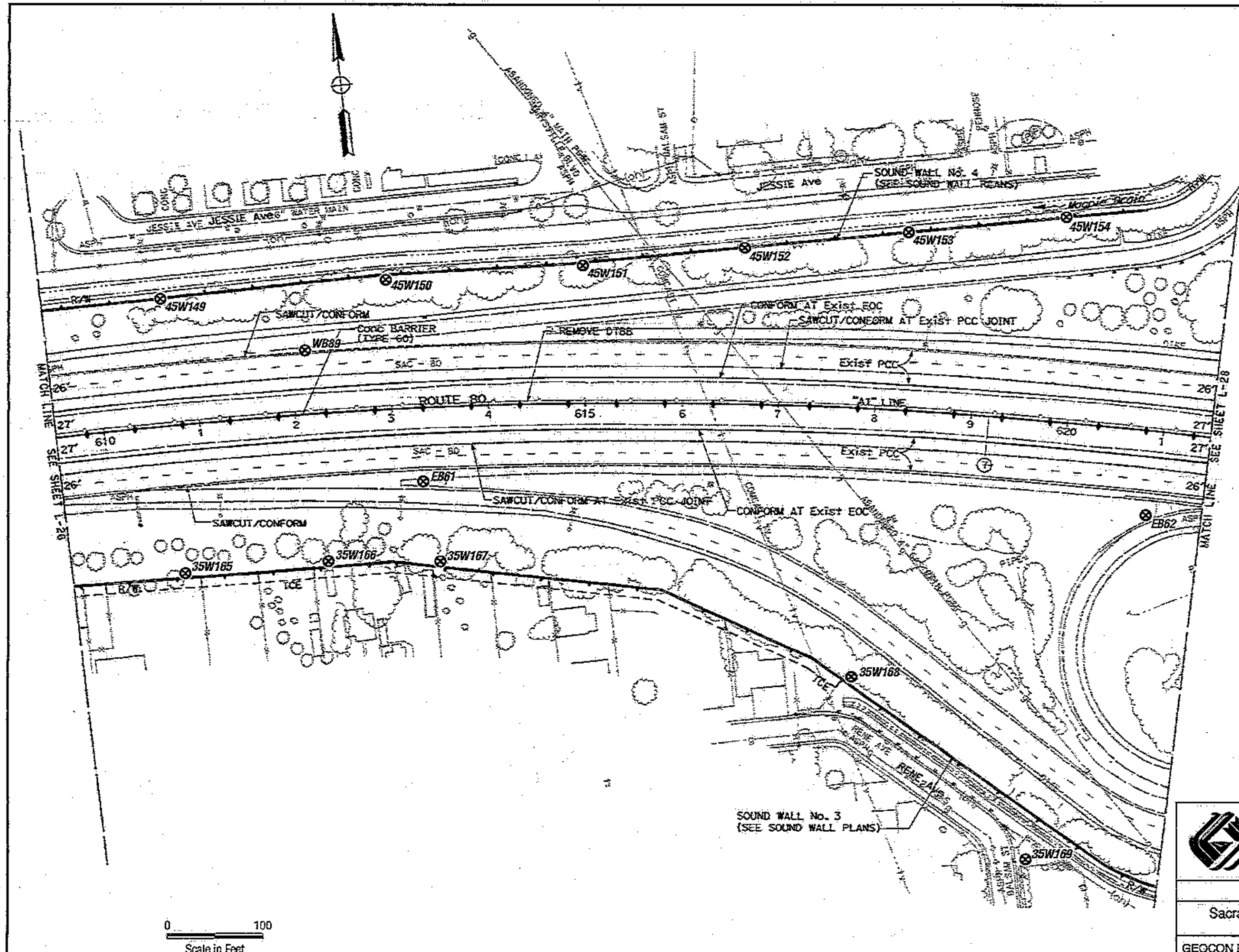
EB1 ⊗ Approximate Soil Boring Location



LEGEND:

EB1⊗ Approximate Soil Boring Location

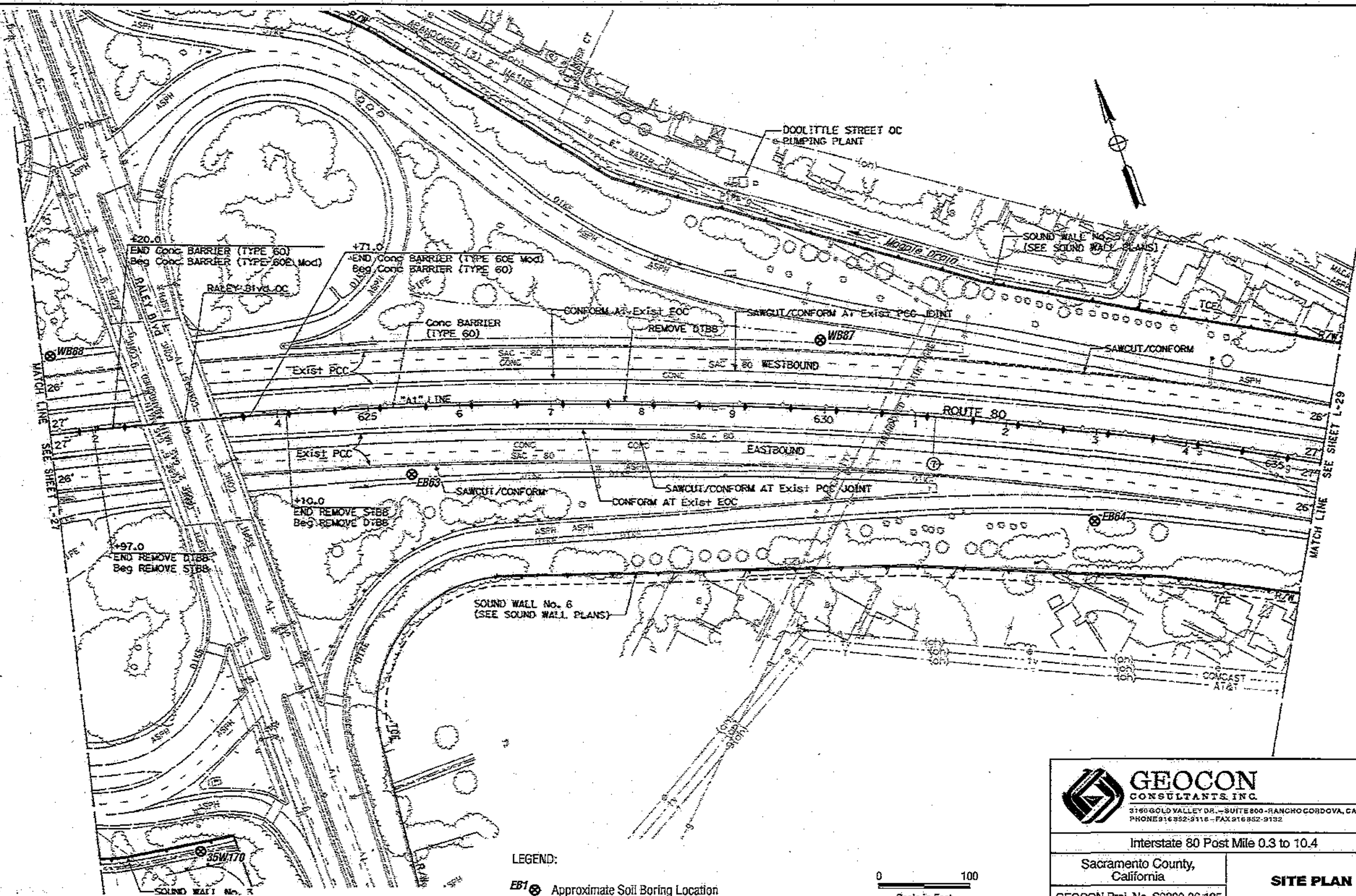
GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916.852-9118 - FAX 916.852-9132	
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-26



LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916852-9118 - FAX 916852-9132		
Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-27



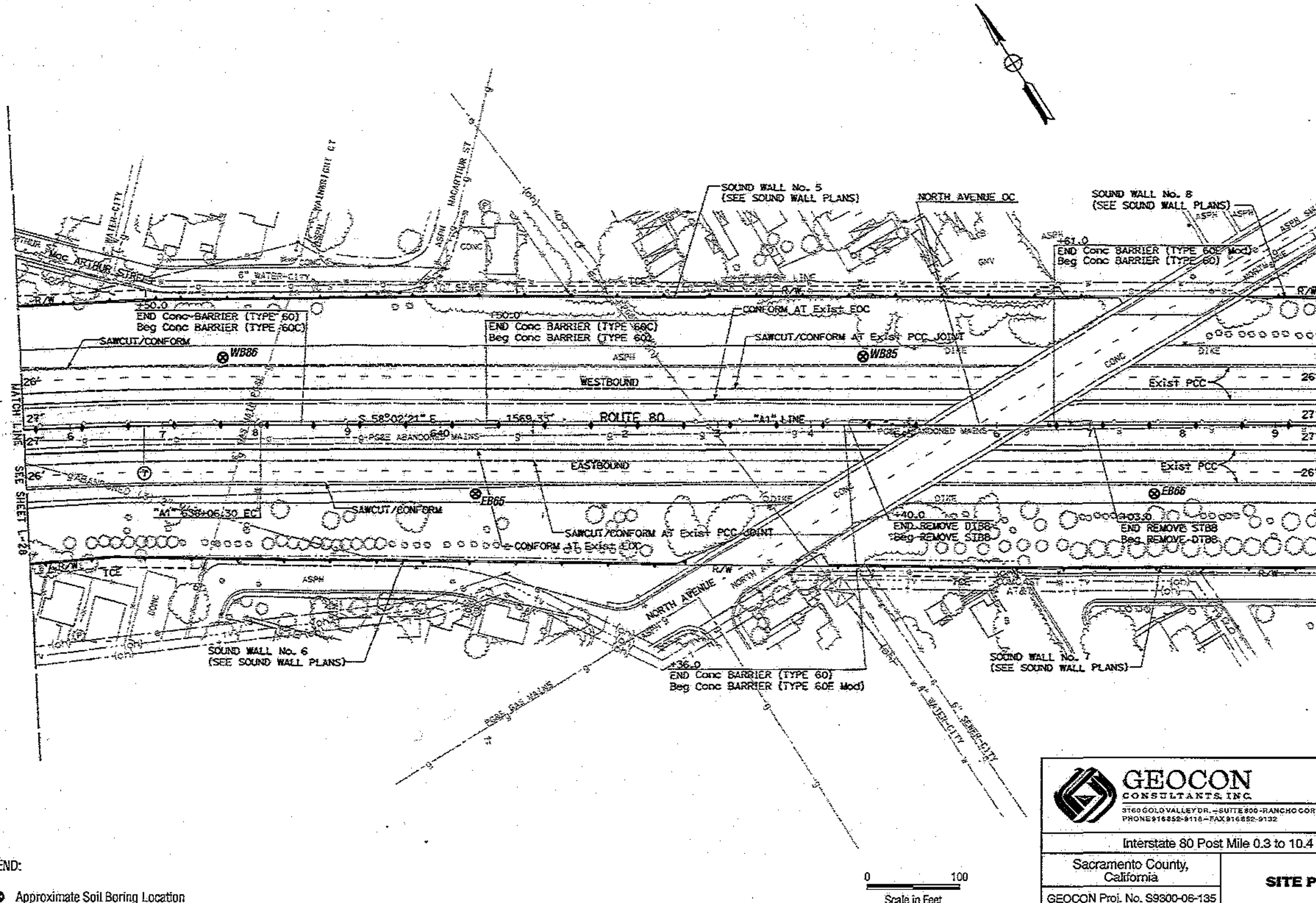
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 - FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-28



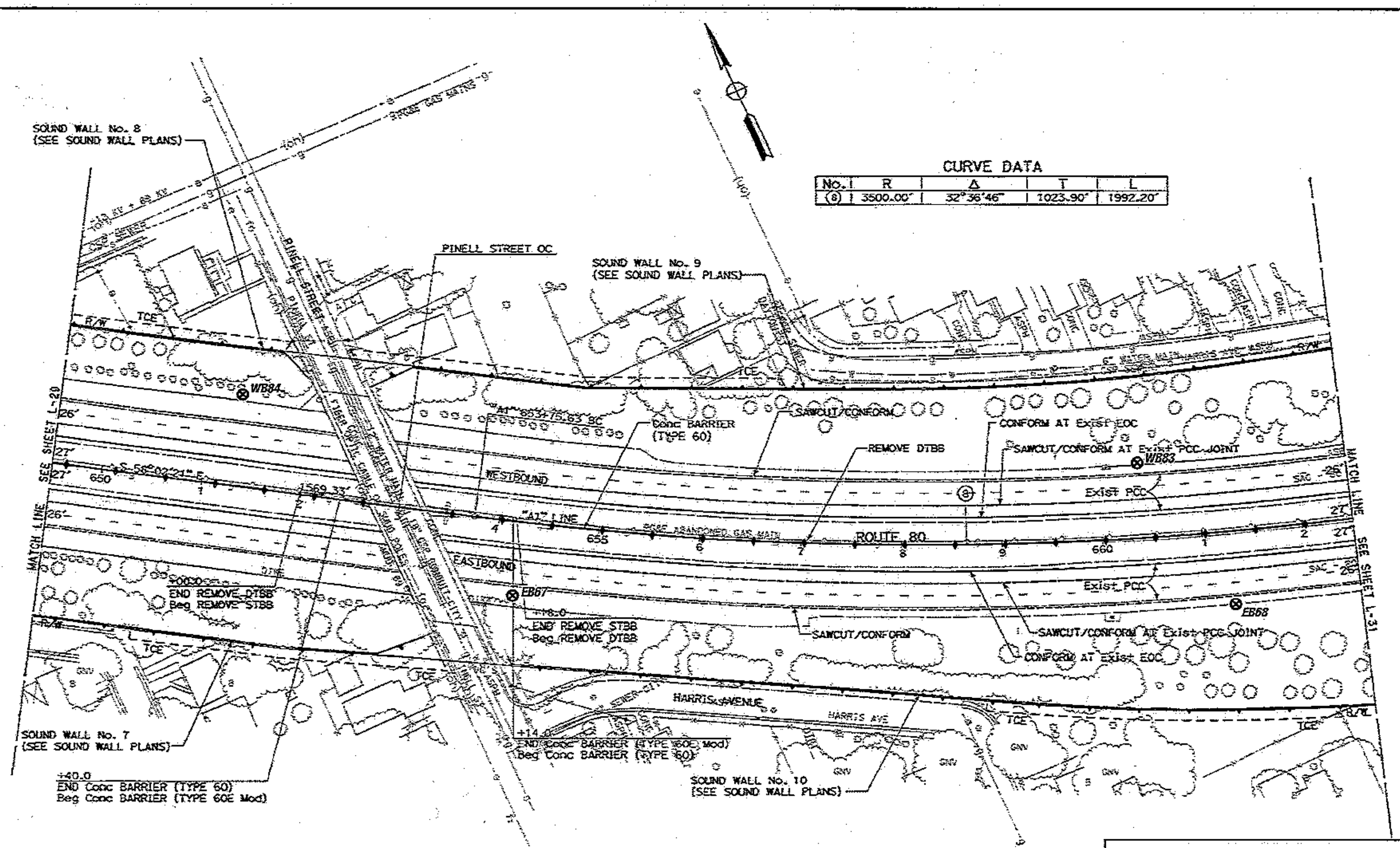
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.

3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916852-9118 - FAX 916852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-29



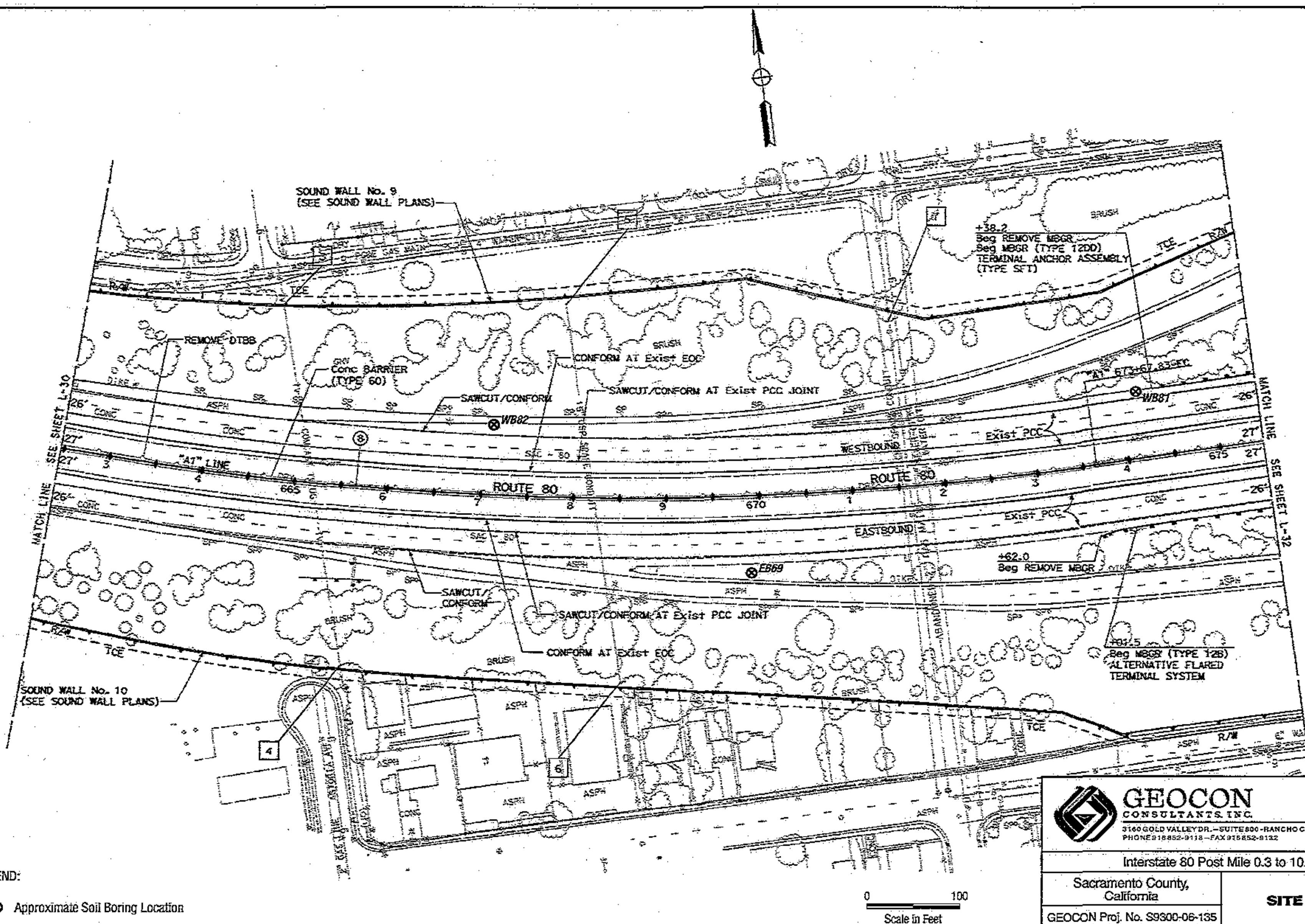
LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 — 100
Scale in Feet

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916-852-9118 - FAX 916-852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-30

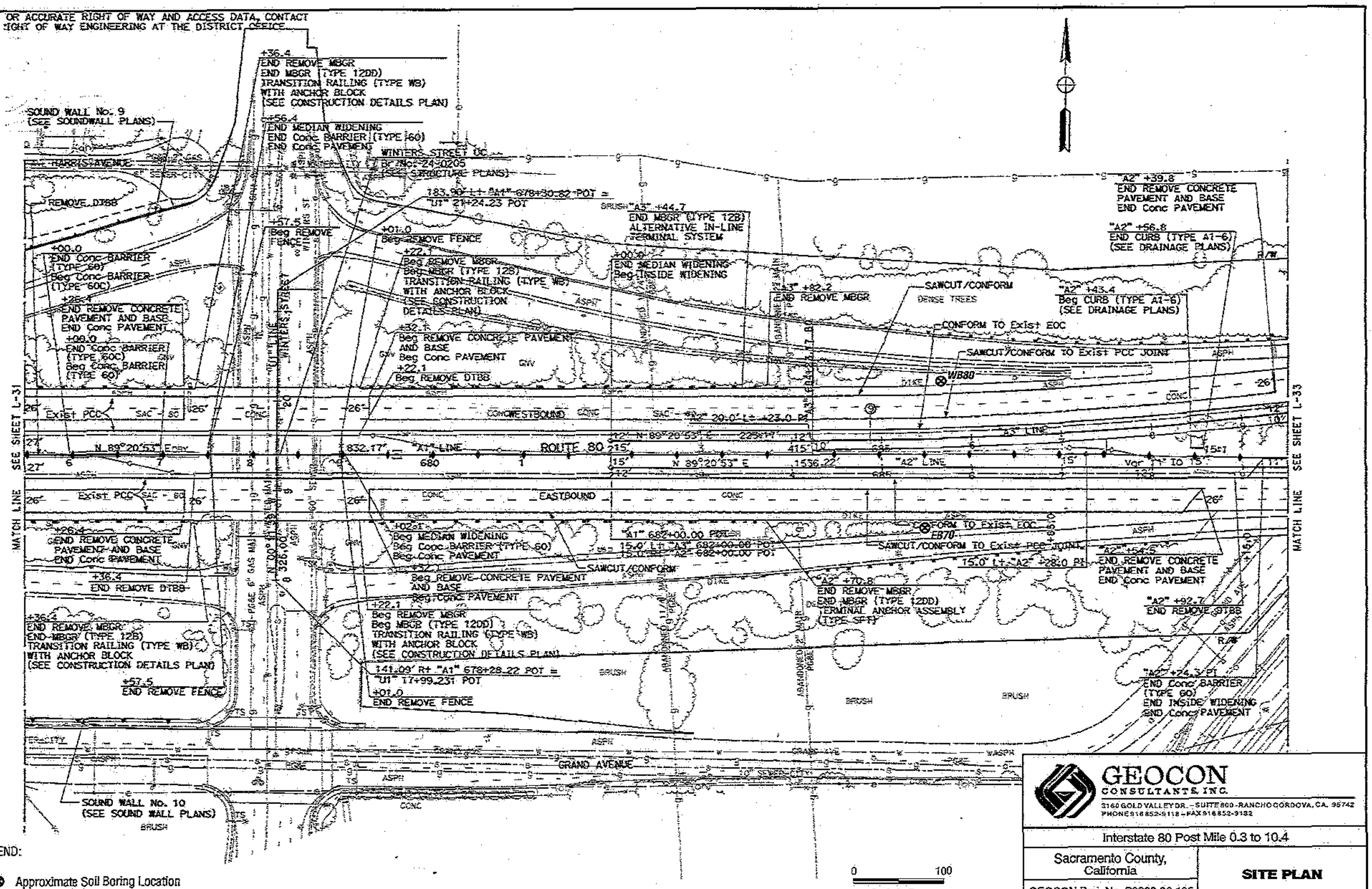


LEGEND:

EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916.852-9118 - FAX 916.852-9132

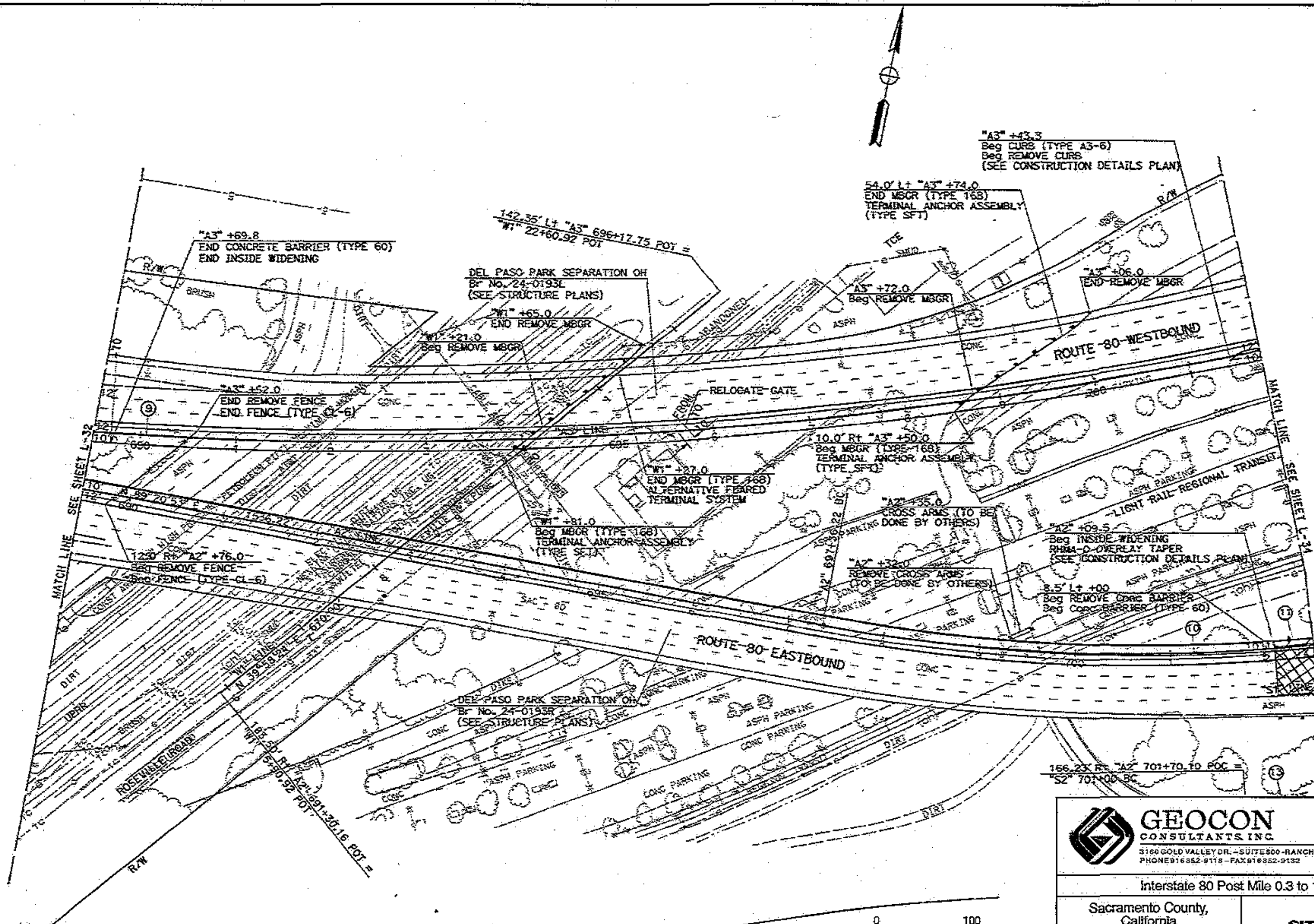
Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 / Figure 2-31



LEGEND:

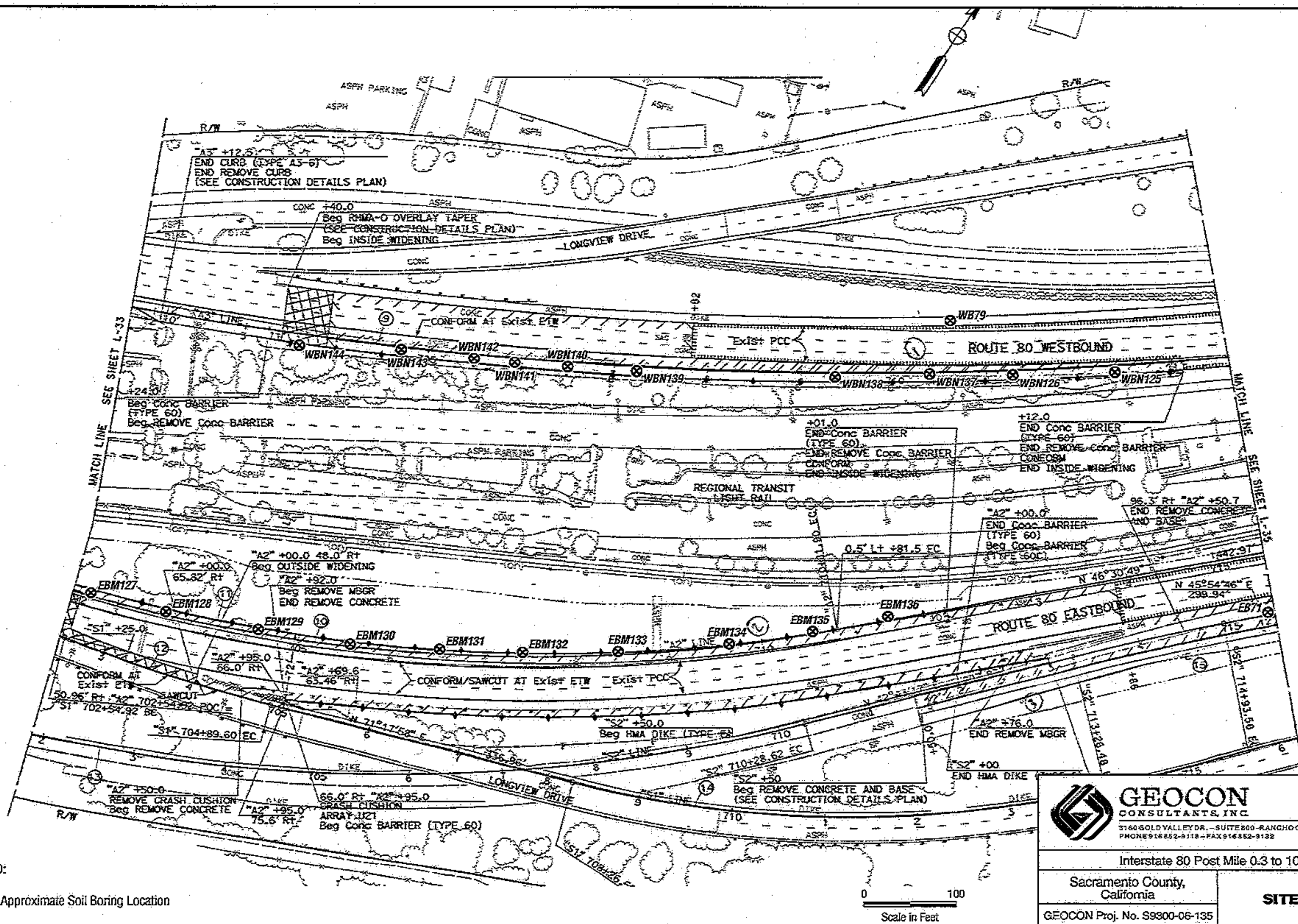
EB1 ⊗ Approximate Soil Boring Location

GEOCON CONSULTANTS, INC. 3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742 PHONE 916 852-9118 - FAX 916 852-9132		
Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-32



GEOCON CONSULTANTS, INC.
3160 GOLD VALLEY DR. – SUITE 800 – RANCHO CORDOVA, CA. 95742
PHONE 916 852-9118 – FAX 916 852-9132

Interstate 80 Post Mile 0.3 to 10.4		
Sacramento County, California	SITE PLAN	
GEOCON Proj. No. S9300-06-135		
Task Order No. 135	July 2010	Figure 2-33



LEGEND:

EB1⊗ Approximate Soil Boring Location

GEOCON
CONSULTANTS, INC.
3160 GOLD VALLEY DR. - SUITE 800 - RANCHO CORDOVA, CA. 95742
PHONE 916852-9118 - FAX 916852-9132

Interstate 80 Post Mile 0.3 to 10.4

Sacramento County, California

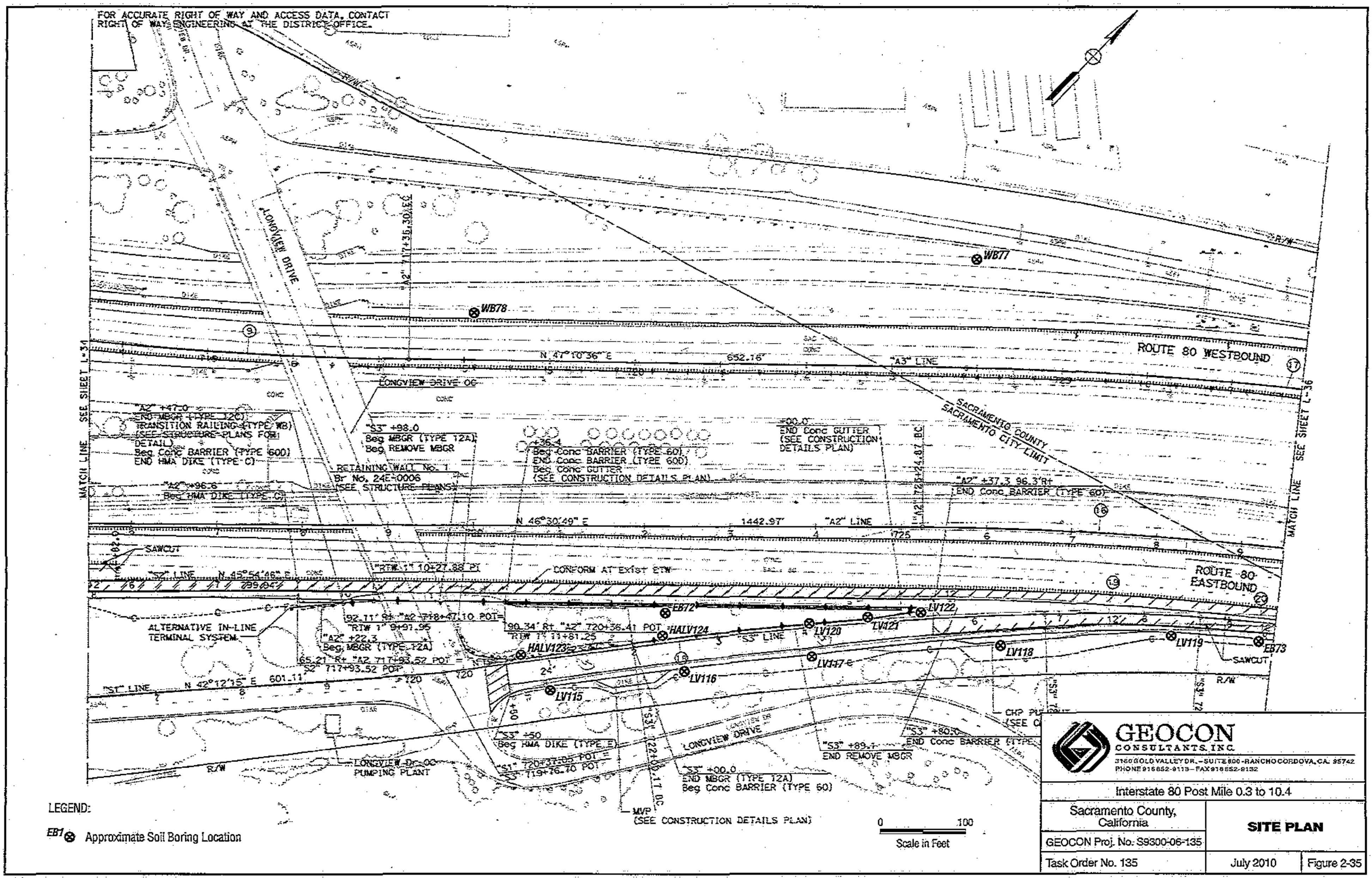
SITE PLAN

GEOCON Proj. No. S9800-06-135

Task Order No. 135

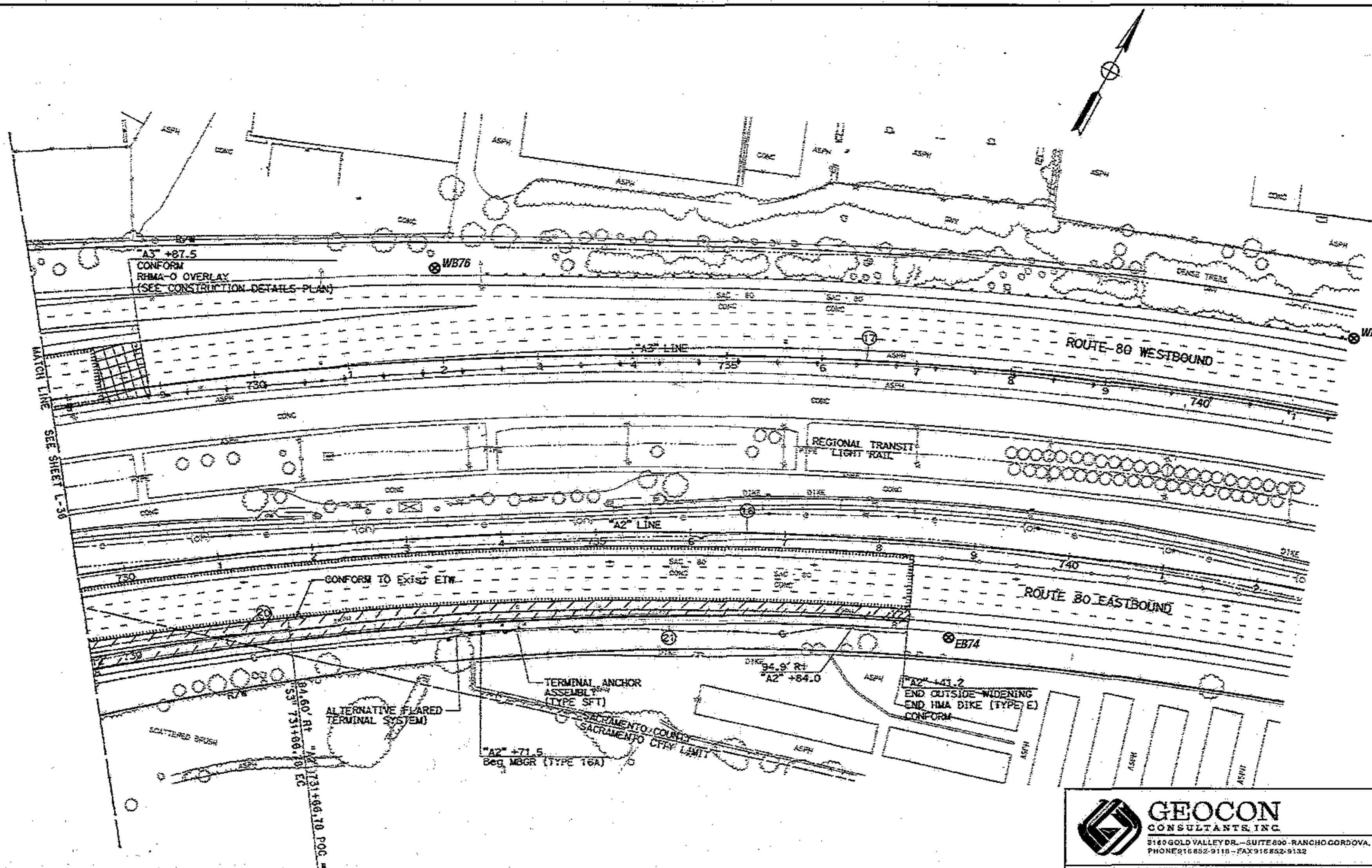
July 2010

Figure 2-34



LEGEND:

EB1 ⊗ Approximate Soil Boring Location



LEGEND:

EB1 ⊗ Approximate Soil Boring Location

0 100
Scale in Feet

GEOCON
CONSULTANTS, INC.
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Interstate 80 Post Mile 0.3 to 10.4	
Sacramento County, California	SITE PLAN
GEOCON Proj. No. S9300-06-135	
Task Order No. 135	July 2010 — Figure 2-36

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
DATA POPULATION #1 - EASTBOUND I-80 OUTSIDE SHOULDER								
EB1-0	7/6/2010	38.605531309	-121.542707897	42	---	---	---	---
EB1-0.5	7/6/2010			12	---	---	---	---
EB1-1	7/6/2010			16	---	---	---	---
EB1-1.5	7/6/2010			6.4	---	---	---	---
EB2-0	7/6/2010	38.605783101	-121.542545001	6.9	---	---	---	---
EB2-0.5	7/6/2010			8.9	---	---	---	---
EB2-1	7/6/2010			<5.0	---	---	---	---
EB2-1.5	7/6/2010			<5.0	---	---	---	---
EB3-0	7/6/2010	38.607419785	-121.541452331	20	---	---	---	---
EB3-0.5	7/6/2010			14	---	---	---	---
EB3-1	7/6/2010			16	---	---	---	---
EB3-1.5	7/6/2010			14	---	---	---	---
EB4-0	7/6/2010	38.609017493	-121.540373277	12	---	---	---	---
EB4-0.5	7/6/2010			24	---	---	---	---
EB4-1	7/6/2010			17	---	---	---	---
EB4-1.5	7/6/2010			11	---	---	---	---
EB5-0	7/6/2010	38.610604610	-121.539271525	11	---	---	---	---
EB5-0.5	7/6/2010			7.4	---	---	---	---
EB5-1	7/6/2010			11	---	---	---	---
EB5-1.5	7/6/2010			<5.0	---	---	---	---
EB6-0	7/6/2010	38.612172095	-121.538199499	120	1.5	<0.25	---	6.2
EB6-0.5	7/6/2010			15	---	---	---	---
EB6-1	7/6/2010			14	---	---	---	---
EB6-1.5	7/6/2010			13	---	---	---	---
EB7-0	7/6/2010	38.613726221	-121.536876721	8.5	---	---	---	---
EB7-0.5	7/6/2010			<5.0	---	---	---	---
EB7-1	7/6/2010			<5.0	---	---	---	---
EB7-1.5	7/6/2010			<5.0	---	---	---	---
EB8-0	7/6/2010	38.614644290	-121.535845418	8.8	---	---	---	---
EB8-0.5	7/6/2010			<5.0	---	---	---	---
EB8-1	7/6/2010			<5.0	---	---	---	---
EB8-1.5	7/6/2010			<5.0	---	---	---	---
EB9-0	7/6/2010	38.616045577	-121.533558324	29	---	---	---	---
EB9-0.5	7/6/2010			<5.0	---	---	---	---
EB9-1	7/6/2010			<5.0	---	---	---	---
EB9-1.5	7/6/2010			<5.0	---	---	---	---
EB10-0	7/6/2010	38.617053850	-121.531614759	100	3.1	<0.25	---	8.2

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
EB10-0.5	7/6/2010			9.9	---	---	---	---
EB10-1	7/6/2010			11	---	---	---	---
EB10-1.5	7/6/2010			9.3	---	---	---	---
EB11-0	7/6/2010	38.622182514	-121.521961216	20	---	---	---	---
EB11-0.5	7/6/2010			5.1	---	---	---	---
EB11-1	7/6/2010			6.4	---	---	---	---
EB11-1.5	7/6/2010			<5.0	---	---	---	---
EB12-0	7/6/2010	38.623348836	-121.519758422	51	1.5	<0.25	---	8.5
EB12-0.5	7/6/2010			8.0	---	---	---	---
EB12-1	7/6/2010			7.8	---	---	---	---
EB12-1.5	7/6/2010			<5.0	---	---	---	---
EB13-0	7/6/2010	38.625804780	-121.514889486	310	19	<0.25	0.46	8.1
EB13-0.5	7/6/2010			24	---	---	---	---
EB13-1	7/6/2010			8.2	---	---	---	---
EB13-1.5	7/6/2010			6.4	---	---	---	---
EB14-0	7/6/2010	38.626386435	-121.513876499	54	3.9	<0.25	---	8.7
EB14-0.5	7/6/2010			<5.0	---	---	---	---
EB14-1	7/6/2010			<5.0	---	---	---	---
EB14-1.5	7/6/2010			<5.0	---	---	---	---
EB15-0	7/6/2010	38.627014492	-121.512751368	120	4.4	<0.25	---	8.6
EB15-0.5	7/6/2010			5.1	---	---	---	---
EB15-1	7/6/2010			5.7	---	---	---	---
EB15-1.5	7/6/2010			7.1	---	---	---	---
EB16-0	7/6/2010	38.628032275	-121.510715620	140	7.3	0.31	---	7.7
EB16-0.5	7/6/2010			16	---	---	---	---
EB16-1	7/6/2010			6.5	---	---	---	---
EB16-1.5	7/6/2010			6.4	---	---	---	---
EB17-0	7/6/2010	38.629159665	-121.508647856	52	2.7	<0.25	---	7.9
EB17-0.5	7/6/2010			9.3	---	---	---	---
EB17-1	7/6/2010			5.9	---	---	---	---
EB17-1.5	7/6/2010			<5.0	---	---	---	---
EB18-0	7/6/2010	38.630295751	-121.506495098	53	2.7	<0.25	---	7.4
EB18-0.5	7/6/2010			5.3	---	---	---	---
EB18-1	7/6/2010			11	---	---	---	---
EB18-1.5	7/6/2010			<5.0	---	---	---	---
EB19-0	7/6/2010	38.632264685	-121.502819391	13	---	---	---	---
EB19-0.5	7/6/2010			38	---	---	---	---
EB19-1	7/6/2010			17	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
EB19-1.5	7/6/2010			6.6	---	---	---	---
EB20-0	7/6/2010	38.633013381	-121.501396303	49	---	---	---	---
EB20-0.5	7/6/2010			39	---	---	---	---
EB20-1	7/6/2010			<5.0	---	---	---	---
EB20-1.5	7/6/2010			14	---	---	---	---
EB21-0	7/6/2010	38.633876900	-121.499621648	8.4	---	---	---	---
EB21-0.5	7/6/2010			<5.0	---	---	---	---
EB21-1	7/6/2010			7.3	---	---	---	---
EB21-1.5	7/6/2010			5.2	---	---	---	---
EB22-0	7/6/2010	38.634540235	-121.498401640	9.1	---	---	---	---
EB22-0.5	7/6/2010			11	---	---	---	---
EB22-1	7/6/2010			29	---	---	---	---
EB22-1.5	7/6/2010			35	---	---	---	---
EB23-0	7/6/2010	38.635897321	-121.495784033	30	---	---	---	---
EB23-0.5	7/6/2010			13	---	---	---	---
EB23-1	7/6/2010			8.7	---	---	---	---
EB23-1.5	7/6/2010			7.8	---	---	---	---
EB24-0	7/6/2010	38.637109501	-121.493534755	<5.0	---	---	---	---
EB24-0.5	7/6/2010			5.4	---	---	---	---
EB24-1	7/6/2010			6.2	---	---	---	---
EB24-1.5	7/6/2010			5.4	---	---	---	---
EB25-0	7/6/2010	38.638121568	-121.491389124	11	---	---	---	---
EB25-0.5	7/6/2010			8.9	---	---	---	---
EB25-1	7/6/2010			8.5	---	---	---	---
EB25-1.5	7/6/2010			8.7	---	---	---	---
EB26-0	7/6/2010	38.638897071	-121.488991228	20	---	---	---	---
EB26-0.5	7/6/2010			9.9	---	---	---	---
EB26-1	7/6/2010			14	---	---	---	---
EB26-1.5	7/6/2010			6.2	---	---	---	---
EB27-0	7/6/2010	38.639388286	-121.486486595	14	---	---	---	---
EB27-0.5	7/6/2010			11	---	---	---	---
EB27-1	7/6/2010			7.6	---	---	---	---
EB27-1.5	7/6/2010			5.7	---	---	---	---
EB28-0	7/6/2010	38.639723904	-121.483664819	28	---	---	---	---
EB28-0.5	7/6/2010			10	---	---	---	---
EB28-1	7/6/2010			27	---	---	---	---
EB28-1.5	7/6/2010			<5.0	---	---	---	---
EB29-0	7/6/2010	38.639937301	-121.481199361	17	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
EB29-0.5	7/6/2010			10	---	---	---	---
EB29-1	7/6/2010			<5.0	---	---	---	---
EB29-1.5	7/6/2010			<5.0	---	---	---	---
EB49-0	7/7/2010	38.640322903	-121.478998730	79	1.4	<0.25	---	8.2
EB49-0.5	7/7/2010			10	---	---	---	---
EB49-1	7/7/2010			6.7	---	---	---	---
EB49-1.5	7/7/2010			5.8	---	---	---	---
EB50-0	7/7/2010	38.640603628	-121.476419720	8.5	---	---	---	---
EB50-0.5	7/7/2010			<5.0	---	---	---	---
EB50-1	7/7/2010			5.7	---	---	---	---
EB50-1.5	7/7/2010			<5.0	---	---	---	---
EB51-0	7/7/2010	38.641458375	-121.465550586	160	11	0.58	---	8.3
EB51-0.5	7/7/2010			31	---	---	---	---
EB51-1	7/7/2010			7.1	---	---	---	---
EB51-1.5	7/7/2010			220	<0.25	<0.25	---	8.4
EB52-0	7/7/2010	38.641395606	-121.462714962	74	12	<0.25	---	7.8
EB52-0.5	7/7/2010			<5.0	---	---	---	---
EB52-1	7/7/2010			40	---	---	---	---
EB52-1.5	7/7/2010			74	<0.25	<0.25	---	8.1
EB53-0	7/7/2010	38.641272429	-121.459726738	170	15	<0.25	---	8.2
EB53-0.5	7/7/2010			9.3	---	---	---	---
EB53-1	7/7/2010			<5.0	---	---	---	---
EB53-1.5	7/7/2010			<5.0	---	---	---	---
EB54-0	7/7/2010	38.641220306	-121.457716158	41	---	---	---	---
EB54-0.5	7/7/2010			12	---	---	---	---
EB54-1	7/7/2010			6.9	---	---	---	---
EB54-1.5	7/7/2010			<5.0	---	---	---	---
HAEB55-0	7/7/2010	38.641136841	-121.455132177	11	---	---	---	---
HAEB55-0.5	7/7/2010			<5.0	---	---	---	---
HAEB55-1	7/7/2010			<5.0	---	---	---	---
HAEB55-1.5	7/7/2010			<5.0	---	---	---	---
EB56-0	7/7/2010	38.640983493	-121.452836078	11	---	---	---	---
EB56-0.5	7/7/2010			9.3	---	---	---	---
EB56-1	7/7/2010			8.2	---	---	---	---
EB56-1.5	7/7/2010			48	---	---	---	---
EB57-0	7/7/2010	38.641727313	-121.443482086	74	5.3	<0.25	---	7.8
EB57-0.5	7/7/2010			5.6	---	---	---	---
EB57-1	7/7/2010			<5.0	---	---	---	---

TABLE I
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
EB57-1.5	7/7/2010			7.0	---	---	---	---
EB58-0	7/7/2010	38.642184376	-121.440886031	170	**9.7**	<0.25	---	6.2
EB58-0.5	7/7/2010			22	---	---	---	---
EB58-1	7/7/2010			<5.0	---	---	---	---
EB58-1.5	7/7/2010			<5.0	---	---	---	---
EB59-0	7/7/2010	38.642649726	-121.438068428	33	---	---	---	---
EB59-0.5	7/7/2010			<5.0	---	---	---	---
EB59-1	7/7/2010			<5.0	---	---	---	---
EB59-1.5	7/7/2010			<5.0	---	---	---	---
EB60-0	7/7/2010	38.643015871	-121.435177865	360	**25**	<0.25	0.36	6.8
EB60-0.5	7/7/2010			47	---	---	---	---
EB60-1	7/7/2010			5.3	---	---	---	---
EB60-1.5	7/7/2010			<5.0	---	---	---	---
EB61-0	7/7/2010	38.643021219	-121.432343892	<5.0	---	---	---	---
EB61-0.5	7/7/2010			5.7	---	---	---	---
EB61-1	7/7/2010			5.0	---	---	---	---
EB61-1.5	7/7/2010			<5.0	---	---	---	---
EB62-0	7/7/2010	38.642807830	-121.430405949	18	---	---	---	---
EB62-0.5	7/7/2010			6.2	---	---	---	---
EB62-1	7/7/2010			8.0	---	---	---	---
EB62-1.5	7/7/2010			6.9	---	---	---	---
EB63-0	7/7/2010	38.642347910	-121.428180188	300	**17**	<0.25	0.37	6.4
EB63-0.5	7/7/2010			16	---	---	---	---
EB63-1	7/7/2010			6.1	---	---	---	---
EB63-1.5	7/7/2010			<5.0	---	---	---	---
EB64-0	7/7/2010	38.641659456	-121.426180551	27	---	---	---	---
EB64-0.5	7/7/2010			<5.0	---	---	---	---
EB64-1	7/7/2010			<5.0	---	---	---	---
EB64-1.5	7/7/2010			<5.0	---	---	---	---
EB65-0	7/7/2010	38.640580288	-121.423738128	42	---	---	---	---
EB65-0.5	7/7/2010			23	---	---	---	---
EB65-1	7/7/2010			5.5	---	---	---	---
EB65-1.5	7/7/2010			<5.0	---	---	---	---
EB66-0	7/7/2010	38.639512759	-121.421571958	<5.0	---	---	---	---
EB66-0.5	7/7/2010			<5.0	---	---	---	---
EB66-1	7/7/2010			9.4	---	---	---	---
EB66-1.5	7/7/2010			8.5	---	---	---	---
EB67-0	7/7/2010	38.638418163	-121.419373599	780	**38**	<0.25	0.74	6.6

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
EB67-0.5	7/7/2010			130	3.4	<0.25	---	6.9
EB67-1	7/7/2010			7.1	---	---	---	---
EB67-1.5	7/7/2010			<5.0	---	---	---	---
EB68-0	7/7/2010	38.637635015	-121.417031499	23	---	---	---	---
EB68-0.5	7/7/2010			16	---	---	---	---
EB68-1	7/7/2010			7.7	---	---	---	---
EB68-1.5	7/7/2010			8.6	---	---	---	---
EB69-0	7/7/2010	38.637201487	-121.414492599	210	**16**	<0.25	---	7.6
EB69-0.5	7/7/2010			7.0	---	---	---	---
EB69-1	7/7/2010			5.5	---	---	---	---
EB69-1.5	7/7/2010			7.8	---	---	---	---
EB70-0	7/7/2010	38.637162765	-121.408852191	59	**21**	0.45	---	7.6
EB70-0.5	7/7/2010			<5.0	---	---	---	---
EB70-1	7/7/2010			8.9	---	---	---	---
EB70-1.5	7/7/2010			5.4	---	---	---	---
EB71-0	7/7/2010	38.639328351	-121.399138289	45	---	---	---	---
EB71-0.5	7/7/2010			<5.0	---	---	---	---
EB71-1	7/7/2010			8.1	---	---	---	---
EB71-1.5	7/7/2010			<5.0	---	---	---	---
EB72-0	7/7/2010	38.640755605	-121.397251060	170	**14**	<0.25	---	6.0
EB72-0.5	7/7/2010			42	---	---	---	---
EB72-1	7/7/2010			31	---	---	---	---
EB72-1.5	7/7/2010			17	---	---	---	---
EB73-0	7/7/2010	38.641969909	-121.395392614	36	---	---	---	---
EB73-0.5	7/7/2010			5.3	---	---	---	---
EB73-1	7/7/2010			5.2	---	---	---	---
EB73-1.5	7/7/2010			5.2	---	---	---	---
EB74-0	7/7/2010	38.643197731	-121.392658877	8.4	---	---	---	---
EB74-0.5	7/7/2010			6.8	---	---	---	---
EB74-1	7/7/2010			30	---	---	---	---
EB74-1.5	7/7/2010			68	2.6	<0.25	---	7.6
DATA POPULATION #2 - WESTBOUND I-80 OUTSIDE SHOULDER								
WB30-0	7/6/2010	38.641038718	-121.476582983	54	3.3	<0.25	---	7.8
WB30-0.5	7/6/2010			5.8	---	---	---	---
WB30-1	7/6/2010			<5.0	---	---	---	---
WB30-1.5	7/6/2010			5.3	---	---	---	---
WB31-0	7/6/2010	38.640720697	-121.479228139	56	2.3	<0.25	---	7.1
WB31-0.5	7/6/2010			340	**33**	<0.25	0.48	8.1
WB31-1	7/6/2010			9.6	---	---	---	---

TABLE 1
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EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WB31-1.5	7/6/2010			5.3	---	---	---	---
WB32-0	7/6/2010	38.640468686	-121.481672104	53	5.3	<0.25	---	8.0
WB32-0.5	7/6/2010			24	---	---	---	---
WB32-1	7/6/2010			12	---	---	---	---
WB32-1.5	7/6/2010			19	---	---	---	---
WB33-0	7/6/2010	38.640158990	-121.484197248	18	---	---	---	---
WB33-0.5	7/6/2010			6.2	---	---	---	---
WB33-1	7/6/2010			11	---	---	---	---
WB33-1.5	7/6/2010			<5.0	---	---	---	---
WB34-0	7/6/2010	38.639843287	-121.486750790	24	---	---	---	---
WB34-0.5	7/6/2010			16	---	---	---	---
WB34-1	7/6/2010			59	0.64	<0.25	---	8.2
WB34-1.5	7/6/2010			7.4	---	---	---	---
WB35-0	7/6/2010	38.639348296	-121.489247158	15	---	---	---	---
WB35-0.5	7/6/2010			16	---	---	---	---
WB35-1	7/6/2010			18	---	---	---	---
WB35-1.5	7/6/2010			19	---	---	---	---
WB36-0	7/6/2010	38.638529393	-121.491765843	9.5	---	---	---	---
WB36-0.5	7/6/2010			8.8	---	---	---	---
WB36-1	7/6/2010			<5.0	---	---	---	---
WB36-1.5	7/6/2010			15	---	---	---	---
WB37-0	7/6/2010	38.637570628	-121.493822749	36	---	---	---	---
WB37-0.5	7/6/2010			7.3	---	---	---	---
WB37-1	7/6/2010			9.8	---	---	---	---
WB37-1.5	7/6/2010			19	---	---	---	---
WB38-0	7/6/2010	38.636512482	-121.495884242	13	---	---	---	---
WB38-0.5	7/6/2010			15	---	---	---	---
WB38-1	7/6/2010			7.3	---	---	---	---
WB38-1.5	7/6/2010			<5.0	---	---	---	---
WB39-0	7/6/2010	38.635346696	-121.497983703	150	15	<0.25	---	8.0
WB39-0.5	7/6/2010			30	---	---	---	---
WB39-1	7/6/2010			9.4	---	---	---	---
WB39-1.5	7/6/2010			7.7	---	---	---	---
WB40-0	7/6/2010	38.634479074	-121.499623173	90	3.9	<0.25	---	8.5
WB40-0.5	7/6/2010			38	---	---	---	---
WB40-1	7/6/2010			<5.0	---	---	---	---
WB40-1.5	7/6/2010			<5.0	---	---	---	---
WB41-0	7/6/2010	38.633088273	-121.502347422	16	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WB41-0.5	7/6/2010			8.2	---	---	---	---
WB41-1	7/6/2010			11	---	---	---	---
WB41-1.5	7/6/2010			14	---	---	---	---
WB42-0	7/6/2010	38.631959670	-121.504626505	12	---	---	---	---
WB42-0.5	7/6/2010			14	---	---	---	---
WB42-1	7/6/2010			10	---	---	---	---
WB42-1.5	7/6/2010			17	---	---	---	---
WB43-0	7/6/2010	38.630861444	-121.506642933	21	---	---	---	---
WB43-0.5	7/6/2010			26	---	---	---	---
WB43-1	7/6/2010			12	---	---	---	---
WB43-1.5	7/6/2010			8.7	---	---	---	---
WB44-0	7/6/2010	38.629705834	-121.508828907	13	---	---	---	---
WB44-0.5	7/6/2010			9.1	---	---	---	---
WB44-1	7/6/2010			10	---	---	---	---
WB44-1.5	7/6/2010			5.4	---	---	---	---
WB45-0	7/6/2010	38.628578126	-121.511025134	18	---	---	---	---
WB45-0.5	7/6/2010			16	---	---	---	---
WB45-1	7/6/2010			12	---	---	---	---
WB45-1.5	7/6/2010			50	4.6	<0.25	---	7.8
WB46-0	7/6/2010	38.627445991	-121.512984005	6.7	---	---	---	---
WB46-0.5	7/6/2010			8.2	---	---	---	---
WB46-1	7/6/2010			5.7	---	---	---	---
WB46-1.5	7/6/2010			5.7	---	---	---	---
WB47-0	7/6/2010	38.626411619	-121.514968283	97	3.0	<0.25	---	7.7
WB47-0.5	7/6/2010			15	---	---	---	---
WB47-1	7/6/2010			12	---	---	---	---
WB47-1.5	7/6/2010			6.3	---	---	---	---
WB48-0	7/6/2010	38.625910153	-121.515904323	66	4.4	<0.25	---	8.4
WB48-0.5	7/6/2010			6.2	---	---	---	---
WB48-1	7/6/2010			7.9	---	---	---	---
WB48-1.5	7/6/2010			6.4	---	---	---	---
WB75-0	7/7/2010	38.644555305	-121.391714593	370	**14**	<0.25	0.26	7.7
WB75-0.5	7/7/2010			17	---	---	---	---
WB75-1	7/7/2010			8.0	---	---	---	---
WB75-1.5	7/7/2010			7.0	---	---	---	---
WB76-0	7/7/2010	38.643417337	-121.395074302	160	**11**	<0.25	---	6.6
WB76-0.5	7/7/2010			17	---	---	---	---
WB76-1	7/7/2010			7.0	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WB76-1.5	7/7/2010			6.7	---	---	---	---
WB77-0	7/7/2010	38.642270860	-121.396922206	75	4.9	<0.25	---	7.9
WB77-0.5	7/7/2010			14	---	---	---	---
WB77-1	7/7/2010			8.6	---	---	---	---
WB77-1.5	7/7/2010			9.5	---	---	---	---
WB78-0	7/7/2010	38.640892803	-121.398852384	45	---	---	---	---
WB78-0.5	7/7/2010			7.2	---	---	---	---
WB78-1	7/7/2010			5.3	---	---	---	---
WB78-1.5	7/7/2010			5.8	---	---	---	---
WB79-0	7/7/2010	38.639624004	-121.400889236	1,100	**66**	<0.25	4.1	8.1
WB79-0.5	7/7/2010			14	---	---	---	---
WB79-1	7/7/2010			<5.0	---	---	---	---
WB79-1.5	7/7/2010			6.5	---	---	---	---
WB80-0	7/7/2010	38.637637415	-121.408266038	230	**27**	<0.25	---	8.2
WB80-0.5	7/7/2010			240	**25**	<0.25	---	8.2
WB80-1	7/7/2010			25	---	---	---	---
WB80-1.5	7/7/2010			7.9	---	---	---	---
WB81-0	7/7/2010	38.637577836	-121.413043436	190	**12**	<0.25	---	8.0
WB81-0.5	7/7/2010			<5.0	---	---	---	---
WB81-1	7/7/2010			9.7	---	---	---	---
WB81-1.5	7/7/2010			<5.0	---	---	---	---
WB82-0	7/7/2010	38.637797491	-121.415614226	150	**6.3**	<0.25	---	7.3
WB82-0.5	7/7/2010			46	---	---	---	---
WB82-1	7/7/2010			8.3	---	---	---	---
WB82-1.5	7/7/2010			10	---	---	---	---
WB83-0	7/7/2010	38.638408334	-121.418049787	72	**5.7**	<0.25	---	7.2
WB83-0.5	7/7/2010			11	---	---	---	---
WB83-1	7/7/2010			7.1	---	---	---	---
WB83-1.5	7/7/2010			<5.0	---	---	---	---
WB84-0	7/7/2010	38.639413631	-121.420262717	52	3.6	<0.25	---	7.1
WB84-0.5	7/7/2010			5.4	---	---	---	---
WB84-1	7/7/2010			<5.0	---	---	---	---
WB84-1.5	7/7/2010			5.0	---	---	---	---
WB85-0	7/7/2010	38.640445754	-121.422352596	97	**8.2**	<0.25	---	6.8
WB85-0.5	7/7/2010			<5.0	---	---	---	---
WB85-1	7/7/2010			<5.0	---	---	---	---
WB85-1.5	7/7/2010			<5.0	---	---	---	---
WB86-0	7/7/2010	38.641536793	-121.424550476	280	**29**	0.32	0.65	6.6

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WB86-0.5	7/7/2010			16	---	---	---	---
WB86-1	7/7/2010			5.6	---	---	---	---
WB86-1.5	7/7/2010			<5.0	---	---	---	---
WB87-0	7/7/2010	38.642405576	-121.426809472	140	**6.6**	<0.25	---	7.1
WB87-0.5	7/7/2010			6.0	---	---	---	---
WB87-1	7/7/2010			<5.0	---	---	---	---
WB87-1.5	7/7/2010			<5.0	---	---	---	---
WB88-0	7/7/2010	38.643164578	-121.429634103	75	**5.5**	<0.25	---	7.1
WB88-0.5	7/7/2010			8.8	---	---	---	---
WB88-1	7/7/2010			<5.0	---	---	---	---
WB88-1.5	7/7/2010			<5.0	---	---	---	---
WB89-0	7/7/2010	38.643418276	-121.431823216	32	---	---	---	---
WB89-0.5	7/7/2010			<5.0	---	---	---	---
WB89-1	7/7/2010			6.9	---	---	---	---
WB89-1.5	7/7/2010			<5.0	---	---	---	---
WB90-0	7/7/2010	38.643503822	-121.434340614	61	3.1	<0.25	---	7.0
WB90-0.5	7/7/2010			<5.0	---	---	---	---
WB90-1	7/7/2010			<5.0	---	---	---	---
WB90-1.5	7/7/2010			<5.0	---	---	---	---
WB91-0	7/7/2010	38.643280663	-121.436788431	110	**16**	<0.25	---	7.6
WB91-0.5	7/7/2010			13	---	---	---	---
WB91-1	7/7/2010			<5.0	---	---	---	---
WB91-1.5	7/7/2010			7.5	---	---	---	---
WB92-0	7/7/2010	38.642882600	-121.439179808	190	**8.0**	<0.25	---	7.4
WB92-0.5	7/7/2010			33	---	---	---	---
WB92-1	7/7/2010			<5.0	---	---	---	---
WB92-1.5	7/7/2010			13	---	---	---	---
WB93-0	7/7/2010	38.642437228	-121.441852056	700	**60**	0.28	1.8	7.1
WB93-0.5	7/7/2010			43	---	---	---	---
WB93-1	7/7/2010			<5.0	---	---	---	---
WB93-1.5	7/7/2010			<5.0	---	---	---	---
WB94-0	7/7/2010	38.641500959	-121.453242944	<5.0	---	---	---	---
WB94-0.5	7/7/2010			6.0	---	---	---	---
WB94-1	7/7/2010			<5.0	---	---	---	---
WB94-1.5	7/7/2010			<5.0	---	---	---	---
HAWB95-0.0	7/8/2010	38.641599293	-121.456397085	170	**10**	<0.25	---	6.7
HAWB95-0.5	7/8/2010			<5.0	---	---	---	---
HAWB95-1.0	7/8/2010			<5.0	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
HAWB95-1.5	7/8/2010			<5.0	---	---	---	---
WB96-0.0	7/8/2010	38.641669051	-121.458763949	100	1.9	<0.25	---	7.7
WB96-0.5	7/8/2010			24	---	---	---	---
WB96-1.0	7/8/2010			9.2	---	---	---	---
WB96-1.5	7/8/2010			<5.0	---	---	---	---
WB97-0.0	7/8/2010	38.641872934	-121.464416269	12	---	---	---	---
WB97-0.5	7/8/2010			12	---	---	---	---
WB97-1.0	7/8/2010			11	---	---	---	---
WB97-1.5	7/8/2010			11	---	---	---	---
WB98-0.0	7/8/2010	38.641895356	-121.465789347	160	**15**	<0.25	---	7.9
WB98-0.5	7/8/2010			11	---	---	---	---
WB98-1.0	7/8/2010			<5.0	---	---	---	---
WB98-1.5	7/8/2010			5.0	---	---	---	---
WB99-0.0	7/8/2010	38.641257499	-121.474661585	39	---	---	---	---
WB99-0.5	7/8/2010			6.8	---	---	---	---
WB99-1.0	7/8/2010			5.5	---	---	---	---
WB99-1.5	7/8/2010			5.5	---	---	---	---
WB100-0.0	7/8/2010	38.641110702	-121.475965368	31	---	---	---	---
WB100-0.5	7/8/2010			83	**6.0**	<0.25	---	8.6
WB100-1.0	7/8/2010			12	---	---	---	---
WB100-1.5	7/8/2010			9.2	---	---	---	---
WB101-0.0	7/8/2010	38.624320642	-121.518958914	66	3.5	<0.25	---	8.4
WB101-0.5	7/8/2010			5.6	---	---	---	---
WB101-1.0	7/8/2010			5.6	---	---	---	---
WB101-1.5	7/8/2010			6.1	---	---	---	---
WB102-0.0	7/8/2010	38.623832744	-121.519828440	120	**8.7**	<0.25	---	7.5
WB102-0.5	7/8/2010			6.6	---	---	---	---
WB102-1.0	7/8/2010			<5.0	---	---	---	---
WB102-1.5	7/8/2010			<5.0	---	---	---	---
WB103-0.0	7/8/2010	38.622567051	-121.522369663	120	**5.4**	<0.25	---	7.1
WB103-0.5	7/8/2010			5.5	---	---	---	---
WB103-1.0	7/8/2010			5.3	---	---	---	---
WB103-1.5	7/8/2010			5.6	---	---	---	---
WB104-0.0	7/8/2010	38.616982115	-121.532861121	51	**8.8**	<0.25	---	7.4
WB104-0.5	7/8/2010			5.6	---	---	---	---
WB104-1.0	7/8/2010			<5.0	---	---	---	---
WB104-1.5	7/8/2010			<5.0	---	---	---	---
WB105-0.0	7/8/2010	38.615950451	-121.534782444	36	---	---	---	---

TABLE I
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WB105-0.5	7/8/2010			43	---	---	---	---
WB105-1.0	7/8/2010			18	---	---	---	---
WB105-1.5	7/8/2010			<5.0	---	---	---	---
WB106-0.0	7/8/2010	38.614905901	-121.536380815	42	---	---	---	---
WB106-0.5	7/8/2010			5.2	---	---	---	---
WB106-1.0	7/8/2010			<5.0	---	---	---	---
WB106-1.5	7/8/2010			<5.0	---	---	---	---
WB107-0.0	7/8/2010	38.613180008	-121.538190973	34	---	---	---	---
WB107-0.5	7/8/2010			15	---	---	---	---
WB107-1.0	7/8/2010			25	---	---	---	---
WB107-1.5	7/8/2010			<5.0	---	---	---	---
WB108-0.0	7/8/2010	38.612085264	-121.538974655	48	---	---	---	---
WB108-0.5	7/8/2010			7.0	---	---	---	---
WB108-1.0	7/8/2010			<5.0	---	---	---	---
WB108-1.5	7/8/2010			<5.0	---	---	---	---
WB109-0.0	7/8/2010	38.610441510	-121.540049369	60	4.4	<0.25	---	8.4
WB109-0.5	7/8/2010			<5.0	---	---	---	---
WB109-1.0	7/8/2010			5.8	---	---	---	---
WB109-1.5	7/8/2010			6.4	---	---	---	---
WB110-0.0	7/8/2010	38.609628644	-121.540604786	78	**10**	<0.25	---	8.5
WB110-0.5	7/8/2010			<5.0	---	---	---	---
WB110-1.0	7/8/2010			10	---	---	---	---
WB110-1.5	7/8/2010			<5.0	---	---	---	---
WB111-0.0	7/8/2010	38.608394877	-121.541428936	100	**6.5**	<0.25	---	6.6
WB111-0.5	7/8/2010			8.9	---	---	---	---
WB111-1.0	7/8/2010			9.7	---	---	---	---
WB111-1.5	7/8/2010			11	---	---	---	---
WB112-0.0	7/8/2010	38.607630416	-121.541939630	37	---	---	---	---
WB112-0.5	7/8/2010			25	---	---	---	---
WB112-1.0	7/8/2010			14	---	---	---	---
WB112-1.5	7/8/2010			5.5	---	---	---	---
WB113-0.0	7/8/2010	38.606822466	-121.542494704	54	0.80	<0.25	---	7.1
WB113-0.5	7/8/2010			29	---	---	---	---
WB113-1.0	7/8/2010			21	---	---	---	---
WB113-1.5	7/8/2010			16	---	---	---	---
WB114-0.0	7/8/2010	38.605828041	-121.543160969	8.8	---	---	---	---
WB114-0.5	7/8/2010			8.8	---	---	---	---
WB114-1.0	7/8/2010			8.6	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WB114-1.5	7/8/2010			7.3	---	---	---	---
DATA POPULATION #3 - EASTBOUND AND WESTBOUND I-80 INSIDE SHOULDER								
WBM125-0.0	7/8/2010	38.639778684	-121.400170808	6.1	---	---	---	---
WBM125-0.5	7/8/2010			12	---	---	---	---
WBM125-1.0	7/8/2010			<5.0	---	---	---	---
WBM125-1.5	7/8/2010			5.3	---	---	---	---
WBM126-0.0	7/8/2010	38.639682287	-121.400352962	19	---	---	---	---
WBM126-0.5	7/8/2010			16	---	---	---	---
WBM126-1.0	7/8/2010			12	---	---	---	---
WBM126-1.5	7/8/2010			12	---	---	---	---
EBM127-0.0	7/9/2010	38.637538503	-121.403189961	320	22	<0.25	0.33	7.1
EBM127-0.5	7/9/2010			39	---	---	---	---
EBM127-1.0	7/9/2010			12	---	---	---	---
EBM127-1.5	7/9/2010			5.8	---	---	---	---
EBM128-0.0	7/9/2010	38.637675824	-121.402730890	60	2.6	<0.25	---	6.7
EBM128-0.5	7/9/2010			8.6	---	---	---	---
EBM128-1.0	7/9/2010			9.7	---	---	---	---
EBM128-1.5	7/9/2010			8.0	---	---	---	---
EBM129-0.0	7/9/2010	38.637834124	-121.402230635	120	5.2	<0.25	---	6.3
EBM129-0.5	7/9/2010			11	---	---	---	---
EBM129-1.0	7/9/2010			5.4	---	---	---	---
EBM129-1.5	7/9/2010			5.6	---	---	---	---
EBM130-0.0	7/9/2010	38.637968785	-121.401896363	96	4.4	<0.25	---	6.2
EBM130-0.5	7/9/2010			9.3	---	---	---	---
EBM130-1.0	7/9/2010			7.8	---	---	---	---
EBM130-1.5	7/9/2010			5.7	---	---	---	---
EBM131-0.0	7/9/2010	38.638082720	-121.401592857	28	---	---	---	---
EBM131-0.5	7/9/2010			6.3	---	---	---	---
EBM131-1.0	7/9/2010			5.3	---	---	---	---
EBM131-1.5	7/9/2010			5.9	---	---	---	---
EBM132-0.0	7/9/2010	38.638219103	-121.401336239	35	---	---	---	---
EBM132-0.5	7/9/2010			<5.0	---	---	---	---
EBM132-1.0	7/9/2010			5.4	---	---	---	---
EBM132-1.5	7/9/2010			6.1	---	---	---	---
EBM133-0.0	7/9/2010	38.638321254	-121.401162938	62	2.3	<0.25	---	7.2
EBM133-0.5	7/9/2010			8.6	---	---	---	---
EBM133-1.0	7/9/2010			7.1	---	---	---	---
EBM133-1.5	7/9/2010			8.0	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
EBM134-0.0	7/9/2010	38.638480244	-121.400878554	120	5.6	<0.25	---	6.4
EBM134-0.5	7/9/2010			13	---	---	---	---
EBM134-1.0	7/9/2010			<5.0	---	---	---	---
EBM134-1.5	7/9/2010			5.5	---	---	---	---
EBM135-0.0	7/9/2010	38.638652524	-121.400617097	96	4.3	<0.25	---	6.5
EBM135-0.5	7/9/2010			<5.0	---	---	---	---
EBM135-1.0	7/9/2010			6.7	---	---	---	---
EBM135-1.5	7/9/2010			8.0	---	---	---	---
EBM136-0.0	7/9/2010	38.638793625	-121.400408881	21	---	---	---	---
EBM136-0.5	7/9/2010			48	---	---	---	---
EBM136-1.0	7/9/2010			18	---	---	---	---
EBM136-1.5	7/9/2010			5.8	---	---	---	---
WBM137-0.0	7/9/2010	38.639366833	-121.400900959	52	3.2	<0.25	---	7.4
WBM137-0.5	7/9/2010			19	---	---	---	---
WBM137-1.0	7/9/2010			6.5	---	---	---	---
WBM137-1.5	7/9/2010			6.9	---	---	---	---
WBM138-0.0	7/9/2010	38.639219211	-121.401194382	89	1.7	<0.25	---	7.4
WBM138-0.5	7/9/2010			15	---	---	---	---
WBM138-1.0	7/9/2010			6.7	---	---	---	---
WBM138-1.5	7/9/2010			9.9	---	---	---	---
WBM139-0.0	7/9/2010	38.638978895	-121.401697452	31	---	---	---	---
WBM139-0.5	7/9/2010			5.7	---	---	---	---
WBM139-1.0	7/9/2010			6.4	---	---	---	---
WBM139-1.5	7/9/2010			6.3	---	---	---	---
WBM140-0.0	7/9/2010	38.638905166	-121.401897579	69	2.7	<0.25	---	6.1
WBM140-0.5	7/9/2010			13	---	---	---	---
WBM140-1.0	7/9/2010			8.2	---	---	---	---
WBM140-1.5	7/9/2010			6.8	---	---	---	---
WBM141-0.0	7/9/2010	38.638818675	-121.402090130	45	---	---	---	---
WBM141-0.5	7/9/2010			6.6	---	---	---	---
WBM141-1.0	7/9/2010			6.8	---	---	---	---
WBM141-1.5	7/9/2010			<5.0	---	---	---	---
WBM142-0.0	7/9/2010	38.638764937	-121.402264370	62	2.5	<0.25	---	6.4
WBM142-0.5	7/9/2010			5.8	---	---	---	---
WBM142-1.0	7/9/2010			<5.0	---	---	---	---
WBM142-1.5	7/9/2010			<5.0	---	---	---	---
WBM143-0.0	7/9/2010	38.638637238	-121.402563387	42	---	---	---	---
WBM143-0.5	7/9/2010			5.7	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
BAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
WBM143-1.0	7/9/2010			9.3	---	---	---	---
WBM143-1.5	7/9/2010			5.5	---	---	---	---
WBM144-0.0	7/9/2010	38.638533320	-121.402878282	73	3.4	<0.25	---	6.4
WBM144-0.5	7/9/2010			20	---	---	---	---
WBM144-1.0	7/9/2010			<5.0	---	---	---	---
WBM144-1.5	7/9/2010			<5.0	---	---	---	---
DATA POPULATION #4 - EASTBOUND I-80 ONRAMP AT LONGVIEW DRIVE								
LV115-0	7/9/2010	38.640137798	-121.397488004	<5.0	---	---	---	---
LV115-1	7/9/2010			6.9	---	---	---	---
LV115-2	7/9/2010			7.3	---	---	---	---
LV115-3	7/9/2010			7.7	---	---	---	---
LV115-4	7/9/2010			19	---	---	---	---
LV116-0.0	7/8/2010	38.640459731	-121.397195772	24	---	---	---	---
LV116-0.5	7/8/2010			37	---	---	---	---
LV116-1.0	7/8/2010			10	---	---	---	---
LV116-1.5	7/8/2010			<5.0	---	---	---	---
LV117-0	7/9/2010	38.640788720	-121.396853795	10	---	---	---	---
LV117-1	7/9/2010			6.3	---	---	---	---
LV117-2	7/9/2010			8.0	---	---	---	---
LV117-3	7/9/2010			31	---	---	---	---
LV117-4	7/9/2010			5.8	---	---	---	---
LV118-0.0	7/8/2010	38.641162002	-121.396406040	<5.0	---	---	---	---
LV118-0.5	7/8/2010			<5.0	---	---	---	---
LV118-1.0	7/8/2010			<5.0	---	---	---	---
LV118-1.5	7/8/2010			<5.0	---	---	---	---
LV119-0	7/9/2010	38.641576603	-121.395954403	<5.0	---	---	---	---
LV119-1	7/9/2010			<5.0	---	---	---	---
LV119-2	7/9/2010			<5.0	---	---	---	---
LV119-3	7/9/2010			<5.0	---	---	---	---
LV119-4	7/9/2010			5.4	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
LV120-0	7/9/2010	38.640952539	-121.396836136	23	---	---	---	---
LV120-1	7/9/2010			6.3	---	---	---	---
LV120-2	7/9/2010			5.1	---	---	---	---
LV120-3	7/9/2010			<5.0	---	---	---	---
LV120-4	7/9/2010			<5.0	---	---	---	---
LV121-0.0	7/8/2010	38.641063817	-121.396724156	33	---	---	---	---
LV121-0.5	7/8/2010			8.2	---	---	---	---
LV121-1.0	7/8/2010			6.3	---	---	---	---
LV121-1.5	7/8/2010			5.1	---	---	---	---
LV122-0	7/9/2010	38.641224788	-121.396532281	20	---	---	---	---
LV122-1	7/9/2010			<5.0	---	---	---	---
LV122-2	7/9/2010			<5.0	---	---	---	---
LV122-3	7/9/2010			<5.0	---	---	---	---
LV122-4	7/9/2010			15	---	---	---	---
HALV123-0	7/9/2010	38.640133094	-121.397743849	91	4.4	<0.25	---	6.4
HALV123-1	7/9/2010			5.6	---	---	---	---
HALV123-2	7/9/2010			6.5	---	---	---	---
HALV123-3	7/9/2010			6.0	---	---	---	---
HALV123-4	7/9/2010			6.8	---	---	---	---
HALV124-0.0	7/8/2010	38.640467070	-121.397370398	20	---	---	---	---
HALV124-0.5	7/8/2010			5.3	---	---	---	---
HALV124-1.0	7/8/2010			<5.0	---	---	---	---
HALV124-1.5	7/8/2010			7.6	---	---	---	---
DATA POPULATION #5 - SOUND WALL #2								
2SW155-0	7/12/2010	38.641798376	-121.442104948	<5.0	---	---	---	---
2SW155-0.5	7/12/2010			<5.0	---	---	---	---
2SW155-1	7/12/2010			<5.0	---	---	---	---
2SW155-2	7/12/2010			<5.0	---	---	---	---
2SW156-0	7/12/2010	38.641899602	-121.441564805	20	---	---	---	---
2SW156-0.5	7/12/2010			8.5	---	---	---	---
2SW156-1	7/12/2010			<5.0	---	---	---	---
2SW156-2	7/12/2010			<5.0	---	---	---	---
2SW157-0	7/12/2010	NA	NA	45	---	---	---	---
2SW157-0.5	7/12/2010			14	---	---	---	---
2SW157-1	7/12/2010			5.5	---	---	---	---
2SW157-2	7/12/2010			<5.0	---	---	---	---
2SW158-0	7/12/2010	38.642123895	-121.440663071	12	---	---	---	---
2SW158-0.5	7/12/2010			14	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
2SW158-1	7/12/2010			11	---	---	---	---
2SW158-2	7/12/2010			<5.0	---	---	---	---
2SW159-0	7/12/2010	38.642247159	-121.439870242	25	---	---	---	---
2SW159-0.5	7/12/2010			13	---	---	---	---
2SW159-1	7/12/2010			8.3	---	---	---	---
2SW159-2	7/12/2010			<5.0	---	---	---	---
2SW160-0	7/12/2010	38.642328339	-121.439362879	24	---	---	---	---
2SW160-0.5	7/12/2010			6.2	---	---	---	---
2SW160-1	7/12/2010			83	1.6	<0.25	---	7.0
2SW160-2	7/12/2010			12	---	---	---	---
DATA POPULATION #6 - SOUND WALL #3								
3SW161-0	7/12/2010	38.642731426	-121.436813488	15	---	---	---	---
3SW161-0.5	7/12/2010			<5.0	---	---	---	---
3SW161-1	7/12/2010			6.7	---	---	---	---
3SW161-2	7/12/2010			6.0	---	---	---	---
3SW162-0	7/12/2010	38.642860124	-121.435737336	11	---	---	---	---
3SW162-0.5	7/12/2010			<5.0	---	---	---	---
3SW162-1	7/12/2010			<5.0	---	---	---	---
3SW162-2	7/12/2010			<5.0	---	---	---	---
3SW163-0	7/12/2010	38.642875024	-121.434649654	11	---	---	---	---
3SW163-0.5	7/12/2010			5.4	---	---	---	---
3SW163-1	7/12/2010			<5.0	---	---	---	---
3SW163-2	7/12/2010			5.4	---	---	---	---
3SW164-0	7/12/2010	38.642873121	-121.433778623	20	---	---	---	---
3SW164-0.5	7/12/2010			<5.0	---	---	---	---
3SW164-1	7/12/2010			<5.0	---	---	---	---
3SW164-2	7/12/2010			<5.0	---	---	---	---
3SW165-0	7/12/2010	NA	NA	7.4	---	---	---	---
3SW165-0.5	7/12/2010			5.1	---	---	---	---
3SW165-1	7/12/2010			<5.0	---	---	---	---
3SW165-2	7/12/2010			<5.0	---	---	---	---
3SW166-0	7/12/2010	38.642839387	-121.432894706	<5.0	---	---	---	---
3SW166-0.5	7/12/2010			14	---	---	---	---
3SW166-1	7/12/2010			5.6	---	---	---	---
3SW166-2	7/12/2010			<5.0	---	---	---	---
3SW167-0	7/12/2010	38.642827936	-121.432460962	9.7	---	---	---	---
3SW167-0.5	7/12/2010			6.1	---	---	---	---
3SW167-1	7/12/2010			5.7	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
3SW167-2	7/12/2010			<5.0	---	---	---	---
3SW168-0	7/12/2010	38.642335429	-121.431025268	21	---	---	---	---
3SW168-0.5	7/12/2010			6.9	---	---	---	---
3SW168-1	7/12/2010			<5.0	---	---	---	---
3SW168-2	7/12/2010			<5.0	---	---	---	---
3SW169-0	7/12/2010	38.642093635	-121.430655074	8.4	---	---	---	---
3SW169-0.5	7/12/2010			5.2	---	---	---	---
3SW169-1	7/12/2010			19	---	---	---	---
3SW169-2	7/12/2010			15	---	---	---	---
3SW170-0	7/12/2010	38.641630883	-121.429732525	32	---	---	---	---
3SW170-0.5	7/12/2010			36	---	---	---	---
3SW170-1	7/12/2010			9.0	---	---	---	---
3SW170-2	7/12/2010			<5.0	---	---	---	---
3SW171-0	7/12/2010	38.642534483	-121.438264638	26	---	---	---	---
3SW171-0.5	7/12/2010			6.7	---	---	---	---
3SW171-1	7/12/2010			8.2	---	---	---	---
3SW171-2	7/12/2010			<5.0	---	---	---	---
3SW172-0	7/12/2010	38.642555351	-121.437931967	13	---	---	---	---
3SW172-0.5	7/12/2010			6.1	---	---	---	---
3SW172-1	7/12/2010			5.8	---	---	---	---
3SW172-2	7/12/2010			5.3	---	---	---	---
DATA POPULATION #7 - SOUND WALL #4								
4SW145-0.0	7/9/2010	38.643468643	-121.436105787	16	---	---	---	---
4SW145-0.5	7/9/2010			5.7	---	---	---	---
4SW145-1.0	7/9/2010			5.4	---	---	---	---
4SW145-2.0	7/9/2010			6.5	---	---	---	---
4SW146-0.0	7/9/2010	38.643525040	-121.435473068	6.6	---	---	---	---
4SW146-0.5	7/9/2010			<5.0	---	---	---	---
4SW146-1.0	7/9/2010			5.3	---	---	---	---
4SW146-2.0	7/9/2010			6.0	---	---	---	---
4SW147-0.0	7/9/2010	38.643578334	-121.434764814	23	---	---	---	---
4SW147-0.5	7/9/2010			<5.0	---	---	---	---
4SW147-1.0	7/9/2010			6.0	---	---	---	---
4SW147-2.0	7/9/2010			10	---	---	---	---
4SW148-0.0	7/9/2010	38.643618126	-121.434055447	13	---	---	---	---
4SW148-0.5	7/9/2010			7.8	---	---	---	---
4SW148-1.0	7/9/2010			8.8	---	---	---	---
4SW148-2.0	7/9/2010			7.0	---	---	---	---

TABLE 1
SUMMARY OF SOIL BORING COORDINATES, LEAD AND SOIL pH ANALYTICAL RESULTS
EAs 03-379701 AND 03-0A9311
INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA

BORING ID	SAMPLE DATE	LATITUDE	LONGITUDE	TOTAL LEAD (mg/kg)	WET LEAD (mg/l)	DI-WET LEAD (mg/l)	TCLP LEAD (mg/l)	SOIL pH
4SW149-0.0	7/9/2010	38.643632530	-121.433386204	37	---	---	---	---
4SW149-0.5	7/9/2010			<5.0	---	---	---	---
4SW149-1.0	7/9/2010			<5.0	---	---	---	---
4SW149-2.0	7/9/2010			<5.0	---	---	---	---
4SW150-0.0	7/9/2010	38.643626247	-121.432811324	28	---	---	---	---
4SW150-0.5	7/9/2010			5.5	---	---	---	---
4SW150-1.0	7/9/2010			8.6	---	---	---	---
4SW150-2.0	7/9/2010			6.1	---	---	---	---
4SW151-0.0	7/9/2010	38.643609405	-121.431900266	24	---	---	---	---
4SW151-0.5	7/9/2010			14	---	---	---	---
4SW151-1.0	7/9/2010			<5.0	---	---	---	---
4SW151-2.0	7/9/2010			9.1	---	---	---	---
4SW152-0.0	7/9/2010	38.643593926	-121.431215230	38	---	---	---	---
4SW152-0.5	7/9/2010			23	---	---	---	---
4SW152-1.0	7/9/2010			44	---	---	---	---
4SW152-2.0	7/9/2010			<5.0	---	---	---	---
4SW153-0.0	7/9/2010	38.643572082	-121.430586313	42	---	---	---	---
4SW153-0.5	7/9/2010			22	---	---	---	---
4SW153-1.0	7/9/2010			64	**9.1**	<0.25	---	7.8
4SW153-2.0	7/9/2010			6.0	---	---	---	---
4SW154-0.0	7/9/2010	38.643573955	-121.429998626	48	---	---	---	---
4SW154-0.5	7/9/2010			23	---	---	---	---
4SW154-1.0	7/9/2010			20	---	---	---	---
4SW154-2.0	7/9/2010			8.7	---	---	---	---

Notes: EB1-0
- Top of sample depth interval in feet below ground surface
- Boring identification

mg/kg = Milligrams per kilogram
mg/l = Milligrams per liter
< = Less than the laboratory reporting limits
NA = Not available
--- = Not analyzed
WET = Waste Extraction Test analyzed by EPA Method 7420
DI-WET = Waste Extraction Test using de-ionized water analyzed by EPA Method 7420
TCLP = Toxicity Characteristic Leaching Procedure soluble lead concentration analyzed by EPA Methods 1311 and 7420
WET soluble lead concentrations in **bold** type are greater than or equal to the Soluble Threshold Limit Concentration value for lead of 5.0 mg/l

Project No. S9300-06-08
March 11, 2008

Mr. Rajive Chadha
California Department of Transportation - District 3
Post Office Box 911
Marysville, California 95901

Subject: INTERSTATE 80 POST MILE 0.3 TO 10.4
SACRAMENTO COUNTY, CALIFORNIA
CONTRACT NO. 03A1368
TASK ORDER NO. 8, EA 03-379700
AERIALLY DEPOSITED LEAD, HEAVY METALS, PETROLEUM
HYDROCARBONS AND BRIDGE SITE INVESTIGATION REPORT

Dear Mr. Chadha:

In accordance with California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order Number (TO) No. 8, and EA 03-379700, Geocon Consultants, Inc. has performed environmental engineering services at the project site. The Site consists of Caltrans right-of-way planned for roadway improvements along Interstate 80 from Post Mile 0.3 to 10.4 in Sacramento County, California. The accompanying report summarizes the services performed including the advancement of 128 direct-push borings for aerially deposited lead sampling, traffic stripe paint sampling, advancement of 18 direct-push and hand-auger borings for soil sampling for petroleum hydrocarbon, pesticide, polychlorinated biphenyl, semivolatile organic compound, and polynuclear aromatic hydrocarbon testing, and asbestos surveys for four bridges located within the project boundaries.

The contents of this report reflect the views of the author, who is responsible for the facts and accuracy of the data presented herein. The contents do not necessarily reflect the official views or policies of the State of California or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

Please contact us if there are any questions concerning the contents of this report or if we may be of further service.

Sincerely,

GEOCON CONSULTANTS, INC.

Gemma G. Reblando
Project Geologist

John E. Juhrend, PE, CEG
Project Manager

GGR:JEJ:jaj

(5 + 3 CD) Addressee

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AERIALLY DEPOSITED LEAD, HEAVY METALS, PETROLEUM HYDROCARBONS AND BRIDGE SITE INVESTIGATION REPORT

1.0 INTRODUCTION

This Site Investigation report for the Interstate 80 Post Mile (PM) 0.3 to 10.4 project was prepared by Geocon Consultants, Inc. under California Department of Transportation (Caltrans) Contract No. 03A1368, Task Order (TO) No. 8 and EA 03-379700. This report also incorporates data collected under Caltrans Contract No. 03A0937 and TO No. 171.

1.1 Project Description and Proposed Improvements

The project area consists of the median and shoulder areas of Interstate 80 (I-80) from the Sacramento-Yolo county line to just east of the Longview Drive overcrossing (PM 0.3 to 10.4) (the Site) in Sacramento County, California. Caltrans intends to rehabilitate the existing roadway, which will include disturbance of soil at the Site. The approximate project location is depicted on the Vicinity Map, Figure 1 and Site Plans, Figures 2-1 through 2-13.

1.2 General Objectives

The purpose of the scope of services outlined in TO No. 8 was to evaluate whether impacts due to aerial lead deposition from motor vehicle exhaust exist in the surface and near surface soils within the project boundaries, to determine whether the yellow and/or white traffic stripe paint on the roadway at the Site contains lead and/or chromium, and to evaluate the potential presence of petroleum hydrocarbon soil impacts associated with railroad corridors within the project boundaries. The investigative results will be used by Caltrans to inform the construction contractor(s) if lead-impacted soil, lead- and/or chromium-containing yellow and white traffic stripe paint, and petroleum hydrocarbon-impacted soil are present within the project boundaries for health and safety, and soil management and disposal evaluation purposes. Additionally, we performed an asbestos-containing material (ACM) bridge survey. The results of the ACM survey are presented in a separate report included as Appendix A.

2.0 BACKGROUND

2.1 Potential Lead Soil Impacts

Ongoing testing by Caltrans throughout California has indicated that aerially deposited lead (ADL) exists along major freeway routes due to emissions from vehicles powered by leaded gasoline. Caltrans reports that total lead concentrations in soil adjacent to the freeways have typically ranged between 50 and 700 milligrams per kilogram (mg/kg). At sites where soil has not been disturbed, the aerially deposited lead is generally limited to the upper 2 feet (ft) of soil within unpaved shoulder and median areas.

2.2 Potential Lead/Chromium-based Traffic Stripe Paint Impacts

Yellow traffic stripe paint utilized by Caltrans may contain lead-chromate. The presence of elevated lead and chromium requires sampling and analytical testing of the paint stripe materials to determine appropriate health and safety procedures and proper management and disposal practices. Disposal of removed traffic stripe paint materials is dependent on the method utilized to remove these materials (i.e. focused stripe removal vs. pavement grinding).

2.3 Hazardous Waste Determination Criteria

Regulatory criteria to classify a waste as "California hazardous" for handling and disposal purposes are contained in the *CCR*, Title 22, Division 4.5, Chapter 11, Article 3, § 66261.24. Criteria to classify a waste as "Resource, Conservation, and Recovery Act (RCRA) hazardous" are contained in Chapter 40 of the Code of Federal Regulations (40 CFR), Section 261.

For waste containing metals, the waste is classified as California hazardous when: 1) the total metal content exceeds the respective Total Threshold Limit Concentration (TTLC); or 2) the soluble metal content exceeds the respective Soluble Threshold Limit Concentration (STLC) based on the standard Waste Extraction Test (WET). A waste may have the potential of exceeding the STLC when the waste's total metal content is greater than or equal to ten times the respective STLC value, since the WET uses a 1:10 dilution ratio. Hence, when a total metal is detected at a concentration greater than or equal to ten times the respective STLC, and assuming that 100 percent of the total metals are soluble, soluble metal analysis is required. A material is classified as RCRA hazardous, or Federal hazardous, when the soluble metal content exceeds the Federal regulatory level based on the Toxicity Characteristic Leaching Procedure (TCLP). The TTLC value for lead is 1,000 mg/kg. The STLC and TCLP values for lead are both 5.0 milligrams per liter (mg/l).

The above regulatory criteria are based on chemical concentrations. Wastes may also be classified as hazardous based on other criteria such as ignitability and corrosivity; however, for the purposes of this investigation, toxicity (i.e., lead concentrations) is the primary factor considered for waste classification since waste generated during the construction activities would not likely warrant testing for ignitability or corrosivity. Waste that is classified as either California hazardous or RCRA hazardous requires management as a hazardous waste.

The Department of Toxic Substances Control (DTSC) regulates and interprets hazardous waste laws in California. DTSC generally considers excavated or transported materials that exhibit "hazardous waste" characteristics to be a "waste" requiring proper management, treatment and disposal. Soil that contains lead above hazardous waste thresholds and is left in-place would not be necessarily classified by DTSC as a "waste." The DTSC has provided site-specific determinations that "movement of wastes within an area of contamination does not constitute "land disposal" and, thus, does not trigger hazardous waste disposal requirements." Therefore, lead-impacted soil that is scarified in-place, moisture-conditioned, and recompacted during roadway improvement activities might not be considered a "waste." DTSC should be consulted to confirm waste classification. It is noted that in addition to DTSC regulations, health and safety requirements and other local agency requirements may also apply to the handling and disposal of lead-impacted soil.

3.0 SCOPE OF SERVICES

The following scope of services was performed as requested by Caltrans in TO No. 8.

3.1 Pre-field Activities

- Conducted a TO meeting on July 2, 2007, to discuss the TO scope of services. Caltrans representative Rajive Chadha and Geocon representatives Rebecca Silva and Michael O'Brien attended the meeting. The purpose of the TO meeting was to identify and observe the project boundaries and conditions. The project limits were further outlined in white paint for subsequent utility clearance.
- Prepared a *Workplan* dated July 6, 2007, which described the requested scope of services and quality assurance/quality control (QA/QC) sampling and laboratory procedures.
- Utilized the *Health and Safety Plan* prepared for TO No. 95 (Contract No. 03A0937) project dated March 23, 2006, to provide guidelines on the use of personal protective equipment and the health and safety procedures implemented during the field activities.
- Contacted the local public utilities via Underground Service Alert on June 28, 2007 (Ticket Nos. 235879, 235882, 235883, 235888, 235891, 235892, 235894, and 235897), July 2, 2007 (Ticket No. 270393), August 21, 2007 (Ticket No. 309358), and on December 4, 2007 (Ticket No. 453723) to attempt to delineate subsurface public utilities and conduits in proximity to the proposed boring locations.
- Retained the services of Sparger Technology, Inc., a Caltrans-approved analytical laboratory, to perform the chemical analysis of soil and traffic stripe paint samples.
- Retained the services of Advanced Technology Laboratories (ATL), a Caltrans-approved and California-certified analytical laboratory, to perform the chemical analysis of soil samples collected in the near the Union Pacific Railroad (UPRR) tracks adjacent to the Natomas East Main Drainage Canal.

3.2 Field Activities

The field activities consisted of collecting soil samples along the paved and unpaved shoulder and median areas of I-80 between PM 0.3 and 10.4, along the soundwall between Rio Linda Boulevard and Winters Street, and directly under the I-80 overcrossing near the Sacramento Regional Transit District (RT) and UPRR tracks. On July 3, 2007, 68 soil samples were collected from 18 direct-push soundwall (SW) borings (SW1 through SW18) at the Caltrans designated soil sampling locations. On July 11 through 13, 2007, 387 soil samples were collected from 130 direct-push borings (B1 through B130) at the Caltrans designated soil sampling locations. Sixteen yellow traffic stripe paint samples (PC1 through PC16) were collected on July 11, 2007, at the Caltrans designated sampling locations. On July 30, 2007, 16 soil samples were collected from four direct-push borings advanced in the vicinity of the RT tracks within the RT parking lot (DP1-RT through DP4-RT) per Caltrans' direction for petroleum hydrocarbon analysis. On August 29, 2007, 23 soil samples were collected from six additional direct-push borings advanced directly under the I-80 overcrossing in the vicinity of the UPRR tracks between Grand Avenue and Roseville Road (DPLB-B2 through DPLB-B4 and DPRB-B2 through DPRB-B4). White traffic stripe paint samples (WTS-1A through WTS-1D) were also collected on September 6, 2007. On December 7, 2007, 28 soil samples were collected from eight additional direct-push and hand-auger borings (DPRR-1 through DPRR-8) advanced near the UPRR tracks adjacent to the Natomas East Main Drainage Canal. The ADL and SW soil borings were excavated to an approximate maximum depth of 3.0 ft. Soil samples were collected at general depths of 0.0 to 1.0 foot, 1.0 to 2.0 ft and 2.0 to 3.0 ft. Direct-push borings DP1-RT through DP4-RT, DPLB-B2 through DPLB-B4, DPRB-B2 through DPRB-B4, and DPRR-1 through DPRR-8 were advanced to an approximate maximum depth of 12 ft. The approximate soil boring and paint sample locations are depicted on Figures 2-1 through 2-13. We also performed an asbestos survey of four bridges within the project boundaries on December 11, 2007.

4.0 INVESTIGATIVE METHODS

4.1 Boring Sample Location Rationale

The following ADL and SW soil boring locations were designated by Caltrans in the vicinity of proposed improvements:

- Borings B1 through B5, B70, B71, SW1 through SW6, and SW18 were advanced along the eastbound (EB) shoulder of I-80;
- Borings B6 through B10, SW7 through SW17 were advanced along the westbound (WB) shoulder of I-80; and
- Borings B11 through B69 and B72 through B130 were advanced along the median of I-80.

The paint sampling locations were designated by Caltrans within the proposed construction area. Yellow traffic stripe paint samples PC1 through PC4 and PC6 were obtained from the shoulder of EB I-80, and PC5 and PC7 through PC16 were obtained from the I-80 median as depicted on Figures 2-1, 2-3, 2-4, 2-6, 2-7 and 2-9 through 2-13. White traffic stripe paint samples WTS-1A through WTS-1D were obtained from the shoulder of WB I-80 as depicted on Figures 2-2, 2-5, 2-8 and 2-10.

Borings DP1-RT through DP4-RT were advanced directly under the I-80 overcrossing within the RT parking lot. Borings DPLB-B2 through DPLB-B4 and DPRB-B2 through DPRB-B4 were advanced directly under the I-80 overcrossing in the vicinity of the UPRR tracks between Grand Avenue and

Roseville Road. Borings DPRR-1 through DPRR-8 were advanced directly under the I-80 overcrossing near the UPRR tracks adjacent to the Natomas East Main Drainage Canal. The approximate boring locations are depicted on Figures 2-7 and 2-12.

The coordinates of each ADL, SW, DP1-RT through DP4-RT, DPRB-B2 through DPRB-B4, and DPLB-B2 through DPLB-B4 boring and paint sample locations were determined using a differential global positioning system (GPS) with the exception of borings B47 through B49, B74, SW1, SW3, SW12 and WTS-1A through WTS-1D. The coordinates for these borings could not be obtained due to signal failure. Coordinates for borings DPRR-1 through DPRR-8 could not be obtained due to overhead obstructions. The GPS was utilized during the field activities to locate the horizontal position of each accessible location with an error of no more than 3.0 ft. The latitude and longitude of the sampling locations are summarized on Table 1.

4.2 Aerially Deposited Lead and Soundwall Soil Sampling Procedures

A total of 387 ADL soil samples were collected from 130 direct-push borings excavated at the Site. Forty-seven SW soil samples were collected from 18 direct-push borings for metals analysis. Soil samples obtained from the direct-push borings were collected in cellulose thermoplastic (acetate) liners driven by the direct-push rig. After collection, the acetate liner that contained the soil sample was cut open and the soil samples were transferred to Ziploc® re-sealable plastic bags. The soil samples were field homogenized within the sample bags and subsequently labeled, placed in an ice chest, and delivered to Sparger under standard chain-of-custody (COC) documentation.

Per Caltrans' request, discrete samples collected from intervals 0.0 to 1.0, 1.0 to 2.0 and 2.0 to 3.0 ft from borings located in the same general area were composited with the exception of discrete soil samples SW3-2.0, SW18-0.0, SW18-1.0 and SW18-2.0. The analytical laboratory was instructed to composite the soil samples. A portion of each discrete sample collected during the field sampling activities was retained by the laboratory for further analysis, if warranted. The composite sample identifications are presented in Tables 2 and 3.

QA/QC procedures were performed during the field sampling activities. These procedures included decontamination of sampling equipment before each boring was advanced and providing COC documentation for each sample submitted to the laboratory. The soil sampling equipment was cleansed between each boring by washing the equipment with an Alconox™ solution followed by a double rinse with deionized water. The field sampling activities were performed under the supervision of Geocon's project manager.

The borings were backfilled with the excess soil cuttings generated at each location. The decontamination water was discharged to the ground surface away from surface water bodies or storm drain inlets.

4.3 Traffic Stripe Paint Sampling Procedures

Sixteen yellow and four white traffic stripe paint samples were collected using a hammer to break a chip off the traffic paint from the traffic stripe. The traffic stripe paint samples were placed in labeled Ziploc® re-sealable plastic bags and delivered to Sparger under standard COC documentation.

4.4 RT and UPRR Soil Sampling Procedures

Soil borings DP1-RT through DP4-RT and DPRR-1 through DPRR-4 were advanced using a direct-push rig operated by TEG of Rancho Cordova, California. Soil borings DPLB-B2, DPLB-B4 and DPRB-B2 through DPRB-B4 were advanced using a compact direct-push rig operated by Geocon. We advanced boring DPLB-B3 located in between two UPRR tracks using a hand-auger due to direct-push rig inaccessibility. We also advanced borings DPRR-5 through DPRR-8 using a hand-auger due to direct-push rig inaccessibility. The borings were advanced to depths of approximately 12 ft, with the exception of borings DPLB-B4, DPRR-5, DPRR-7 and DPRR-8 due to refusal at depths of 9.0, 5.0, 8.0 and 8.0 ft, respectively. A continuous soil core was collected inside a clear acetate sleeve fitted inside the push rods during the advancement of borings. The soil cores were logged by the field geologist utilizing the Unified Soil Classification System (USCS) under the direction of a California Professional Geologist with the exception of hand-auger borings DPRR-5 through DPRR-8. A description of the soil encountered in hand-auger borings DPRR-5 through DPRR-8 is presented in Section 5.1.

Soil samples were collected by cutting a section out of the core at the desired interval and sealing the ends of the sample with Teflon™ sheets and plastic end caps. The samples were then labeled and placed in a chilled cooler. Selected soil samples were submitted to Sparger under standard COC documentation. Soil samples collected near the UPRR tracks adjacent to the Natomas East Main Drainage Canal were submitted to ATL under standard COC documentation.

Per Caltrans' request, discrete samples collected at approximate depths of 1.0 to 2.0 ft, 4.0 ft, 7.0 to 8.0 ft and 10 to 11.5 ft from the same boring were composited. The analytical laboratory was instructed to composite the soil samples. A portion of each discrete sample collected during the field sampling activities was retained by the laboratory for further analysis, if warranted.

Disturbed soil samples from the soil core were retained in re-sealable plastic bags for field screening with a photo-ionization detector (PID) to qualitatively assess the presence of volatile organic compounds. The PID readings were recorded on the borings logs, which are presented in Appendix B.

Following sample collection, each boring was backfilled from its total depth to the surface with neat cement per City of Sacramento Public Utilities Department requirements. Borings located on the street were sealed with cold patch to match the surrounding surface. A City of Roseville representative was present to inspect the grouted borings.

4.5 Asbestos Sampling Procedures

Bulk asbestos samples were collected from each bridge after first wetting friable material with a light mist of water. The samples were then cut from the substrate and transferred to a labeled container and delivered to EMSL Analytical, Inc. under standard chain-of-custody documentation.

4.6 Traffic Control

Caltrans provided traffic control using an attenuator truck and warning signs during the field sampling activities along the I-80 median. Geocon provided a moving shoulder closure during field sampling along the shoulder areas of I-80 and a street lane closure during the advancement of the UPRR borings.

4.7 Laboratory Analyses

4.7.1 ADL Soil Samples

The ADL soil samples collected within the project boundaries were submitted to Sparger for the following analyses under standard ten-day turn-around-time (TAT). The laboratory was instructed to homogenize the ADL soil samples prior to analysis in accordance with contract requirements.

- One hundred eight composite soil samples were analyzed for total lead following United States Environmental Protection Agency (EPA) Test Method 6010B.
- Eleven randomly selected composite soil samples were analyzed for soil pH using EPA Test Method 9045.

4.7.2 Soundwall Soil Samples

Twenty-one composite soil samples collected along the proposed soundwall locations were analyzed for Title 22 metals following EPA Test Methods 6010B and 7470 (mercury) under standard ten-day TAT.

4.7.3 Traffic Stripe Paint Samples

Sixteen yellow and four white traffic stripe paint samples collected within the project boundaries were submitted to Sparger for total lead and total chromium analyses following EPA Test Method 6010B under standard ten-day TAT.

4.7.4 RT and UPRR Grand Avenue/Roseville Road Soil Samples

Four composite RT soil samples and six composite UPRR Grand Avenue/Roseville Road soil samples collected within the project boundaries were analyzed by Sparger for the following analyses under expedited TAT:

- Total petroleum hydrocarbons as diesel (TPHd) and motor oil (TPHmo) following EPA Test Method 8015M;
- Pesticides following EPA Test Method 8081A;
- Polychlorinated biphenyls (PCBs) following EPA Test Method 8082;
- Semivolatile organic compounds (SVOCs) following EPA Test Method 8270C;
- Title 22 metals following EPA Test Methods 6010B and 7471A (mercury); and
- Soil pH using EPA Test Method 9045.

4.7.5 UPRR Adjacent to Natomas East Main Drainage Canal Soil Samples

Eight composite soil samples (DPRR-1 through DPRR-8) collected in the vicinity of the UPRR tracks adjacent to the Natomas East Main Drainage Canal were analyzed by ATL for the following analyses under expedited TAT:

- TPHd and TPHmo following EPA Test Method 8015M;
- Organochlorine pesticides following EPA Test Method 8081A;
- PCBs following EPA Test Method 8082;
- Polynuclear aromatic hydrocarbons (PAHs) following EPA Test Method 8310;
- Title 22 metals following EPA Test Methods 6010B and 7471A (mercury); and
- Soil pH using EPA Test Method 9045.

4.7.6 Bridge Samples

Six bulk asbestos samples were submitted for asbestos analysis in accordance with EPA Test Method 600/R-93/116 using polarized light microscopy (PLM).

4.7.7 Quality Assurance/Quality Control

QA/QC procedures were performed for each method of analysis with specificity for each analyte listed in the test method's QA/QC. The laboratory QA/QC procedures included the following:

- One method blank for every ten samples, batch of samples or type of matrix, whichever was more frequent.

- One sample analyzed in duplicate for every ten samples, batch of samples or type of matrix, whichever was more frequent.
- One spiked sample for every ten samples, batch of samples or type of matrix, whichever was more frequent, with the spike made at ten times the detection limit or at the analyte level.

Prior to submitting the soil samples to the laboratory, the COC documentation was reviewed for accuracy and completeness. Reproductions of the laboratory reports and COC documentation are presented in Appendix C.

5.0 FIELD OBSERVATIONS AND INVESTIGATIVE RESULTS

5.1 Site Conditions

The soil conditions encountered in the borings located along the shoulders and median of I-80 generally consists of silty sand and roadbase materials to a depth of approximately 0.5 foot. Underlying soil generally consists of sand and silty sand to a depth of approximately 3 ft. Deeper borings located directly under the I-80 overcrossing in the vicinity of the RT and UPRR tracks generally consist of fill material comprised of gravelly sand and roadbase materials, where encountered beneath the surface paving materials extending to depths between 1.0 and 3.5 ft. The underlying alluvial deposits consist of clayey silt, clay and silty sand to the maximum depth explored of 12 ft. Borings DPRR-1 through DPRR-4 located east of the UPRR tracks directly underneath the I-80 overcrossing adjacent to the Natomas East Main Drainage Canal generally consist of fill material comprised of olive gray (5Y 4/1) sandy silt extending to depths between 2.0 and 5.0 ft. Underlying soil generally consists of sand and silt to an approximate maximum depth of 12 ft. Hand-auger borings DPRR-5 through DPRR-8 located west of the UPRR tracks directly underneath the I-80 overcrossing adjacent to the Natomas East Main Drainage Canal generally consist of moderate yellowish brown (10YR 5/4) sandy silt extending to depths between 5.5 and 11.0 ft. Groundwater was not encountered during the excavation of the soil borings.

5.2 Laboratory Analytical Results

The laboratory analytical results are discussed below. The ADL analytical results are summarized on Table 2. The laboratory results for metals analyses are summarized on Table 3. The traffic stripe paint sample analytical results are summarized on Table 4. The laboratory results for TPHd, TPHmo, pesticides, PCBs, SVOCs, PAHs and soil pH are summarized on Table 5. The laboratory reports and COC documentation are presented in Appendix C.

5.2.1 ADL Soil Samples

Total lead was reported at concentrations exceeding the laboratory method reporting limits (MRLs) in each of the 108 ADL composite soil samples analyzed at concentrations ranging from 1.81 to 93.8

mg/kg. Ten of the 108 composite soil samples had reported total lead concentrations greater than or equal to 50 mg/kg (i.e., greater than ten times the STLC value for lead of 5.0 mg/l).

Soil pH values ranged from 6.98 to 8.78.

5.2.2 Soundwall Soil Samples

A total of 21 composite soil samples were analyzed for Title 22 metals. The following metals were reported at concentrations exceeding the laboratory MRLs.

- Arsenic ranging from 2.1 to 3.8 mg/kg;
- Barium ranging from 57 to 233 mg/kg;
- Cadmium ranging from 0.53 to 1.2 mg/kg;
- Chromium ranging from 14 to 35 mg/kg;
- Cobalt ranging from 6.0 to 9.4 mg/kg;
- Copper ranging from 6.7 to 19 mg/kg;
- Lead ranging from 4.0 to 22 mg/kg;
- Nickel ranging from 6.4 to 33 mg/kg;
- Vanadium ranging from 19 to 40 mg/kg;
- Zinc ranging from 11 to 59 mg/kg; and
- Mercury ranging from 0.015 to 0.042 mg/kg.

None of the reported metals concentrations exceeded ten times their respective STLC values and appear to be within the range for naturally occurring background concentrations.

5.2.3 Traffic Stripe Paint Samples

Sixteen yellow traffic stripe paint samples (PC1 through PC16) were collected from within the project boundaries. Total lead was reported for each of the yellow traffic stripe paint samples at concentrations ranging from 1.70 to 4,390 mg/kg. Three of the 16 yellow stripe paint samples (PC7, PC9 and PC16) had total lead concentrations greater than the California hazardous waste threshold for lead of 1,000 mg/kg (TTLC). Total chromium was reported for 15 of the 16 yellow traffic stripe paint samples at concentrations ranging from 1.56 to 1,420 mg/kg. None of the 16 yellow traffic stripe paint samples had total chromium concentrations greater than the California hazardous waste threshold for chromium of 2,500 mg/kg (TTLC). Caltrans elected not to further analyze the yellow paint samples with total lead levels exceeding the TTLC for TCLP soluble lead as the current design plans do not specify grinding of the yellow traffic stripe paint during roadway construction.

Four white traffic stripe paint samples (WTS-1A through WTS-1D) were collected from within the project boundaries. Total lead was reported for three of the four white traffic stripe paint samples at concentrations ranging from 1.17 to 40.6 mg/kg. Total chromium was only reported for one of the four white traffic stripe paint samples at 6.23 mg/kg. None of the four white traffic stripe paint samples had total lead and total chromium concentrations greater than the California hazardous waste threshold (TTLC) for lead and chromium of 1,000 and 2,500 mg/kg, respectively.

5.2.4 RT and UPRR Grand Avenue/Roseville Road Soil Samples

TPHd, TPHmo, pesticides, PCBs and SVOCs were not reported at concentrations exceeding the MRL in the soil samples collected in the vicinity of the RT tracks and UPRR tracks between Grand Avenue and Roseville Road. Soil pH values ranged from 6.64 to 8.43.

Ten composite soil samples were analyzed for Title 22 metals. The following metals were reported at concentrations exceeding the laboratory MRL.

- Arsenic ranging from 2.8 to 5.9 mg/kg;
- Barium ranging from 83 to 233 mg/kg;
- Chromium ranging from 24 to 32 mg/kg;
- Cobalt ranging from 9.1 to 13 mg/kg;
- Copper ranging from 9.8 to 20 mg/kg;
- Lead ranging from 2.9 to 11 mg/kg;
- Nickel ranging from 14 to 23 mg/kg;
- Vanadium ranging from 36 to 68 mg/kg;
- Zinc ranging from 26 to 44 mg/kg; and
- Mercury ranging from 0.011 to 0.026 mg/kg.

None of the 17 metals were reported at concentrations exceeding ten times their respective STLC values and appear to be within the range for naturally occurring background concentrations.

5.2.5 UPRR Adjacent to Natomas East Main Drainage Canal Soil Samples

TPHd and TPHmo were reported for the composite soil samples from borings DPRR-1 through DPRR-8 at concentrations up to 26 mg/kg (DPRR-1) and 56 mg/kg (DPRR-1), respectively.

Organochlorine pesticides and PCBs were not reported for the composite soil samples from borings DPRR-1 through DPRR-8. Soil pH values were 8.2 and 8.4.

The following PAH compounds were reported for the composite soil samples from borings DPRR-1 through DPRR-3.

- Benzo(a)anthracene at 0.063 mg/kg (DPRR-1) and 0.022 (DPRR-2);
- Benzo(a)pyrene at 0.060 (DPRR-1), 0.012 mg/kg (DPRR-2) and 0.013 mg/kg (DPRR-3);
- Benzo(b)fluoranthene at 0.041 mg/kg (DPRR-1), 0.042 (DPRR-2) and 0.011 mg/kg (DPRR-3);
- Benzo(k)fluoranthene at 0.014 mg/kg (DPRR-1) and 0.017 (DPRR-2);
- Chrysene at 0.030 mg/kg (DPRR-2) and 0.032 (DPRR-3);
- Indeno(1,2,3-cd)pyrene at 0.043 mg/kg (DPRR-1) and 0.029 (DPRR-2);
- Benzo(g,h,i)perylene at 0.041 mg/kg (DPRR-1) and 0.032 (DPRR-2);
- Fluoranthene at 0.032 mg/kg (DPRR-1), 0.033 (DPRR-2) and 0.029 mg/kg (DPRR-3);
- Phenanthrene in the composite soil sample from DPRR-3 at 0.013 mg/kg; and
- Pyrene at 0.040 mg/kg (DPRR-1), 0.027 (DPRR-2) and 0.032 mg/kg (DPRR-3).

None of the PAH compounds had concentrations exceeding the EPA Preliminary Remediation Goals (PRGs) for residential soil.

Eight composite soil samples were analyzed for Title 22 metals. The following metals were reported at concentrations exceeding the laboratory MRL.

- Arsenic ranging from 1.6 to 2.8 mg/kg;
- Barium ranging from 88 to 200 mg/kg;
- Cadmium ranging from 1.4 to 2.7 mg/kg;
- Chromium ranging from 27 to 38 mg/kg;
- Cobalt ranging from 7.8 to 14 mg/kg;
- Copper ranging from 12 to 22 mg/kg;
- Lead ranging from 2.8 to 25 mg/kg;
- Nickel ranging from 16 to 26 mg/kg;
- Vanadium ranging from 32 to 50 mg/kg; and
- Zinc ranging from 22 to 58 mg/kg.

None of the 17 metals were reported at concentrations exceeding ten times their respective STLC values and appear to be within the range for naturally occurring background concentrations.

5.2.6 Asbestos Results

Chrysotile asbestos at a concentration of 80% was detected in a sample representing nonfriable asbestos sheet packing used as barrier rail shims on Bridge 24-0193L/R (Del Paso Park Overhead).

Chrysotile asbestos at a concentration of 80% was detected in a sample representing nonfriable asbestos sheet packing used as barrier rail shims on Bridge 24-0205L/R (Winters Street Undercrossing).

Chrysotile asbestos at a concentration of 80% was detected in a sample representing nonfriable asbestos sheet packing used as barrier rail shims on Bridge 24-0203L/R (Del Paso Heights Overhead).

Chrysotile asbestos at a concentration of 80% was detected in a sample representing nonfriable asbestos sheet packing used as barrier rail shims on Bridge 24-0218L/R (Natomas East Canal Overhead).

We were not able to quantify the shims on the subject bridges due to safety concerns (i.e., traffic). No asbestos was detected in samples of the remaining suspect materials collected.

5.2.7 Laboratory QA/QC

We reviewed the laboratory QA/QC provided with the laboratory report. The data show acceptable surrogate recoveries and non-detect results for the method blanks. However, the relative percent difference (RPD) for duplicate samples 82999, 83035, 82861, 82871 and Matrix Spike (MS) and/or Matrix Spike Duplicate (MSD) for samples 82998 were outside the RPD limit. The laboratory states “high RPD due to sample matrix effect.” Percent recoveries for MS and/or MSD for antimony, lead, vanadium and zinc are also outside recovery criteria for samples 82998, 82854, 83084, and 83085. The laboratory states “Low MS/MSD recoveries due to sample matrix effect. High MS/MSD recoveries due to sample matrix effect.” The data showed acceptable recoveries and RPDs for the remainder of the matrix spikes and duplicates.

Percent recoveries and RPDs for duplicate, MS and/or MSD samples for EPA Methods 6010 and 8015 are outside recovery criteria for the samples collected on December 7, 2007. The laboratory report states “MS and/or MSD are/is outside recovery criteria for sample 095811-036AMS; however, the analytical batch was validated by the Laboratory Control Sample (LCS). Surrogate recovery biased low for sample 095811-032A, possibly due to matrix interferences. The sample was reanalyzed and demonstrated the same low recovery. RPD for Duplicate (DUP) is outside criteria for sample 095811-030ADUP and 095811-036ADUP; however, the LCS validated the analytical batch.” The data showed acceptable recoveries and RPDs for the rest of the matrix spikes and duplicates. Based on this limited data review, no additional qualifications of the data are necessary, and the data are of sufficient quality for the purposes of this report.

5.3 Statistical Evaluation for Lead Detected in Soil Samples

Statistical methods were applied to the total lead data to evaluate the upper confidence limits (UCLs) of the arithmetic means of the total lead concentrations for each sampling depth. The statistical methods used are discussed in a book entitled *Statistical Methods for Environmental Pollution Monitoring,* by Richard Gilbert; in an EPA *Technology Support Center Issue* document entitled, *The Lognormal Distribution in Environmental Applications,* by Ashok Singh et. al., dated December 1997; and in a book entitled *An Introduction to the Bootstrap,* by Bradley Efron and Robert J. Tibshirani.

5.3.1 Total Lead Distribution

The presence of non-detects and/or low concentrations in total lead data sets can strongly skew sample data towards low values. In these cases, the data are often lognormally distributed or non-parametric and classical statistical methods do not work properly since they assume that the data exhibit an underlying normal distribution. Consequently, it is necessary to apply the appropriate method when determining the UCLs on the true total lead means.

5.3.2 Calculating the UCLs for the True Mean

The upper one-sided 90% and 95% UCLs of the arithmetic mean are defined as the values that, when calculated repeatedly for randomly drawn subsets of site data, equal or exceed the true mean 90% and 95% of the time, respectively. Statistical confidence limits are the classical tool for addressing uncertainties of a distribution mean. The UCLs of the arithmetic mean concentration are used as the mean concentrations because it is not possible to know the true mean due to the essentially infinite number of soil samples that could be collected from a site. The UCLs therefore account for uncertainties due to limited sampling data. As data become less limited at a site, uncertainties decrease, and the UCLs move closer to the true mean.

Non-parametric bootstrap techniques used to calculate the UCLs are discussed in the previously referenced EPA document and in *An Introduction to the Bootstrap.* The bootstrap results are included in Appendix D. The calculated UCLs and statistical results are summarized in the table below:

SAMPLE INTERVAL (feet)	90% TOTAL LEAD UCL (mg/kg)	95% TOTAL LEAD UCL (mg/kg)	TOTAL LEAD MEAN (mg/kg)	MINIMUM VALUE (mg/kg)	MAXIMUM VALUE (mg/kg)
0.0 to 1.0	42.3	43.7	37.8	3.21	93.8
1.0 to 2.0	9.20	9.58	7.64	1.81	33.8
2.0 to 3.0	8.24	8.61	6.80	1.87	35.2

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 ADL and Soundwall Soil Waste Disposal/Reuse Classification

Waste classifications are evaluated based on the 90% UCL of the lead content for the relevant excavation depths; this has historically been considered sufficient to satisfy a good faith effort by the EPA as discussed in SW-846. Risk assessment characterization is based on the 95% UCL of the lead content in the waste for the relevant depths; this is in accordance with the Risk Assessment Guidance for Superfund (RAGS) Volume 1 documentation for Exposure Assessment.

Soil materials excavated to a maximum depth of 3.0 ft along the shoulder, median and soundwall areas of I-80 between PM 0.3 to 10.4 can be reused onsite or disposed of as non-hazardous soil since the calculated 90% total lead UCLs are less than 50 mg/kg.

None of the Title 22 metals were reported for the SW soil samples at concentrations exceeding the respective TTLC values and ten times the respective STLC values.

6.2 Traffic Stripe Paint Waste Classification/Disposal

The yellow and white traffic stripe paint was sampled per Caltrans' request since it may be removed from the underlying asphalt concrete by grinding or sand blasting, which would create a paint waste stream.

The highest reported concentrations of total lead and total chromium for the yellow traffic stripe paint samples were 4,390 mg/kg and 1,420 mg/kg, respectively. Since the total lead concentrations of three of the 16 yellow traffic stripe paint samples (PC7, PC9 and PC16) are greater than the TTLC value for lead of 1,000 mg/kg, the yellow traffic stripe paint may require disposal as a California hazardous waste. Caltrans' current design plans do not specify grinding of the yellow traffic stripe paint. The paint stripes will be removed along with the roadway and underlying sub-base. Additional analytical testing of the yellow traffic stripe paint may be required if design plans change and grinding of the yellow stripe paint is required since the paint samples were not analyzed for WET and TCLP soluble lead.

The highest reported concentrations of total lead and total chromium for the white traffic stripe paint samples were 40.6 and 6.23 mg/kg, respectively. The white traffic stripe will not require disposal as a California hazardous waste since the total lead and total chromium concentrations are less than the TTLC values of 1,000 mg/kg for lead and 2,500 mg/kg for chromium and less than ten times the STLC value for lead of 5.0 mg/l.

6.3 RT and UPRR Grand Avenue/Roseville Road Soil

We did not observe obviously impacted soil to the maximum depth explored of 12 ft during the field sampling activities conducted in the vicinity of the RT tracks and UPRR tracks between Grand Avenue and Roseville Road. TPHd, TPHmo, pesticides, PCBs and SVOCs were not reported for each of the soil samples collected within these areas.

Based on the non-detect results of petroleum hydrocarbons, pesticides, PCBs and SVOCs, soil impacts were not encountered in the exploratory borings performed within this area that would warrant special health and safety, soil handling or disposal protocols. If stained or odorous soil conditions are encountered during onsite construction excavations, these materials should be isolated, stockpiled and characterized to determine appropriate health and safety and soil disposal options.

6.4 UPRR Adjacent to Natomas East Main Drainage Canal Soil

We did not observe obviously impacted soil to the maximum depth explored of 12 ft during the field sampling activities conducted near the UPRR tracks adjacent to the Natomas East Main Drainage Canal. TPHd and TPHmo were reported for the composite soil samples at relatively low concentrations up to 56 mg/kg. Pesticides and PCBs were not reported for the composite soil samples collected within this area. PAH compounds were reported for the composite soil samples at concentrations less than the EPA PRGs for residential soil.

Based on the relatively low concentrations of petroleum hydrocarbons and PAHs and the non-detect results of pesticides and PCBs, impacted soil was not encountered within this area that would warrant special health and safety, soil handling or disposal protocols. If stained or odorous soil conditions are encountered during onsite construction excavations, these materials should be isolated, stockpiled and characterized to determine appropriate health and safety and soil disposal options.

6.5 Asbestos in Bridges

NESHAP regulations do not require that asbestos-containing sheet packing (a Category I nonfriable/nonhazardous material) identified during our survey be removed prior to demolition or treated as hazardous waste. However, the disturbance of these materials is still covered by the Cal/OSHA asbestos standard. We recommend that a licensed demolition contractor registered with Cal/OSHA for asbestos-related work (or a licensed and certified asbestos abatement contractor) perform demolition activities if the asbestos-containing materials identified during our survey are left in-place during demolition. Contractors are responsible for segregating and characterizing waste streams prior to disposal. Contractors are responsible for informing the landfill of the contractor's intent to dispose of asbestos-containing waste.

Geocon also recommends the notification of contractors (that will be conducting renovation, demolition, or related activities) of the presence of asbestos in their areas (i.e., provide the contractor[s] with a copy of this report and a list of asbestos removed by asbestos abatement contractor[s] during subsequent abatement activities). Contractors should be instructed not to disturb asbestos during their work.

In accordance with Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 902, written notification to SMAQMD is required ten working days prior to commencement of *any* demolition activity (whether asbestos is present or not) and for renovation activities involving specified quantities of RACM. In accordance with Title 8, CCR 341.9, written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain asbestos-related work. Additional information regarding the asbestos survey is presented in Appendix A.

6.6 Worker Protection

Per Caltrans requirements, the contractor(s) should prepare a project-specific Lead Compliance Plan (CCR Title 8, Section 1532.1, the "Lead in Construction" standard) to minimize worker exposure to lead-impacted soil. The plan should include protocols for environmental and personnel monitoring, requirements for personal protective equipment, and other health and safety protocols and procedures for the handling of lead-impacted soil.

Since material at the Site contains lead and/or chromium and according to Caltrans, the yellow thermoplastic and yellow paint may produce toxic fumes when heated, we recommend that a health and safety plan be prepared to minimize worker exposure. The health and safety plan should include a discussion of the constituents of concern, routes of exposure, permissible exposure limits, and personal protective measures. The health and safety plan should be reviewed and signed by the onsite construction workers prior to any field activities. We also recommend that contractors on the Site grinding asphalt which has been coated with yellow paint prepare a dust control plan. The dust control plan should include dust mitigation and monitoring procedures.

7.0 REPORT LIMITATIONS

This report has been prepared exclusively for Caltrans. The information contained herein is only valid as of the date of the report, and will require an update to reflect additional information obtained.

This report is not a comprehensive site characterization and should not be construed as such. The findings as presented in this report are predicated on the results of the limited sampling and laboratory testing performed. In addition, the information obtained is not intended to address potential impacts related to sources other than those specified herein. Therefore, the report should be deemed conclusive with respect to only the information obtained. We make no warranty, express or implied, with respect to the content of this report or any subsequent reports, correspondence or consultation. Geocon strived to perform the services summarized herein in accordance with the local standard of care in the geographic region at the time the services were rendered.

KLEINFELDER
Bright People. Right Solutions.

MEMORANDUM

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Date: September 16, 2008

Subject: Foundation Report For
Del Paso Park Separation & OH Bridge Widening
Structure No. 24-0193L and 24-0193R
03-SAC-80-PM 9.0
The Sacramento 80 HOV Widening Project (EA # 03-379701)
Sacramento County, California

INTRODUCTION

This memorandum presents geotechnical recommendations for design and specification development for the proposed widening of Del Paso Park separation and overhead structures (24-0193L and 24-0193R) located on State Highway 80 in Sacramento County, California. Kleinfelder performed this work under Task Order 49431 of Contract 59A0494 and Task Order 58914 of Contract 59A0589 with the Department of Transportation, State of California (Caltrans). The location of the project site is shown on Plate 1.

The following foundation recommendations are based on the subsurface information gathered during June 2007 through January 2008 along with a review of the previous foundation reports, As-Built records, Log of Test Borings (LOTB) for the existing bridges, and the revised loading received from Caltrans dated July 3, 2008.

PROJECT DESCRIPTION

The existing Del Paso overhead structure consists of two separate structures. The Westbound structure (24-0193L) is a 9-span and the Eastbound structure (24-0193R) is a 10-span cast-in-place (CIP), prestressed box girder bridge. The existing bridges were originally built in 1970.

Both of the existing structures will be widened towards the median by about 17-1/2 feet wide prestressed box girder sections. The limits of the proposed westbound structure (24-0193L) widening are between stations 689+87.46 and 703+27.46 ("A3" station line). The limits of the proposed eastbound structure (24-0193R) widening are between stations 689+14.987 and 701+80.987 ("A2" station line). The new sections will be structurally separate from the existing bridge, and integrated to the existing bridge by a closure pour. Therefore, design of the widened section will be as an independent structure, not influenced by the existing structure.

SITE GEOLOGY

Regional Geology

The Sacramento Valley is part of the Great Valley Geomorphic Province. This province consists of an asymmetrical synclinal trough about 640 km long and 80 km wide that was formed by the uplift and tilting of the Sierran Block. Since the Mesozoic, erosion from the adjacent mountains ranges has in-filled the valley trough with a thick sequence of marine, alluvial, volcaniclastic, basin and delta plain sediments deposited by ancient and modern rivers and their tributaries. The thickness of these sediments varies from a thin veneer at the edges of the valley to more than 9 miles in the west central portion.

Geology

The Regional Geology Map (Plate 3), prepared from Helley, E.J., and Harwood, D.S. (1985) "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," (United States Geological Survey Miscellaneous Field Studies Map MF-1790) shows three Quaternary age units mapped in the site vicinity. These formations are alluvium deposits (Qa), the Lower Member of the Riverbank Formation (Qrl) and the Turlock Lake Formation (Qtl).

Helley and Harwood (1985) indicate the site is underlain by the alluvium deposited along Arcade Creek. They show the contact between the alluvium deposits and the Riverbank Formation as having a northeast-southwest orientation, approximately paralleling the bridges about 200 feet north of the site. Helley and Harwood describe the alluvium deposits as Holocene age (11,000 years ago to present) unweathered gravel, sand, and silt deposited by present-day stream and river systems. Thickness varies for this unit within the Sacramento Valley from a few inches to about 33 feet. The alluvium overlies the older Riverbank and Turlock Lake formations and is distinguished by relatively lower blow counts (N < 20).

The Riverbank Formation is described as semiconsolidated gravel, sand and silt with a reddish color. Helley and Harwood give the age of the Riverbank Formation between 130,000 and 450,000 years ago. The Riverbank formation often forms a "hard pan" layer several feet thick relatively close to the surface. All borings appear to terminate in the Riverbank Formation as indicated by the relatively high blow counts and moderately cemented nature of the soils at depth.

The Turlock Lake Formation is mapped about 0.8 miles east of the site and is described as deeply weathered and dissected arkosic gravels with sand and silt. The gravels consist of more resistant metamorphic rock fragments and quartz pebbles.

FIELD INVESTIGATON AND SUBSURFACE CONDITIONS

A total of twenty-five (25) test borings were drilled for the proposed project. All borings were advanced using mud rotary drilling method. Drilling for borings DPLB-B1 through DPLB-B10 and DPRB-B1 through DPRB-B11 were performed between June 28 and October 19, 2007 by Caltrans drilling services and Spectrum Explorations of Stockton, California. Borings DPLB-B4-D, DPLB-B7-D, DPRB-B2-D and DPRB-B9-D were drilled between December 26, 2007 and January 16, 2008. Borings with "–D" designation were drilled adjacent to the boring number preceding the designation. All drilling and sampling operations were supervised by Kleinfelder staff. The Boring Location Plan is shown on Plate 2. Summary of borings is presented in Tables 1 and 2.

Table 1: Field Exploration Summary for Del Paso Left Bridge (24-0193L)

Boring ID	Date Drilled	Equipment Used	Approximate Station (A3-line) (ft)	Approximate Ground Surface Elevation (ft)	Boring Depth (ft)
DPLB-B1	06/27/07	CME 75	680+00	83.0	86.5
DPLB-B2	07/26/07	CME 75	690+50	56.0	71.5
DPLB-B3	10/19/07	ACKER	692+20	55.0	71.5
DPLB-B4	09/17/07	ACKER	694+00	55.0	71.5
DPLB-B4-D	01/02/08	CME 75	693+80	55.0	120.0
DPLB-B5	07/13/07	CME 75	695+50	56.0	81.5
DPLB-B6	07/12/07	CME 75	695+70	57.0	91.0

Table 1: Field Exploration Summary for Del Paso Left Bridge (24-0193L) (cont)

Boring ID	Date Drilled	Equipment Used	Approximate Station (A3-line) (ft)	Approximate Ground Surface Elevation (ft)	Boring Depth (ft)
DPLB-B7	07/23/07	CME 75	698+80	57.0	61.5
DPLB-B7-D	12/27/08	CME75	698+75	57.0	155.0
DPLB-B8	07/23/07	CS 2000	699+10	57.0	91.5
DPLB-B9	07/23/07	CME 75	700+30	58.0	71.0
DPLB-B10	07/24/07	CS 2000	701+80	65.0	101.5

Table 2: Field Exploration Summary for Del Paso Right Bridge (24-0193R)

Boring ID	Date Drilled	Equipment Used	Approximate Station (A2-line) (ft)	Approximate Ground Surface Elevation (ft)	Boring Depth (ft)
DPRB-B1	06/25/07	CME 75	668+15	83.0	81.5
DPRB-B2	09/19/07	ACKER	690+00	55.0	71.5
DPRB-B2-D	12/26/07	CME 75	690+40	55.0	150.0
DPRB-B3	10/18/07	ACKER	690+75	55.0	91.5
DPRB-B4	09/18/07	ACKER	692+60	55.0	92.5
DPRB-B5	07/16/07	ACKER MFCA	694+00	55.0	71.5
DPRB-B6	07/17/07	ACKER MPCA	695+50	55.0	91.5
DPRB-B7	08/08/07	CME75	697+00	63.0	71.5
DPRB-B8	08/13/07	CME 75	697+35	59.0	91.5
DPRB-B9	08/09/07	CME 75	699+20	57.0	71.5
DPRB-B9-D	1/16/08	MOBILE B-47	699+00	57.0	150.0
DPRB-B10	08/14/07	CME 75	700+75	55.0	71.5
DPRB-B11	09/20/07	ACKER	701+90	69.0	92.5

Visual classifications on and laboratory testing results from samples obtained from 25 boreholes indicate predominance of cohesive soils (lean clay and silt) in the upper 20 to 30 feet and granular soils (silty sands and sandy silts) from about 30 to 50 feet. The soils then transition back to clays and silts from about 50 feet to the maximum depth explored. The soil consistency varies between very stiff to hard for cohesive soils, and dense to very dense for granular soils.

The soils below elevation 35 feet have average SPT blow count values (N) of 44 with a range of 21 to 68.

In Borings DPLB-B4 and DPRB-B2 at a depth of about 60 feet and 40 feet, respectively, a soft layer of silt exist in Boring DPLB-B4 with blow count value of 10, and a soft lean clay layer with blow count value of 8 in Boring DPRB-B2.

In the deep Borings DPLB-B4-D, DPLB-B7-D, DPRB-B2-D, and DPRB-B9-D, majority of the soils from a depth of about 75 feet to the maximum depth explored varied between hard sandy silts and dense silty sands. Lean clay layers with low to medium plasticity were mainly found in Boring DPRB-B2.

GROUNDWATER

A review of data from the State Department of Water Resources web site (http://wdl.water.ca.gov) for monitoring wells in the area indicates groundwater elevations in a nearby well (No. 09N005E12L001M) varied between elevation -56.6 and -32.0 feet during 1995 and 2007.

Piezometers were installed to monitor groundwater levels at borings DPLB-B1, DPLB-B4-D, DPLB-B7-D, DPRB-B2-D, and DPRB-B9-D. The table below describes groundwater measurements taken between January and June 2008.

Table 3: Groundwater Reading Data

Piezometer Location	Groundwater Depth (feet)	Date
DPLB-B1	DRY	1/7/2008
		2/8/2008
		3/11/2008
		6/30/2008
DPLB-B4-D	93.21	1/7/2008
	82.82	2/8/2008
	95.14	3/11/2008
	94.94	6/30/2008
DPLB-B7-D	92.95	1/7/2008
	97.13	2/8/2008
	92.71	3/11/2008
	93.40	6/30/2008

Table 3: Groundwater Reading Data (cont)

Piezometer Location	Groundwater Depth (feet)	Date
DPRB-B2-D	95.39	3/11/2008
DPRB-B9-D	92.60	2/8/2008
	96.76	3/11/2008
	95.42	6/30/2008

The extraction wells currently under operation in the nearby McClellan Air Force Base may have influence over groundwater level at the Del Paso Bridge site.

CORROSION POTENTIAL

Chemical analyses were performed on fourteen (14) soil samples collected from the left bridge and fifteen (15) soil samples from the right bridge to evaluate corrosion potential of the on-site soils. Testing was performed at Caltrans Headquarters Geotechnical Laboratory in Sacramento, California.

Table 4: Corrosion Test Results for Del Paso Left Bridge (24-0193L)

Location	Depth (ft)	Minimum Resistivity (Ohm-cm) (Caltrans Test Method 532)	pH (Caltrans Test Method 643)	Chloride Content (ppm)	Sulfate Content (ppm)
DPLB-B2	5.0	7970	7.25	--	--
DPLB-B2	31.0	2515	7.00	--	--
DPLB-B3	5.0	2178	7.56	--	--
DPLB-B3	60.5	2552	6.16	--	--
DPLB-B4	6.5	4055	6.71	--	--
DPLB-B4	37.0	6005	6.84	--	--
DPLB-B5	3.0	3635	7.03	--	--
DPLB-B6	2.0	4131	7.67	--	--
DPLB-B6	20.0	2913	7.13	--	--

Table 4: Corrosion Test Results for Del Paso Left Bridge (24-0193L) (cont)

Location	Depth (ft)	Minimum Resistivity (Ohm-cm) (Caltrans Test Method 532)	pH (Caltrans Test Method 643)	Chloride Content (ppm)	Sulfate Content (ppm)
DPLB-B7	5.0	2301	8.00	--	--
DPLB-B8	15.0	2305	6.95	--	--
DPLB-B9	2.0	2494	7.35	--	--
DPLB-B10	10.0	18640	7.28	--	--
DPLB-B10	45.0	11625	6.87	--	--

Table 5: Corrosion Test Results for Del Paso Right Bridge (24-0193R)

Location	Depth (ft)	Minimum Resistivity (Ohm-cm) (Caltrans Test Method 532)	pH (Caltrans Test Method 643)	Chloride Content (ppm)	Sulfate Content (ppm)
DPRB-B1	1.0	4399	6.50	--	--
DPRB-B2	11.5	1993	7.68	--	--
DPRB-B2	31.5	10878	7.57	--	--
DPRB-B3	4.0	1481	5.98	--	--
DPRB-B3	66.0	3006	6.98	--	--
DPRB-B4	11.5	5913	6.90	--	--
DPRB-B4	41.5	3049	7.21	--	--
DPRB-B5	2.0	3604	5.86	--	--
DPRB-B6	1.0	629	7.16	195	4544
DPRB-B6	25.0	4221	7.13	--	--
DPRB-B7	10.0	2602	6.04	--	--
DPRB-B8	35.0	3159	7.77	--	--
DPRB-B9	30.0	920	7.52	6	3
DPRB-B10	31.0	2703	7.01	--	--
DPRB-B11	6.0	3784	6.73	--	--

Based on the Caltrans Corrosion Guidelines (2003 version 1.0), a site is considered corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. Moreover, a minimum resistivity value for soil and/or water less than 1000 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion. In Caltrans Geotechnical Laboratory, a sample is tested for chloride and sulfate contents only if the test results for minimum resistivity and pH indicate potential for corrosivity.

Based on Caltrans guidelines and laboratory test results, the site may be considered as non-corrosive to steel and concrete with the exception of Boring DPRB-B6. This Boring is located near Bent 6 at the proposed Del Paso right bridge widening site.

Controlling corrosion parameters are as follows:

- 629 Ohm-cm Resistivity
- 195 ppm Chloride
- 4544 ppm Sulfate

Kleinfelder does not practice corrosion engineering and therefore does not provide recommendations regarding corrosion potential mitigation. The above information is provided to help facilitate the understanding of corrosion potential at a site.

LABORATORY TESTING

Selected soil samples obtained from the test borings were sent to the Caltrans Geotechnical Laboratory in Sacramento, California for testing. Tests performed included:

- Sieve and Hydrometer analyses (ASTM D242)
- Natural moisture content (ASTM D2216)
- Atterberg limits (ASTM D4318)
- Unconsolidated Undrained (UU) Triaxial tests
- Unconfined Compression tests

Laboratory test results will be available upon request.

SEISMIC DATA AND EVALUATION

Faulting and Seismicity

The project site is located in a low seismically-active region. Some northwest-southeast fault zones exist near the project vicinity, which have a history of seismic activities.

According to Mualchin (1996), with an errata posted on the website http://www.dot.ca.gov/hq/esc/earthquake_engineering/Seismology/seismicmap.html, the nearest fault is PRAIRIE CREEK-SPENCEVILLE-DENTMAN (PSD) fault at a distance of about 15 miles (25 km) to the east.

The proposed Del Paso Bridge Widening site does not lie within an Alquist-Priolo Earthquake Fault Zone (CGS, 1997). No active faults are known to transect the project site. Therefore, the possibility of primary surface rupture or deformation at the site is considered low. The closest distance from the site to the some of the active major faults, type of faults, their maximum moment magnitudes, and peak bedrock accelerations are presented in Table 1.1 corresponding to Mualchin (1996, with an errata posted on the website http://www.dot.ca.gov/hq/esc/earthquake_engineering/Seismology/seismicmap.html). The faults in the near vicinity of the site are shown on Plate 5, Fault and PBA Map. Our calculations indicate peak bedrock acceleration (PBA) of 0.12g using the Mualchin & Jones (1992) and 0.13 using the Sadigh et al. (1997) relationship for magnitude 7.0 at a distance of 15 miles (25 km). In addition, the Caltrans PBA map (Mualchin 1996) shows that the PBA for this site lies between the contour lines of 0.1g and 0.2g. Therefore, we recommend a PBA of 0.2g.

Table 6: Fault Parameters Based on Mualchin (1996)

Fault Name	Fault Code (2)	Site Distance (km)	Type of Displacement (1)	Maximum Magnitude (2)	Peak Bedrock Acceleration Mean (g) (3)	(4)
PRAIRIE CREEK-SPENCEVILLE-DENTMAN*	PSD	25	NL	6.5	0.12	0.13
BIG BEND-WOLF CK-MAIDU-BEAR MT/E*	BWM	35	NL	6.5	0.09	0.08
DUNNIGAN HILLS	DUH	44	RE	6.5	0.07	0.07
BEAR MOUNTAIN/W*	BMW	47	NL	6.5	0.05	0.06

Table 6: Fault Parameters Based on Mualchin (1996) (cont)

Fault Name	Fault Code (2)	Site Distance (km)	Type of Displacement (1)	Maximum Magnitude (2)	Peak Bedrock Acceleration Mean (g) (3)	(4)
COAST RANGES-SIERRAN BLOCK BDY ZNE	CSB	54	RE	7.0	0.06	0.08
VACA-KIRBY HILL-MONTEZUMA HILLS/E*	VME	62	XX	6.75	0.04	0.05

Notes:
(1) ST-strike slip, RE-reverse including thrust, NO-normal-oblique, NL-normal, XX-not known
(2) Mualchin (1996, with errata dated November 2004)
(3) Mualchin & Jones (1992, 1996)
(4) Sadigh et al. (1997 Rock). For XX faults more conservative reverse/thrust attenuation fault relationship used.

SEISMIC DESIGN CRITERIA

Based on our subsurface investigation program and geological study, the site is a soil site. According to Table B.1 of Caltrans Seismic Design Criteria (SDC) Version 1.4 (2006), the site can be classified as Soil Profile Type D for design purpose.

Based on the discussions above, the controlling fault is the PRAIRIE CREEK-SPENCEVILLE-DENTMAN fault with the associated peak bedrock acceleration (PBA) of about to 0.2g. The recommended ARS curve for this project can be estimated from the ARS curve presented in Figure B.7 of SDC for associated PBA value of 0.2g.

The seismic design parameters presented in Table 7 may be used for the design of the proposed Del Paso Bridge Widening Project in Sacramento, California. These values were estimated using Caltrans Seismic Hazard Map (CSHM, Mualchin, 1996), procedures outlined in Caltrans Seismic Design Criteria (SDC) Version 1.4 (2006) and Caltrans Guidelines for Structures Foundations Reports (CGSFR) (March 2006).

Table 7: Summary of Seismic Data

Causative Fault (Type of Fault)	PRAIRIE CREEK-SPENCEVILLE-DENTMAN (NL)
MCE[1] Magnitude	6.5
Distance to Fault	15 miles (25 km)
Design PBA[2]	0.2g
SDC Soil Profile Type	Type D
ARS Curve Recommendation[3]	SDC ARS Figures B.7 (2006)

Notes:
[1]MCE = Maximum Credible Earthquake.
[2]Design PBA = Design Peak Bedrock Acceleration, Based on Caltrans Seismic Hazard Map (1996) and verified by attenuation relationships by Sadigh et al. (1997).

According to the guidelines presented in Section 6.1.2.1 of the SDC and Section 2.5.1 of the CGSFR, for structures located within 9 miles (15 km) of a fault, the ARS curve needs to be adjusted to account for fault rupture directivity effects. Since the distance to the fault is more than 10 miles (15 km), no modification to ARS curve is needed. Based on the above, the recommended ARS curves (both spectral acceleration and displacement) are presented on Plate 5. The spectral acceleration and displacement values are also listed in the Table 8.

Table 8: Recommended ARS Values (Soil Profile D)

Period (sec)	Spectral Acceleration (g)	Spectral Displacement (inch)
0.01	0.2801	0.0003
0.02	0.2801	0.0011
0.03	0.2801	0.0025
0.05	0.3637	0.0089
0.08	0.4476	0.0246
0.10	0.5185	0.0507
0.12	0.5791	0.0816
0.15	0.6293	0.1386
0.17	0.6533	0.1848
0.20	0.6732	0.2635
0.24	0.6740	0.3800
0.30	0.6527	0.5750
0.40	0.6019	0.9426
0.50	0.5507	1.3474
0.75	0.4312	2.3739
1.00	0.3266	3.1962
1.50	0.1897	4.1778
2.00	0.1217	4.7633
3.00	0.0613	5.4036
4.00	0.0350	5.4811

AS-BUILT FOUNDATION INFORMATION

Information on existing foundations for the Del Paso Park separation and overhead structure was obtained from the Foundation Report prepared by Caltrans on July 17, 1967. Cast-in-drilled-hole piles 6.5 feet in diameter, with the majority belled to 12- or 16- foot diameter at the bottom were recommended for all supports shown on the "General Plan" except the abutments. A summary of the foundation recommendations are presented in the tables below:

Table 9: Pile Information for Existing Left Bridge

Support	Design Load	Spec. Pile Tip Elevation (feet)	Bell Diameter (feet)	Bell Footing Pressure (tsf)
Left Bridge				
Abutment 1	45 ton CIDH piles	38.0	--	--
Column 2 Lt	2040 kips	19.0	12	6.0
Column 2 Rt	1830 kips	19.0	12	6.0
Column 3 Lt	2270 kips	20.0	12	6.0
Column 3 Rt	2270 kips	20.0	12	6.0
Column 4 Lt	2310 kips	18.0	12	6.0
Column 4 Rt	2270 kips	18.0	12	6.0
Column 5 Lt	1880 kips	20.0	12	5.0
Column 5 Rt	1800 kips	20.0	12	5.0
Column 6 Lt	2070 kips	21.0	12	5.0
Column 6 Rt	1890 kips	21.0	12	5.0
Column 7 Lt	2800 kips	23.0	16	5.0
Column 7 Rt	2380 kips	23.0	16	5.0
Column 8 Rt	1550 kips	23.0	12	4.0
Column 9 Lt	2440 kips	23.0	16	4.0
Column 9 Rt	1600 kips	24.0	12	4.0
Abutment 10	45 ton CIDH piles	39.0	--	--

Table 10: Pile Information for Existing Right Bridge

Support	Design Load	Spec. Pile Tip Elevation (feet)	Bell Diameter (feet)	Bell Footing Pressure (tsf)
Right Bridge				
Abutment 1	45 ton CIDH piles	38.0	--	--
Column 2 Lt	1490 kips	38.0	12	5.0
Column 2 Rt	1740 kips	38.0	12	5.0
Column 3 Lt	1720 kips	19.0	12	5.0
Column 3 Rt	1910 kips	19.0	12	5.0
Column 4 Lt	1650 kips	37.0	12	5.0
Column 4 Rt	1690 kips	37.0	12	5.0
Column 5 Lt	1500 kips	38.0	12	5.0
Column 5 Rt	1440 kips	38.0	12	5.0
Column 6 Lt	1550 kips	20.0	12	5.0
Column 6 Rt	1490 kips	20.0	12	5.0
Column 7 Lt	1780 kips	20.0	12	5.0
Column 7 Rt	1720 kips	20.0	12	5.0
Column 8 Lt	2510 kips	38.0	16	4.5
Column 8 Rt	2520 kips	38.0	16	4.5
Column 9 Lt	2510 kips	38.0	16	4.5
Column 9 Rt	1880 kips	38.0	16	4.5
Colum 10 Rt	1620 kips	38.0	12	5.0
Abutment 11	45 ton CIDH piles	37.0	--	--

According to the Foundation Review dated October 18, 1967, the pile tip elevations were changed from the original Foundation Report dated July 17, 1967 for the right bridge. The table below reflects the changes.

Table 11: Revised Pile Tip Elevations for Right Bridge

Support	Spec. Pile Tip Elevation (feet)
Right Bridge	
Column 2 Lt	25.0
Column 2 Rt	25.0
Column 4 Lt	25.0
Column 4 Rt	25.0
Column 5 Lt	28.0
Column 5 Rt	28.0
Column 8 Lt	22.0
Column 8 Rt	25.0
Column 9 Lt	25.0
Column 9 Rt	25.0
Column 10 Rt	25.0

The existing structures' foundation investigation included thirty-seven (37) cone penetrometer borings, sixteen (16) rotary sample borings and two 36" auger borings that were used to evaluate the nature and extent of the subsurface material. The data in As Built Log of Test Boring (LOTB) sheets dated March 24, 1969, indicates the foundation materials at the site consist of dense to very dense, fine grained, alluvial deposits (sand, silt, and clay mixtures). Eight feet below ground surface was the maximum depth explored. Perched groundwater was encountered at various elevations. LOTB sheet from the 1970 As Built Plans indicates the groundwater table ranged between elevations 2.8 and 43.3 feet.

PILE FOUNDATIONS

General

The Office of Bridge Design North have selected a deep foundation system utilizing 6.5 feet diameter cast-in-drill-hole (CIDH) concrete pile for bents and 16-inch CIDH concrete piles for abutments.

Axial Load Capacity

We utilized the computer program SHAFT v5.0 to estimate the axial load capacity and settlement of drilled shafts. The SHAFT program follows the guidelines of FHWA publication IF-99-025 (1999). Based on our discussion with Caltrans Geotechnical Design group, full side friction (no permanent casing) and no end bearing were considered.

The proposed pile tip elevations were based on the cut-off elevation and factored load values provided by the Office of Bridge Design dated July 3, 2008.

Estimated settlements at Service load are less than 1-inch.

The recommended tip elevations at each support location are summarized in following tables.

Abutment Foundations Design Recommendations (24-0193L)

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load (kips) per Support		LRFD Service-I Limit State Total Load (kips) per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut. 1	16" CIDH	81.0	357	182	140	280	32(a)	32	N/A
Abut. 10	16" CIDH	65.5	632	420	140	280	22.5(a)	22.5	N/A

Abutment Foundations Design Recommendations (24-0193R)

Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-I Limit State Load (kips) per Support		LRFD Service-I Limit State Total Load (kips) per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut. 1	16" CIDH	78	900	268	90	180	48(a)	48	N/A
Abut. 11	16" CIDH	66	720	333.9	90	180	21(a)	21	N/A

Note:

1. *Design tip elevations are controlled by (a) Compression.*
2. *There is no design tip elevation for Settlement.*
3. *Design tip elevations for Lateral Load will be provided by Design.*

Bent Foundations Design Recommendations (24-0193L)

Support Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp. (φ=1)	Tension (φ=1)			
Bent 2	6.5' CIDH	54	1884	1	2588	0	1346	0	-40(a-I), 8(a-II)	-40	N/A
Bent 3	6.5' CIDH	53	2267	1	3032	0	1611	0	-54(a-I), -10(a-II)	-54	N/A
Bent 4	6.5' CIDH	53	2264	1	3029	0	1611	0	-49(a-I), -5(a-II)	-49	N/A
Bent 5	6.5' CIDH	54	1964	1	2663	0	1387	0	-43(a-I), -4(a-II)	-43	N/A
Bent 6	6.5' CIDH	55	1932	1	2624	0	1347	0	-54(a-I), 8(a-II)	-54	N/A
Bent 7	6.5' CIDH	55	2313	1	3101	0	1670	0	-38(a-I), 9(a-II)	-38	N/A
Bent 8	6.5' CIDH	52	1940	1	2641	0	1333	0	-59(a-I), 4(a-II)	-59	N/A
Bent 9	6.5' CIDH	52	2103	1	2841	0	1470	0	-43(a-I), 5(a-II)	-43	N/A

Bent Foundations Design Recommendations (24-0193R)

Support Location	Pile Type	Cut-off Elevation (ft)	Service-I Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp. (φ=1)	Tension (φ=1)			
Bent 2	6.5' CIDH	53	1555.3	1	2459.7	0	1215.0	0	-55(a-I), -3(a-II)	-55	N/A
Bent 3	6.5' CIDH	53	1661.3	1	2601.2	0	1316.5	0	-61(a-I), -16(a-II)	-61	N/A
Bent 4	6.5' CIDH	53	1568.6	1	2461.7	0	1238.1	0	-46(a-I), 2(a-II)	-46	N/A
Bent 5	6.5' CIDH	53	1501.2	1	2394.2	0	1160.4	0	-48(a-I), 3(a-II)	-48	N/A
Bent 6	6.5' CIDH	57	1279.9	1	2088.5	0	956.1	0	-33(a-I), 17(a-II)	-33	N/A
Bent 7	6.5' CIDH	59	1445.4	1	2288.2	0	1127.6	0	-41(a-I), 9(a-II)	-41	N/A
Bent 8	6.5' CIDH	57	1758.1	1	2744.0	0	1400.2	0	-39(a-I), 13(a-II)	-39	N/A
Bent 9	6.5' CIDH	54	1852.0	1	2865.6	0	1492.3	0	-43(a-I), 7(a-II)	-43	N/A
Bent 10	6.5' CIDH	56	1723.2	1	2702.7	0	1362.8	0	-53(a-I), -7(a-II)	-53	N/A

Notes: 1. Design tip elevations are controlled by: (a-I) Compression (Strength Limit), (a-II) Compression (Extreme Event).
2. There is no design tip elevation for Settlement..
3. Design tip elevations for lateral load will be provided by design.

Pile Data Table (24-0193L)

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut. 1	16" CIDH	280	0	32(a)	32	N/A
Bent 2	6.5' CIDH	3700	0	-40(a)	-40	N/A
Bent 3	6.5' CIDH	4330	0	-54(a)	-54	N/A
Bent 4	6.5' CIDH	4330	0	-49 (a)	-49	N/A
Bent 5	6.5' CIDH	3800	0	-43(a)	-43	N/A
Bent 6	6.5' CIDH	3750	0	-54(a)	-54	N/A
Bent 7	6.5' CIDH	4430	0	-38(a)	-38	N/A
Bent 8	6.5' CIDH	3770	0	-59(a)	-59	N/A
Bent 9	6.5' CIDH	4060	0	-43(a)	-43	N/A
Abut. 10	16" CIDH	280	0	22.5(a)	22.5	N/A

Pile Data Table (24-0193R)

Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut. 1	16" CIDH	180	0	48(a)	48	N/A
Bent 2	6.5' CIDH	3510	0	-55(a)	-55	N/A
Bent 3	6.5' CIDH	3720	0	-61(a)	-61	N/A
Bent 4	6.5' CIDH	3520	0	-46(a)	-46	N/A
Bent 5	6.5' CIDH	3420	0	-48(a)	-48	N/A
Bent 6	6.5' CIDH	2990	0	-33(a)	-33	N/A
Bent 7	6.5' CIDH	3270	0	-41(a)	-41	N/A
Bent 8	6.5' CIDH	3920	0	-39(a)	-39	N/A
Bent 9	6.5' CIDH	4090	0	-43(a)	-43	N/A
Bent 10	6.5' CIDH	3860	0	-53(a)	-53	N/A
Abut. 11	16" CIDH	180	0	21(a)	21	N/A

Notes:

1. *Design tip elevations for Abutments are controlled by: (a) Compression.*
2. *Design tip elevations for Bents are controlled by: (a) Compression.*
3. *There is no design tip elevation for Settlement.*

ABUTMENTS AND WING WALLS

Backfill

The abutment walls will be extended as required by the General Plan. Structure backfill shall be placed behind the abutments and wing walls, conforming to the requirements of the Caltrans Standard Specifications. The backfill material placed for abutment walls should consist of non-expansive soils (Expansion Index, ASTM D4829 < 50 or a Sand Equivalent, CTM 217 > 20). The zone for non-expansive backfill should be in conformance with Figure 5.4 of the Caltrans Guidelines for Structures Foundation Report (March, 2006 Version 2.0) "Typical Section: Expansive Soil Exclusion Zone in Bridge Embankment".

Lateral Earth Pressures

In accordance with the Caltrans Bridge Design Specification (BDS, 2004) Section 5.5.5.11, the abutments which do not deflect sufficiently to create an active wedge in the backfill soil, the lateral earth pressure distributions shall be the higher value between a triangular shaped pressure diagram based on At-Rest Earth Pressure Coefficient, K_0 and a trapezoidal shaped pressure distribution based on Active Earth Pressure Coefficient, K_a with maximum ordinate of $0.8K_a\gamma H$ (H=Restrained Height). We recommend using a Coulomb's active earth pressure coefficient, K_a of 0.28 and corresponding equivalent fluid pressure ($k_a\gamma$) of 36 pcf (minimum required by Caltrans), and an at-rest earth pressure coefficient, K_O of 0.44 for the analysis of abutments and wingwalls. The earth pressure coefficients were estimated with a wall friction angle equal to zero, backfill slope angle of zero, and backfill friction angle of 34^0.

In accordance with the Caltrans BDS Section 5.5.4, the effects of earthquake are considered in the design of retaining walls, which support bridge abutments. The Monobe-Okabe analysis may be used to estimate seismic lateral earth pressures on a retaining wall. In accordance with the BDS Section 5.2.2.3, horizontal seismic coefficient can be taken as one-third of, A, the expected peak acceleration produced by the Maximum Credible Earthquake on bedrock at the site as defined in the Caltrans Seismic Hazard Map (1996 with errata). We recommend a horizontal seismic coefficient, k_h value of 0.12 (one-third of 0.36g) and corresponding additional seismic equivalent fluid pressure ($\Delta K_{AE}\gamma$) of 9.5 pcf for seismic force applied on the retaining wall. The seismic pressure should be applied as an inverted triangular shape pressure distribution. The resultant of the earthquake induced earth pressure may be assumed to act at a point that is 0.6H above the base of the wall. The vertical seismic acceleration coefficient, k_v can be considered as zero for the analysis.

In accordance with the Caltrans Seismic Design Criteria (2006) Section 7.8.1, the maximum passive pressure is 5 ksf for 5.5 feet height abutment and varies proportionally for different heights.

We recommend a coefficient of friction value of 0.5 (assuming friction between concrete and soil, $\delta = 2/3\Phi$) for friction between cast-in-place concrete foundations and the underlying soil.

Surcharge pressures due to dead (abutment, etc.) or live loads should be included in the lateral earth pressures, if applicable. In case of traffic coming closer than half the height of the wall, we recommend a live load surcharge pressure equal to not less than 2 feet of soil surcharge with an average unit weight of 125 pcf. The surcharge pressure should be evaluated with highway loading for the proposed bridge.

Wall Drainage

The recommended lateral earth pressures assume that drainage is provided behind the walls to prevent the accumulation of hydrostatic pressures. Proper drainage should be designed behind the walls to allow drained conditions in the retained soils, in accordance with Caltrans Standard Plan (May 2006) BO-3.

GENERAL NOTES TO THE DESIGNER

1. All support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memo to Designers" 4-2.

2. If lateral demands exist on the support piles, the structural designer engineer shall indicate on the plans, in the pile data table, the design pile elevations required to meet the lateral load demands. If the specified pile tip elevations given in the above pile data table are not adequate for the lateral load demands, the Office of Geotechnical Design-North, shall be contacted for further recommendations.

CONSTRUCTION CONSIDERATIONS

- Unless noted otherwise, installation of pile foundations shall conform to the requirements of Section 19 (Piling) of the Caltrans Standard Specifications.
- Caving conditions in the fill material and upper native material may be encountered during the CIDH pile installation. Temporary casing may be required to control caving during construction (refer to Standard Specifications Section 49-4 and all applicable sections). All temporary casing shall be removed while the concrete is being placed.
- Observation and testing by a qualified geotechnical staff should be performed during construction as applicable.

- Groundwater is anticipated during CIDH pile construction at some support locations. Groundwater surface elevation is subject to seasonal fluctuations and may occur at higher or lower than indicated on the Log of Test Boring (LOTB) sheets depending on the conditions and time of construction. Measures to control impact of both ground and surface water on the stability of temporary excavations should be employed and should remain the sole responsibility of the Contractor.
- The extraction wells currently under operation in the nearby McClellan Air Force Base may have influence over groundwater level at the Del Paso Bridge site.
- The calculated geotechnical capacity of CIDH piles is based upon side friction only. No end bearing was considered.
- CIDH piling excavation shall be not be left open for more than necessary for placement of reinforcement concrete. Concrete pour for construction shall be done immediately after pile has reached the specified pile tip elevation. Difficulties of placing concrete under groundwater should be anticipated.
- Excavations should be performed in accordance with Section 19-3 of Caltrans Standard Specifications and Standard Plan A62B. All trenches and temporary excavations should be excavated in accordance with CAL/OSHA safety requirements.
- All temporary slopes steeper than 1V:1.5H and higher than 5 feet will require shoring and should be in accordance with Caltrans Trenching and Shoring Manual.
- Ponding of water adjacent to the structure should be avoided. During and after construction, positive drainage should be provided to direct surface water away from structures and all excavations toward suitable, non-erosive drainage devices.
- The Contractor should research utility locations and take necessary precautions to protect-in-place or relocate utilities as applicable, prior to excavation.

LIMITATIONS

The recommendations presented in this document are for the preliminary design and construction of the proposed Del Paso Park Separation & OH Bridge Widening (Bridge No. 24-0193L and 24-0193R) along eastbound and westbound Interstate 80 in Sacramento County, California, as described in the text of this report.

Soil and groundwater conditions were observed and interpreted at the exploration locations only. Conditions may vary between the exploration locations and seasonal fluctuations in the groundwater level may occur due to variations in rainfall and local groundwater management practice. If conditions encountered during construction differ from those described herein, our recommendations may be subject to modification.

The findings, conclusions, and recommendations were prepared in accordance with generally accepted geotechnical engineering practice. No warranties, expressed or implied, are made.

This document is intended for use by Caltrans, within a reasonable time from its issuance. This document is not designed as a specification.

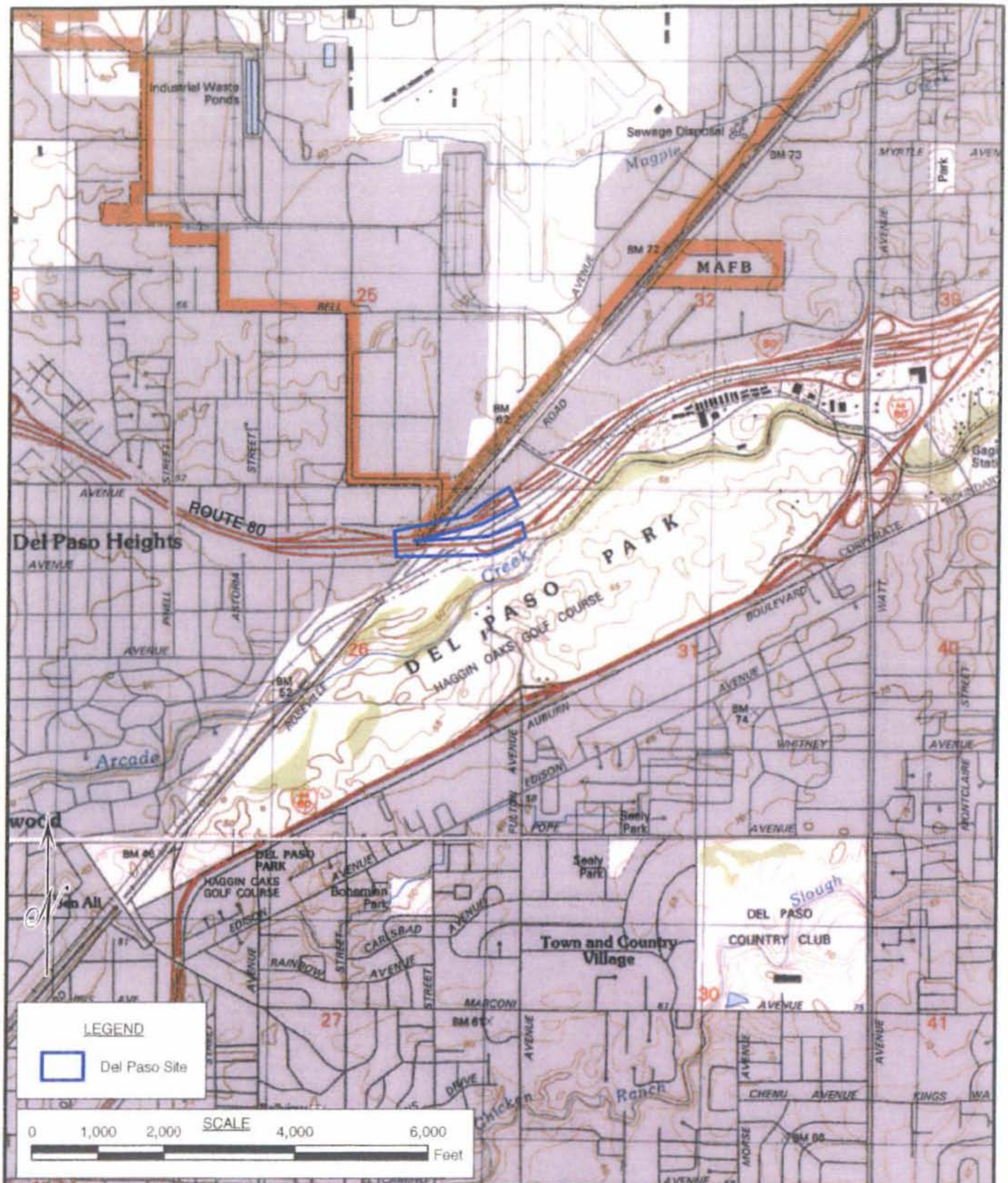
The scope of our geotechnical services did not include any environmental site assessment for the presence or absence of hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Our evaluation of subsurface conditions at the site has considered subsurface soil and groundwater conditions present at the time of our investigation. The influence(s) of post-construction changes to these conditions may influence future performance of the proposed project.

ATTACHMENTS:

Plate 1	Site Location Map
Plate 2	Boring Location Plan
Plate 3	Geologic Map
Plate 4	Fault and PBA Map
Plate 5	Recommended ARS Curves

PLATES



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SITE LOCATION MAP

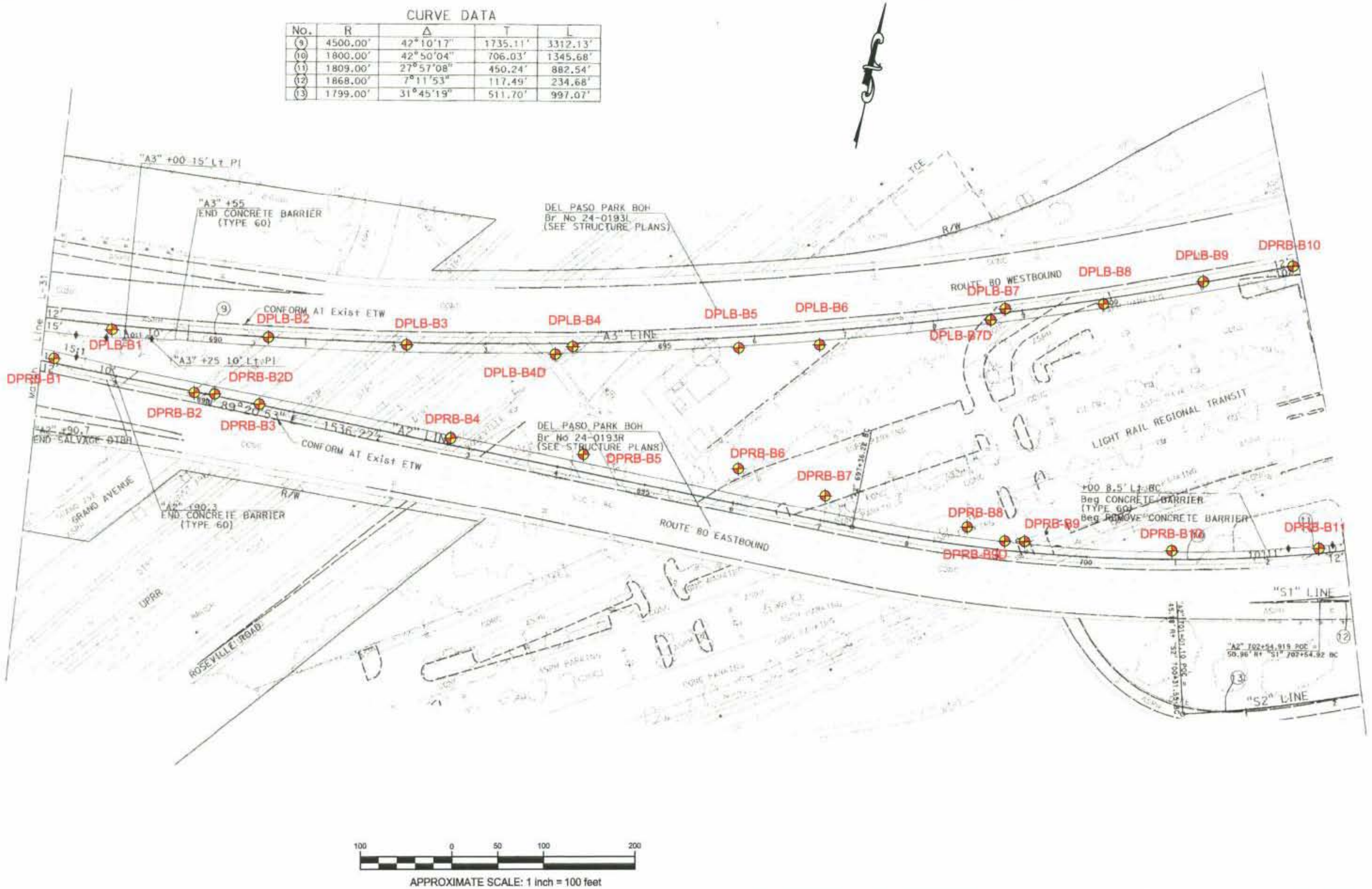
THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
DEL PASO PARK SEPARATION & OH WIDENING
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Plate 1

Graphic By: D. Anderson	9/13/07	Project Number: 84591	File Name: Hwy80 Del Paso Site

CURVE DATA

No.	R	Δ	T	L
9	4500.00'	42°10'17"	1735.11'	3312.13'
10	1800.00'	42°50'04"	706.03'	1345.68'
11	1809.00'	27°57'08"	450.24'	882.54'
12	1868.00'	7°11'53"	117.49'	234.68'
13	1799.00'	31°45'19"	511.70'	997.07'



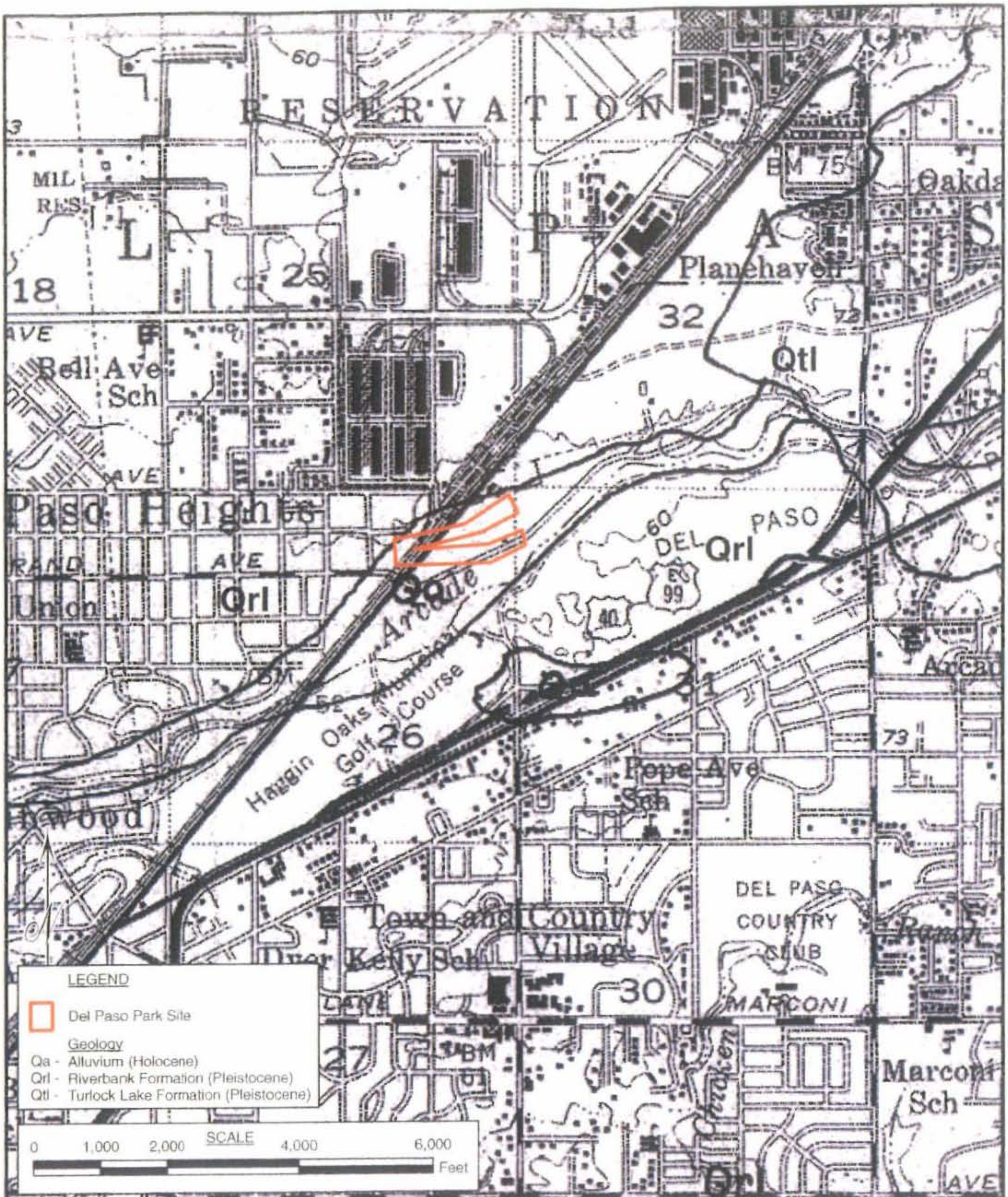
LEGEND

DPRB-B11 Approximate Boring Location

KLEINFELDER			**BORING LOCATION MAP** SACRAMENTO ROUTE 80 HOV WIDENING PRJECT DEL PASO PARK SEPERATION & OH WIDENING EA-03-379701 SACRAMENTO COUNTY, CALIFORNIA
Drawn By: D. Ross		Date: 04/02/2008	
Project No.: 84591		Filename: 84591_2A-1	

PLATE

2



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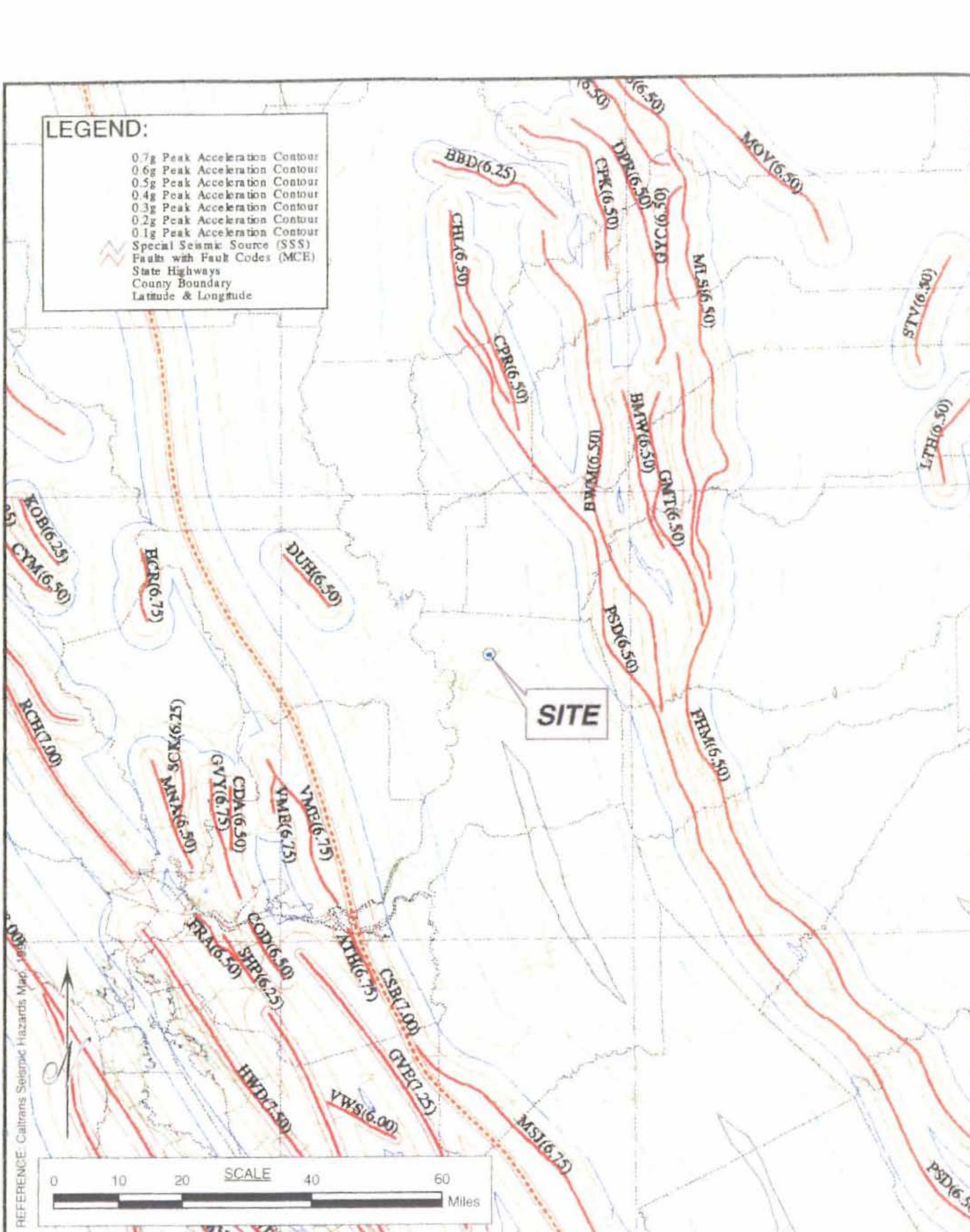
GEOLOGIC MAP

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
DEL PASO PARK SEPARATION & OH WIDENING
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

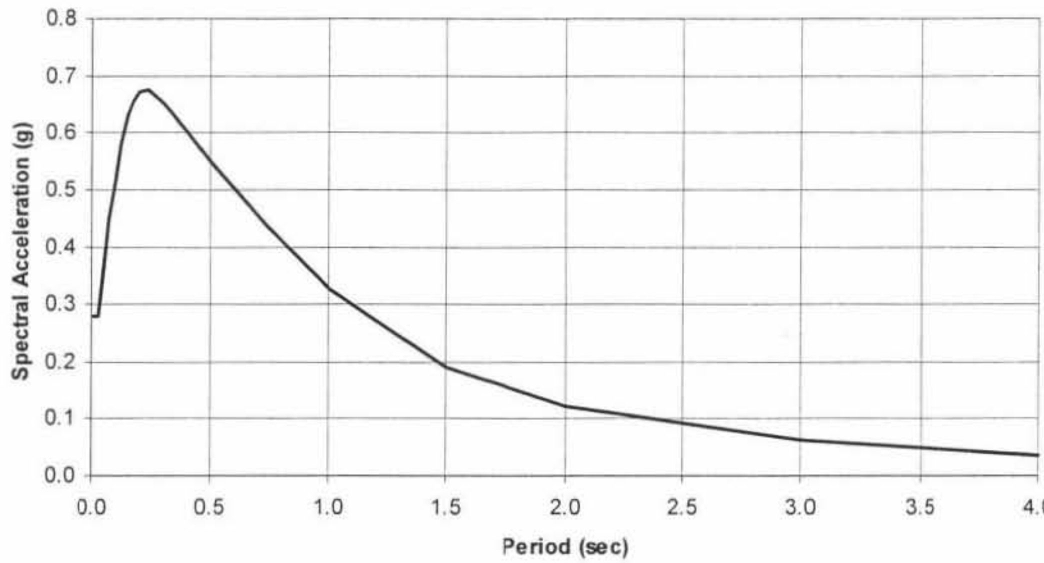
Plate 3

Project Number: 84591 | File Name: Hwy80 Del Paso Geo

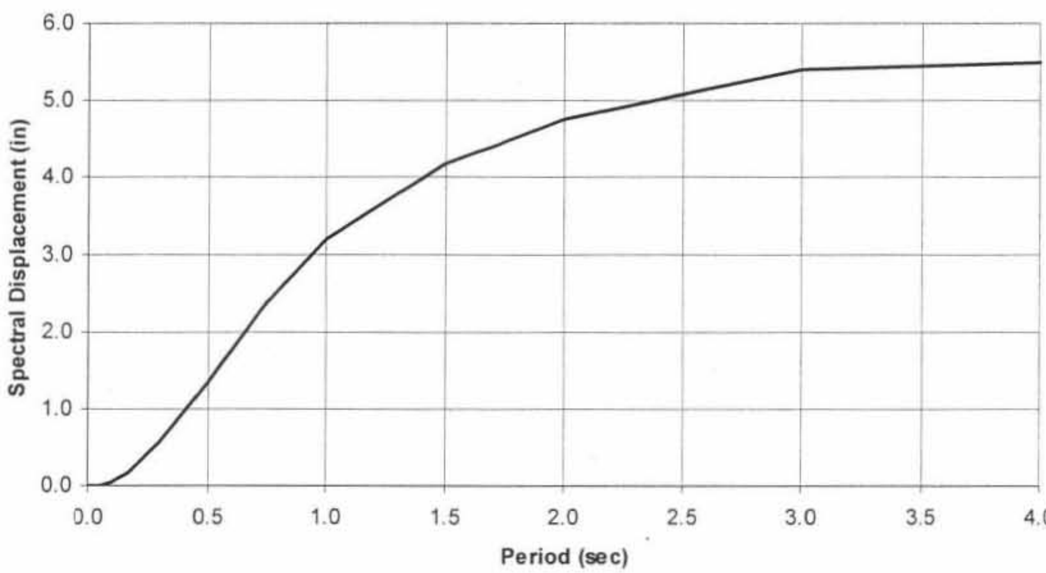


KLEINFELDER		FAULT AND PBA MAP		
3077 Fite Circle Sacramento, Ca. 95827 916-366-1701 www.Kleinfelder.com		THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT DEL PASO PARK SEPARATION & OH WIDENING EA-03-379701 SACRAMENTO COUNTY, CALIFORNIA		Plate 4
Graphic By: D. Anderson	9/13/07	Project Number: 84591	File Name: Hwy80 Del Paso Seismic	

Soil Profile Type D, M6.5, PBA = 0.2g



Soil Profile Type D, M6.5, PBA = 0.2g



KLEINFELDER 3077 FITE CIRCLE SACRAMENTO, CA 94566 PH: (916) 366-1701 FAX: (916) 366-7013 www.kleinfelder.com	**RECOMMENDED ARS CURVES** PROPOSED DEL PASO BRIDGE WIDENING SACRAMENTO, CALIFORNIA	DRAWN BY: E. ORTAKCI CHECKED BY: Z. ZAFIR PLATE **5**
DRAWN: SEP 2007 APPROVED BY______	PROJECT NO. 90749	

State of California | Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. JEFF SIMS
BRANCH CHIEF
Division of Engineering Services
Structural Design-Mail Station 9
Office of Bridge Design North

Date: October 15, 2008

File: 03-SAC-80- PM M6.60
Rio Linda Blvd. UC
(Seismic Retrofit-Infill Walls)
Br. No. 24-0203
EA#03-379701

Attn: Eric Watson

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report for Infill Walls

Introduction

Per your request, the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation Report for the proposed seismic retrofit of Rio Linda Boulevard Undercrossing (Br. No. 24-0203) located on Interstate 80 at PM 6.60, in Sacramento County, California, in the City of Sacramento. The bridge site is plotted on the Location Map (Figure 1).

The following foundation recommendations are based on the Foundation Report for Design and Specification Development Rio Linda Bridge Widening (Structure No. 24-0203) dated October 6, 2008 completed by Kleinfelder, subsurface information gathered during a recent subsurface investigation performed by Kleinfelder (June 2007 and July 2007) along with a review of the previous foundation reports, As-Built records and Log of Test Borings (LOTB) for the existing bridge. Kleinfelder performed the work under Task Order 049431 of Contract 59A0494 and Task Order 58914 of Contract 59A0589.

With regards to the current foundation recommendations given in this report, elevations are based on NGVD 29 vertical datum and horizontal coordinates are based on NAD83 horizontal datum, unless otherwise noted.

Project Description

The existing Rio Linda Blvd. UC (Br. No. 24-0203R/L) consists of a right and left structure. Both structures were built in 1970 and consist of a six lane divided highway, three lanes westbound and three lanes eastbound. The existing structures are four span, continuous reinforced concrete box girder bridges with reinforced concrete two column bents and reinforced concrete open-end seat abutments. The existing structures are supported on spread footings.

The proposed seismic retrofit will consist of installing infill walls between the two existing columns at each bent location. The infill walls will be supported on spread footings.

Site Geology and Subsurface Conditions

The site geology and subsurface conditions, including the regional setting and area geology summarized below was obtained from the Foundation Report for Design and Specification Development Rio Linda Bridge Widening (Structure No. 24-0203) dated October 6, 2008 completed by Kleinfelder.

Regional Setting and Area Geology

The project site is located within the Sacramento Valley of the Great Valley geomorphic province. California's Great Valley is a long flat valley, smoothed out between the rugged mountains of the Coast Ranges and the Sierra Nevada. The Great Valley, also known as the Central Valley, is approximately 404 miles long and averages approximately 49.7 miles in width. Most of the surface of the Great Valley is covered by Recent and Pleistocene alluvium. Sediments eroded from the Sierra Nevada and the Coast Ranges (to a lesser extent), are deposited on the floodplains and bottomlands as the mountain streams greatly decrease their velocity in the long flat valley. Rising dramatically from the relatively flat floor of the Sacramento Valley, the Sutter Buttes are the major topographic feature of the otherwise nearly flat Great Valley (Harden, 1998).

Based on the "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," prepared by Helley, E. J. and Harwood, D.S. 1985 (United States Geological Survey Miscellaneous Field Studies Map MF-1790) indicates the area consists of three geologic units. The three units mapped are Quaternary Alluvium (Qa), the Lower Member of the Quaternary Riverbank Formation (Qrl) and the Turlock Lake Formation (Qtl) (Figure 2).

Helley and Harwood indicate that the alluvium deposited along Arcade Creek underlies the site. According to the map, the contact between the alluvium deposits and the Riverbank Formation has a northeast-southwest orientation, approximately paralleling the bridges about 200 feet north of the site. The alluvium deposits described by Helley and Harwood as Holocene age (11,000 years ago to present) unweathered gravel, sand and silt deposited by present day stream and river systems. The thickness of this unit varies from a few inches to approximately 33 feet in the Sacramento Valley. The alluvium overlies the older Riverbank and Turlock Formations and is distinguished by relatively lower Standard Penetration Test (SPT) blow counts. The blow counts in the alluvium are less than 20.

The Riverbank Formation is described as semiconsolidated gravel, sand and silt with a reddish color. The age of the Riverbank Formation according to Helley and Harwood (1985) is between 130,000 and 450,000 years ago. The Riverbank Formation is described as forming a "hard pan" layer several feet thick relatively close to the surface of the boring. All of the borings performed by Kleinfelder appear to terminate in the Riverbank Formation as indicated by relatively high SPT blow counts and moderately cemented nature of the soils at depth.

Field Investigation and Subsurface Conditions

Kleinfelder conducted a subsurface investigation for the bridge widening in June 2007 and July 2007. The 2007 subsurface investigation consisted of seven test borings (RLBB-B1 through RLBB-B5, RLBB-B7 and RLBB-B8) that were advanced using the rotary wash drilling method. Drilling was performed by Caltrans Drilling Services and Spectrum of Stockton, California. Kleinfelder staff supervised all of the drilling and sampling operations.

Table 1: Field Exploration Summary

Boring ID	Date Drilled	Equipment Used	Station A-Line (ft)	Approximate Ground Surface Elevation (ft)	Boring Depth (ft)
RLBB-B1	07/02/07	CME 75	567+90	56.0	61.5
RLBB-B2	07/24/07	CME 75	568+85	32.0	61.5
RLBB-B3	07/24/07	CME 75	568+86	32.0	61.5
RLBB-B4	07/10/07	CME 75	569+40	32.3	61.5
RLBB-B5	07/11/07	CME 75	569+40	32.4	61.5
RLBB-B7	07/26/07	CME 75	569+80	35.5	71.5
RLBB-B8	06/28/07	CME 75	570+40	57.0	61.5

Note: The information provided in Table 1 is obtained from the Foundation Report for Design and Specification Development Rio Linda Bridge Widening (Structure No. 24-0203) dated October 6, 2008 completed by Kleinfelder.

According to the Foundation Report for Design and Specification Development Rio Linda Bridge Widening (Structure No. 24-0203) dated October 6, 2008 completed by Kleinfelder, the embankments at both abutments consist of silty sand and sandy silt fill materials approximately 35 feet thick. The native near-surface soils at Bent 2 and 4 consist of a thin, relatively soft, discontinuous clay/silt layer (basin deposits) up to 5.0 feet thick. This soft layer is underlain by denser soils of the Riverbank Formation which have average SPT blow count values (N) of greater than 60 with a range of 33 to 96.

The As-Built LOTB plans dated August 1970 indicate a predominance of dense to very dense granular soils.

The project site is located near the former MeClellan Air Force Base, a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. According to the EPA, over 300 identified sites within the former base are contaminated with solvents, metals and other hazardous wastes as the result of aircraft maintenance and other industrial activities at the base. Our Office does not practice hazardous mitigation of subsurface material, including ground water and therefore does not provide recommendations regarding mitigation. The Contractor should be made aware of the nearby Superfund site and the potential for hazardous subsurface materials.

Ground Water

According to the As-Built LOTB, ground water was measured between elevation –2.0 and –1.0 feet.

The State Department of Water Resources web site (http://wdl.water.ca.gov) for wells monitoring ground water levels for the Sacramento Valley (Sacramento County) was reviewed. According to a nearby well (No. 10N05E30L001M), ground water levels varied between elevations –11.9 ft and –3.4 ft during a period between 1995 to 2005.

During the 2007 subsurface investigation performed by Kleinfelder, the borings were drilled using a rotary wash method and were backfilled immediately after completion. Water levels were not measured during the investigation.

The project site is near the former McClellan Air Force Base (AFB), a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. Part of the mitigation process includes drawing down the ground water with extraction wells. The extraction wells currently under operation in the nearby former McClellan AFB may also have an influence on the nearby and future ground water levels. Depending on time of construction, the ground water levels may be higher.

Corrosion Evaluation

Kleinfelder collected five soil samples during the 2007 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the soil samples for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 550 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not included to define a corrosive site. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the soil samples were considered to be non-corrosive at this site. Refer to Table 2 below for specific test results.

Table 2: Corrosion Test Summary-Soil Samples for Rio Linda Blvd. UC (Br. No. 24-0203).

Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Sulfate Content (PPM)	Chloride Content (PPM)
RLBB-B2	21.0	7.24	1748	N/A	N/A
RLBB-B2	35.0	7.20	2237	N/A	N/A
RLBB-B3	3.0	6.99	4043	67	146
RLBB-B3	45.0	7.09	3616	N/A	N/A
RLBB-B7	25.0	7.14	1744	N/A	N/A

Note: The information provided in Table 2 is obtained from the Foundation Report for Design and Specification Development Rio Linda Bridge Widening (Structure No. 24-0203) dated October 6, 2008 completed by Kleinfelder.

Laboratory Testing

Laboratory testing was performed on selected samples of the subsurface materials obtained from the 2007 subsurface investigation performed by Kleinfelder. The soil samples were tested by the Caltrans Geotechnical Laboratory located in Sacramento. The tests performed included: mechanical analysis (sieve and hydrometer-ASTM D242), Natural Moisture Content (ASTM D2216), Atterberg limits (liquid limit, plastic limit and plasticity index-ASTM D4318), unconsolidated undrained (UU) triaxial test and soil corrosion (pH, sulfate, chloride, and resistivity). All tests were performed in general accordance with American Society for Testing and Materials (ASTM) standards or California Test Methods (CTM). Laboratory test results will be available upon request.

Seismic Data and Evaluation

The project site is not located within any Alquist-Priolo Earthquake Fault Zones (EFZs) as established by the California Geological Survey. No active faults are known to cross the project site. Therefore, the potential for ground rupture hazard due to fault movement is considered low since no known fault crosses the project site. Based on the Department of Transportation (Caltrans) 1996 Seismic Hazard Map, the controlling fault for the site is the Coast Ranges-Sierran Block Boundary (CSB), a reverse, including thrust fault. The CSB fault is located approximately 24 miles west of the site and is capable of generating a Maximum Credible Earthquake (MCE) moment magnitude of M_w=7.0. The 1996 Seismic Hazard Map shows that the PBA for this site is between the contour lines of 0.1g and 0.2g. Therefore, the estimated Peak Horizontal Bedrock Acceleration (PHBA) at the site is recommended to be about 0.2g.

Based on the 2007 and 1970 subsurface investigations for the bridge, the soil profile at the site may be classified as Type D, as defined in the Department's Seismic Design Criteria (SDC, 2006, Version 1.4). The recommended design Acceleration Response Spectrum (ARS) curve shown in Figure 3 was obtained from Figure B.8 of the SDC. According to the guidelines presented in Section 6.1.2.1 of the Seismic Design Criteria, for structures that are within 10 miles (15 km) of a fault, the ARS curve needs to be magnified. Since the distance to the fault is more than 10 miles, no modification to the ARS curve is needed.

As-Built Foundation Information

The As-Built records for the existing Rio Linda Blvd. UC (Br. No. 24-0203) indicate that the bridge is supported with spread footings at all support locations. These documents indicate the following:

- The abutments are founded on 54 foot long by 2.5-foot wide spread footings with a thickness of 2.5 feet. The bottom elevations of the footings are 52.5 feet at Abutment 1 and 53.0 feet at Abutment 5. A design bearing capacity of 1.5 tsf was recommended for the abutment footings.

- The bents are founded on 11-foot by 11-foot reinforced concrete spread footings with a thickness of 2.5 feet. The bottom elevations of the footings are 25.0 feet for Bent 2 and 3 and 27.0 feet for Bent 4. A design bearing capacity of 4.0 tsf was recommended for the bent footings at or below elevation 27.0 feet.

Foundation Recommendations

The following foundation recommendations are for the seismic retrofit of the existing Rio Linda Boulevard Undercrossing (Br. No. 24-0203). The seismic retrofit of the existing structures will include the installation of newly constructed infill walls that will retrofit the existing bents of the left and right structures. The infill walls may be supported on spread footings at all bent locations. The recommended Nominal Bearing Resistances to be used for design, bottom of footing elevations and minimum footing width dimensions are summarized below in Table 3.

Table 3: Spread Footing Data for Rio Linda Blvd. UC (Br. No. 24-0203) Left and Right Bridges.

Support Location	Minimum Footing Width (ft)	Bottom of Footing Elevation	Recommended Bearing Limits	
			WSD [1]	LFD [2]
			Allowable Bearing Capacity (q_{all}) (ksf)	Nominal Bearing Resistance (q_n) (ksf)
Bent 2	8.5	25.0	N/A	6.0
Bent 3	8.5	25.0	N/A	6.0
Bent 4	8.5	25.0	N/A	6.0

Notes: 1) Working Stress Design (WSD): the Maximum Contact Pressure (q_{max}), is not to exceed the recommended Gross Allowable Bearing Capacity (q_{all}). 2) Load Factor Design, (LFD): The Maximum Contact Pressure (q_{max}), divided by the Strength Reduction Factor, (ϕ), is not to exceed the Nominal Bearing Resistance (q_n).

The recommended Nominal Bearing Resistances to be used for design, provided in Table 3, above, are based on the following design criteria:

Bents 2, 3 and 4 footings have a minimum width as shown in Table 3.

Bents 2, 3 and 4 footings are to be constructed at or below the recommended elevation as shown in Table 3.

If the above minimum footing widths are reduced or bottom of footing elevation are raised, the Office of Geotechnical Design-North, Branch A, is to be contacted for reevaluation.

General Notes to Designer

1. All support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to the foundation review.

Construction Considerations

1. Soft/loose soil was encountered in Boring RLBB-B2 during the subsurface investigation. All footing excavations are to be inspected and approved by the Engineer or a representative of the Geotechnical Design Branch North prior to placing any steel, forms or concrete into the footing excavation. If soft/loose soil is encountered at any support locations, it shall be removed and be replaced with structure backfill or slurry cement backfill. The structure backfill material shall be placed and compacted to at least 95% Relative Compaction up to the planned foundation subgrade elevation in accordance with Section 19-3.06 and the slurry cement backfill shall be placed in accordance with Section 19-3.062. Concrete placement for all foundation footings shall be neat against undisturbed native soils or approved structure backfill materials.

2. The extraction wells currently under operation in the nearby McClellan Air Force Base may have an influence on the current ground water levels. Depending on the time of construction, the ground water levels may be higher.

3. Excavations should be performed in accordance with Section 19-3 of Caltrans Standard Specifications and Standard Plan A62B. All trenches and temporary excavations should be excavated in accordance with CAL/OSHA safety requirements.

4. Ponding of water adjacent to the structure should be avoided. During and after construction, positive drainage should be provided to direct surface water away from structures and all excavations toward suitable, non-erosive drainage devices.

The recommendations contained in this report are based on specific project information regarding design loads and structure locations that has been provided by the Office of Bridge Design North (OBDN). If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Jacqueline Martin (916) 227-1051 or Reid Buell (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

Project Information

Standard special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings for Rio Linda Blvd. UC, Br. No. 24-0203.

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Foundation Report for Rio Linda Blvd. UC (Seismic Retrofit-Infill Walls), Br. No. 24-0203, dated October 15, 2008.
B. Foundation Report for Design and Specification Development Rio Linda Bridge Widening, Br. No. 24-0203, dated October 6, 2008.

Report by:

Jacqueline Martin

JACQUELINE MARTIN
Engineering Geologist
Office of Geotechnical Design-North

Supervised by:

Reid Buell

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cc: OGDSN
GS File Room
Reid Buell
R.E. Pending
Structure OE

REFERENCES

Bartow, J.A., and D.E. Marchang, 1979, Preliminary geologic map of Cenozoic deposits of the Clay are, California: U.S. Geological Survey Open File Report 79-667, (Scale 1 to 62,500).

Department of Water Resources (2008). Ground water level data. Available from the Department of Water Resources site, http://wdl.water.ca.gov.

Environmental Protection Agency (2007). McClellan Air Force Base cleanup and Redevelopment. [Data file]. Available from the Environmental Protection Agency site, http://www.epa.gov/region09/waste/sfund/mcclellan/index.html.

Federal Highway Administration (FHWA), Design and Construction of Driven Pile Foundations: Workshop Manual – Volume 1 (Pub. No. FHWA HI-97-013) published January 1997, Revised November1998.

Harden, Deborah R., 1998, California Geology, Prentice Hall, 252 pp.

Helley, E.J. and Harwood, D.S., 1985, Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California, United States Geological Survey (USGS), Map MF 1790, scale 1:62,500, 1 of 5 sheets.

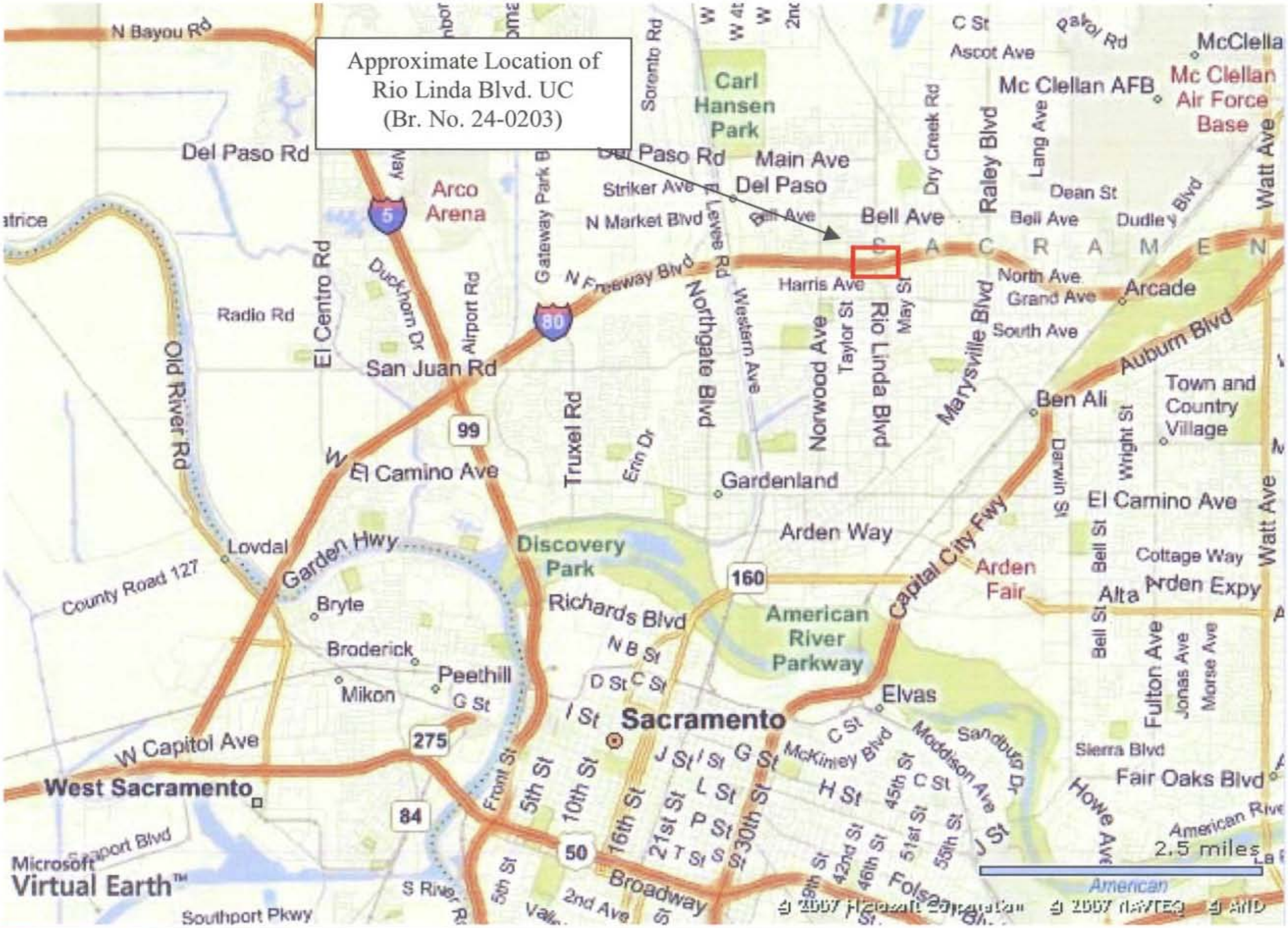
Marchand, D.E. and A. Allwardt, 1978, Preliminary Geologic Map Showing Quaternary Deposits of the Northeastern San Joaquin Valley, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-945, scale 1:125,000.

Marchand, D.E. and A. Allwardt, 1981, Late Cenozoic stratigraphic units, northeastern San Joaquin Valley, California: U.S. Geological Survey Bulletin 1470, 70 p.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

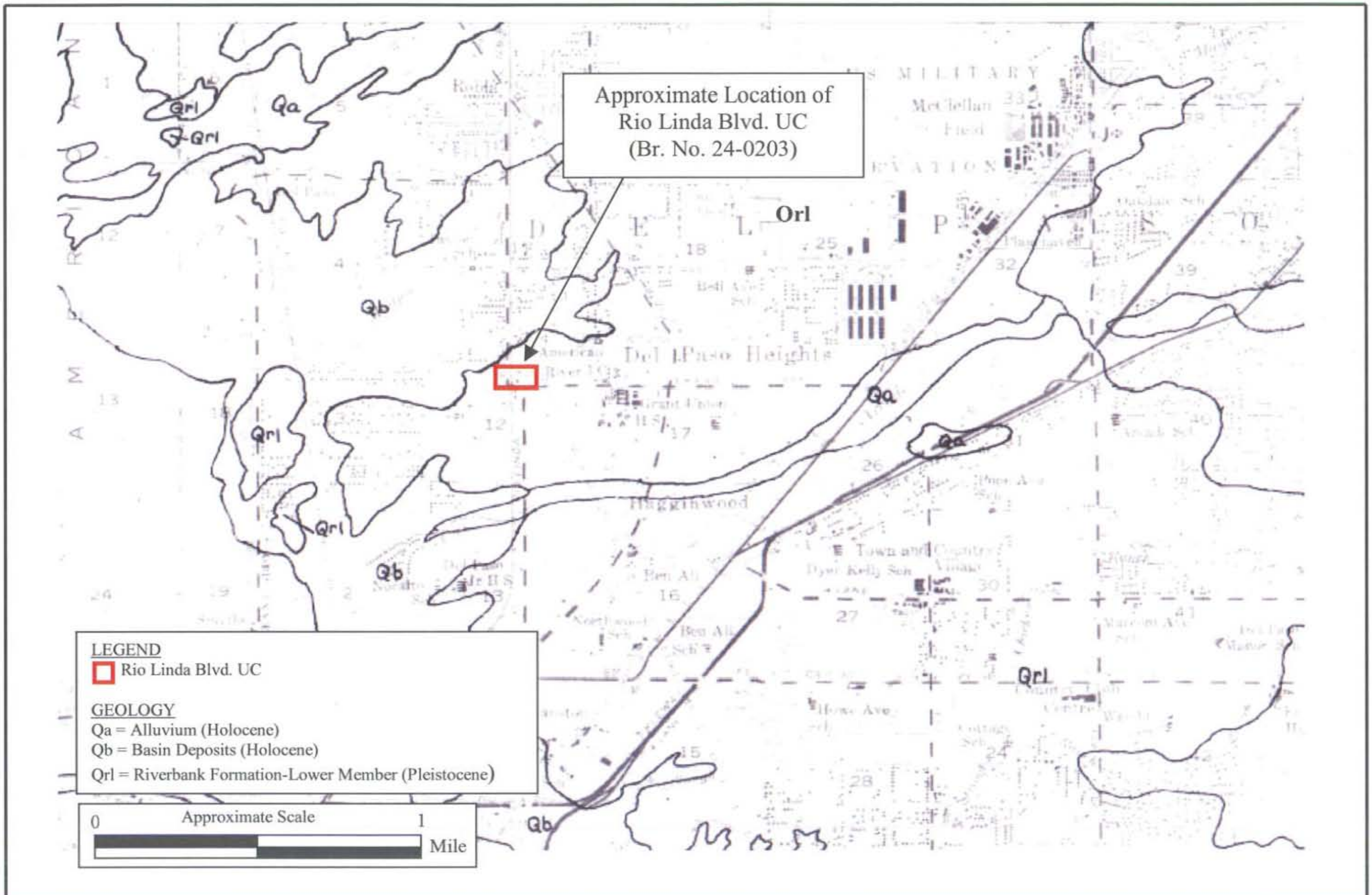
State of California, Department of Transportation (Caltrans):

- Standard Plans, May 2006
- Standard Specifications, May 2006
- Bridge Standard Details Sheets, April 2000.
- Memo to Designers, Section 3-1, December 2000.
- CT-Corrosion Guidelines, September 2003, Version 1.0.



Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-379701	Location Map	
October 15, 2008		
03-SAC-80 PM M6.60 Rio Linda Blvd. UC, Br. No. 24-0203		Figure 1



Caltrans

Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-379701	Geologic Map
October 15, 2008	
03-SAC-80 PM M6.60 **Rio Linda Blvd. UC, Br. No. 24-0203**	Figure 2

Rio Linda Blvd. UC (Seismic Retrofit-Infill Walls)
Br. No. 24-0203
03-379701
October 15, 2008

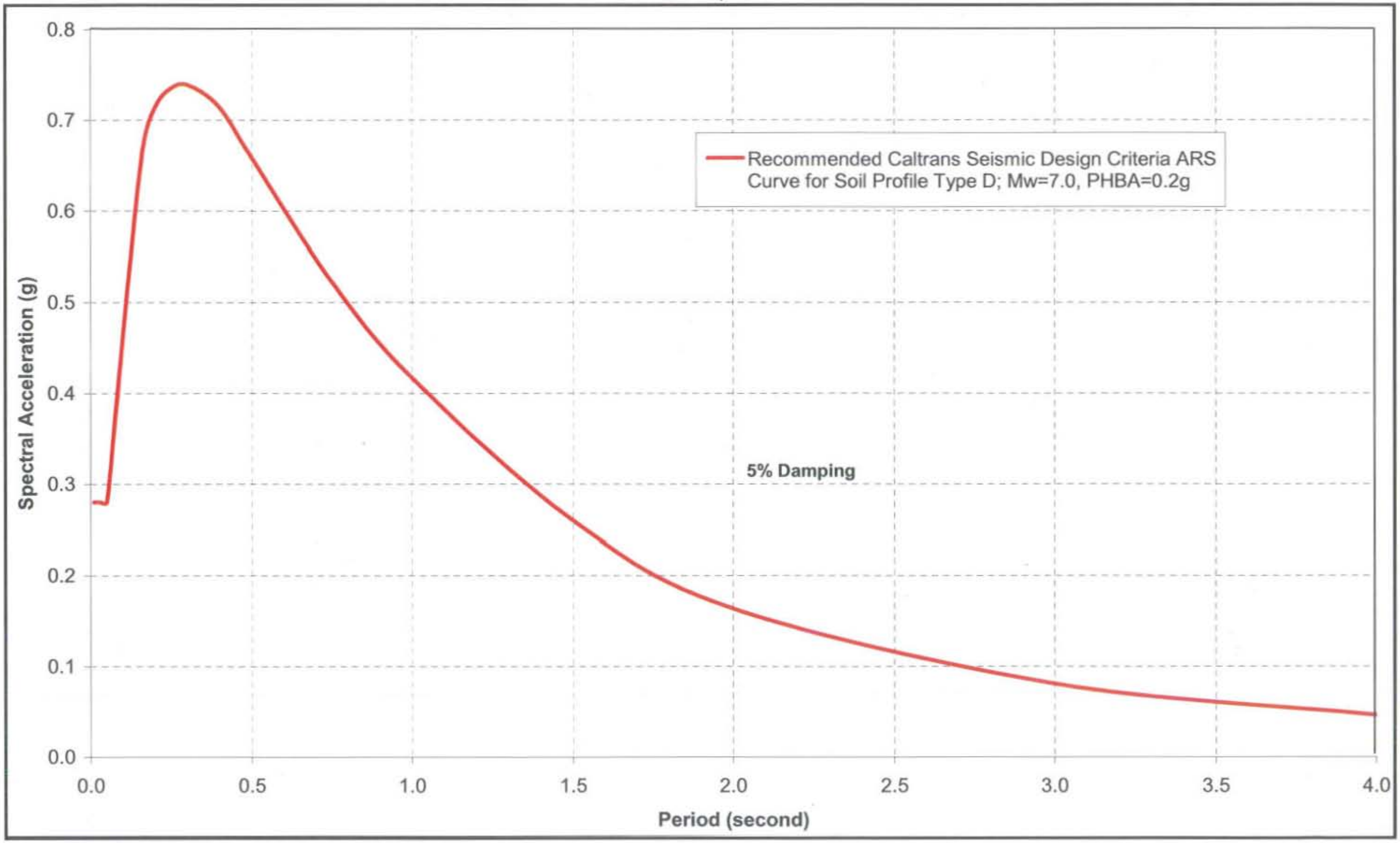


Figure 3. Acceleration Response Spectrum Recommended for Design

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MEMORANDUM

To: Jeff Sims, P.E., Branch Chief, Caltrans-Office of Bridge Design North
Eric Watson, P.E., Caltrans-Office of Bridge Design North
Jacqueline Martin, Caltrans – Office of Geotechnical Design North

From: Emre Ortakci – Kleinfelder
Parham Khoshkbari, P.E. - Kleinfelder

REGISTERED PROFESSIONAL ENGINEER
PARHAM KHOSHKBARI
No. 71168
EXP. 6/30/09
CIVIL
STATE OF CALIFORNIA

File: 90749

Date: October 6, 2008

**Subject: Foundation Report for
Design and Specification Development
Rio Linda Bridge Widening (Structure No. 24-0203)
(03-SAC-80-2.2/3.7)
The Sacramento 80 HOV Widening Project (EA 03-379701)
Sacramento County, California**

INTRODUCTION

This memorandum presents geotechnical recommendations for design and specification development for the proposed widening of the Rio Linda Boulevard Undercrossing structure (24-0203) located on Interstate 80 (I-80) in Sacramento County, California. Kleinfelder performed this work under Task Order 049431 of Contract 59A0494 and Task Order 58914 of contract 59A0589 with the Department of Transportation, State of California (Caltrans). The location of the project site is shown on Plate 1.

PROJECT DESCRIPTION

The existing Rio Linda undercrossing consists of two separate structures carrying I-80 traffic over Rio Linda Boulevard in the east and west directions. Both of the bridge structures are four-span, continuous reinforced, concrete box girder bridges. The bridges were originally built in 1970.

The existing structures will be widened towards the median by about 42.0 ft with reinforced concrete box girder sections. The limits of the proposed widenings are between Stations 568+12.00 to 570+29.78 ("A" Line). The new sections will be structurally separate from the existing bridges, and integrated into the existing structures by closure pours. Therefore, the new section will behave as an independent structure and will not be influenced by the existing structure.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Setting and Area Geology

The Regional Geology Map (Plate 3), prepared from Helley, and Harwood (1985) "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," (United States Geological Survey Miscellaneous Field Studies Map MF-1790) shows three Quaternary age units mapped in the site vicinity. These formations are alluvium deposits (Qa), the Lower Member of the Riverbank Formation (Qrl) and the Turlock Lake Formation (Qtl).

Helley and Harwood (1985) indicate the site is underlain by the alluvium deposited along Arcade Creek. They show the contact between the alluvium deposits and the Riverbank Formation as having a northeast-southwest orientation, approximately paralleling the bridges about 200 feet north of the site. Helley and Harwood describe the alluvium deposits as Holocene age (11,000 years ago to present) unweathered gravel, sand, and silt deposited by present-day stream and river systems. Thickness varies for this unit within the Sacramento Valley from a few inches to 33 feet. The alluvium overlies the older Riverbank and Turlock Lake formations and is distinguished by relatively lower Standard Penetration Test (SPT) blow counts ($N < 20$).

The Riverbank Formation is described as semiconsolidated gravel, sand and silt with a reddish color. Helley and Harwood (1985) give the age of the Riverbank Formation between 130,000 and 450,000 years ago. The Riverbank formation often forms a "hard pan" layer several feet thick relatively close to the surface. All borings appear to terminate in the Riverbank Formation as indicated by the relatively high SPT blow counts and moderately cemented nature of the soils at depth.

The Turlock Lake Formation is described as deeply weathered and dissected arkosic gravels with sand and silt. The gravels consist of more resistant metamorphic rock fragments and quartz pebbles. The Turlock Lake Formation also will often contain a "hard pan" layer near the surface.

Site Topography

The existing structures are built over an approximately 150 foot wide nearly flat area with an elevation of about 30 feet msl. Rio Linda Boulevard passes under the bridges as well as a paved bike trail. The bridge decks are at about elevation 66 feet msl. The side slopes of the abutment fills appear to be about 2 (horizontal) to 1 (vertical).

Field Investigation and Subsurface Conditions

Seven (7) test borings, RLBB-B1 through RLBB-B5, RLBB-B7 and RLBB-B8 were advanced using the rotary wash drilling method. Drilling was performed between June 28 and July 26, 2007 by Caltrans drilling services and Spectrum of Stockton, California. All drilling and sampling operations were supervised by Kleinfelder staff. Elevations referenced herein are based on mean sea level (msl) and the current Caltrans datum.

Table 1: Field Exploration Summary

Boring ID	Date Drilled	Equipment Used	Station on A-line (ft)	Approximate Ground Surface Elevation (ft)	Boring Depth (ft)
RLBB-B1	07/02/07	CME 75	567+90	56.0	61.5
RLBB-B2	07/24/07	CME 75	568+85	32.0	61.5
RLBB-B3	07/24/07	CME 75	568+86	32.0	61.5
RLBB-B4	07/10/07	CME 75	569+40	32.3	61.5
RLBB-B5	07/11/07	CME 75	569+40	32.4	61.5
RLBB-B7	07/26/07	CME 75	569+80	35.5	71.5
RLBB-B8	06/28/07	CME 75	570+40	57.0	61.5

The approximate locations of the borings are shown on Plate 2.

The embankments at both abutments consist of silty sand and sandy silt fill materials approximately 35 feet thick. The native near-surface soils at the bent 2 and 4 consist of a thin, relatively soft, discontinuous clay/silt layer (basin deposits) up to 5 feet thick. This soft layer is underlain by denser soils of the Riverbank Formation which have average SPT blow count values (N) of greater than 60 with a range of 33 to 96.

The As-built LOTB plans dated August, 1970 indicate a predominance of dense to very dense granular soils.

GROUNDWATER

The LOTB sheet from the 1970 As Built Plans indicates the groundwater level is between elevation -2 feet and -1 foot, msl based on the Caltrans datum.

A review of data from the State Department of Water Resources web site (http://wdl.water.ca.gov) for monitoring wells in the area indicates groundwater elevations in a nearby well (No. 10N05E30L001M) varied between elevation -11.9 feet and elevation -3.4 feet, msl (NGVD29 Datum) during a period between 1995 and 2005. The well is located 3 miles north of the project site.

Rotary wash method of drilling with mud or water as drilling fluid was used for current borings. Borings were backfilled immediately after completion and water level was not measured.

CORROSION EVALUATION

Chemical analyses were performed on five (5) soil samples recovered from the borings to evaluate the corrosion potential of the on-site soils. Testing was performed at the Caltrans Headquarters Geotechnical Laboratory in Sacramento, California.

Table 2: Corrosion Test Results

Location	Depth (ft)	Minimum Resistivity (Ohm-cm) (Caltrans Test Method 532)	pH (Caltrans Test Method 643)	Chloride Content (ppm)	Sulfate Content (ppm)
RLBB-B2	21	12458	7.24		
RLBB-B2	35	5709	7.20		
RLBB-B3	3	755	6.99	67	146
RLBB-B3	45	4988	7.09		
RLBB-B7	25	4427	7.14		

Based on the Caltrans Corrosion Guidelines (2003 version 1.0), a site is considered corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. Moreover, a minimum resistivity value for soil and/or water less than 1000 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion. In Caltrans Geotechnical Laboratory, a sample is tested for chloride and sulfate contents only if the test results for minimum resistivity and pH indicate the potential for corrosivity.

Based on Caltrans guidelines and laboratory test results, the site may be considered as non-corrosive to steel and concrete.

Kleinfelder does not practice corrosion engineering and therefore does not provide recommendations regarding corrosion potential mitigation. The above information is provided to help facilitate the understanding of corrosion potential at a site.

LABORATORY TESTING

Selected soil samples were sent to the Caltrans Geotechnical Laboratory in Sacramento, California for laboratory testing. Tests requested included:

- Sieve and Hydrometer analyses (ASTM D242)
- Natural moisture content (ASTM D2216)
- Atterberg limits (ASTM D4318)
- Unconsolidated Undrained (UU) Triaxial test

FAULTING AND SEISMICITY

The project site is located in a low seismically-active region. Some northwest-southeast fault zones exist near the project vicinity, which have a history of seismic activities.

According to Mualchin (1996, with an errata posted on the website http://www.dot.ca.gov/hq/esc/earthquake_engineering/Seismology/seismicmap.html), the nearest fault is Prairie Creek-Spenceville-Dentman (PSD) fault at a distance of about 20 miles (32 km) to the east.

The proposed Rio Linda Bridge Widening site does not lie within an Alquist-Priolo Earthquake Fault Zone (CGS, 1997). No active faults are known to transect the project site. Therefore, the possibility of primary surface rupture or deformation at the site is considered low. The closest distance from the site to the some of the active major faults, type of faults, their maximum moment magnitudes, and peak bedrock accelerations are presented in Table 1 corresponding to Mualchin (1996, with an errata posted on the website http://www.dot.ca.gov/hq/esc/earthquake_engineering/Seismology/seismicmap.html). The faults in the near vicinity of the site are shown on Plate 4, Fault and PBA Map. Our calculations indicate peak bedrock acceleration (PBA) of about 0.1g using both the Mualchin & Jones (1992) and the Sadigh et al. (1997) relationships for the Prairie Creek-Spenceville-Dentaman (PSD) fault (M6.5 at 32 km) and the Coast Ranges-Sierran Block Boundary (CSB) Zone (M7 at 49 km).

Therefore, the controlling fault is the Coast Ranges-Sierran Block Boundary (CSB). In addition, the Caltrans PBA map (Mualchin 1996) shows that the PBA for this site lies between the contour lines of 0.1g and 0.2g. Therefore, we recommend a PBA of 0.2g and CSB as the controlling fault.

Table 3: Fault Parameters Based on Mualchin (1996)

Fault Name	Fault Code (2)	Site Distance (km)	Type of Displacement (1)	Maximum Magnitude (2)	Peak Bedrock Acceleration Mean (g) (3)	(4)
PRAIRIE CREEK-SPENCEVILLE-DENTMAN*	PSD	32	NL	6.5	0.1	0.09
DUNNIGAN HILLS	DUH	39	RE	6.5	0.08	0.09
BIG BEND-WOLF CK-MAIDU-BEAR MT/E*	BWM	40	NL	6.5	0.08	0.07
COAST RANGES-SIERRAN BLOCK BOUNDARY ZONE	CSB	49	RE	7	0.08	0.09
BEAR MOUNTAIN/W*	BMW	54	NL	6.5	0.04	0.04
VACA-KIRBY HILL-MONTEZUMA HILLS/E*	VME	58	XX	6.75	0.04	0.06

Notes:
(1) ST-strike slip, RE-reverse including thrust, NO-normal-oblique, NL-normal, XX-not known
(2) Mualchin (1996, with errata dated November 2004)
(3) Mualchin & Jones (1992, 1996)
(4) Sadigh et al. (1997 Rock). For XX faults more conservative reverse/thrust attenuation fault relationship used.

Seismic Design Criteria

According to Table B.1 of Caltrans Seismic Design Criteria (SDC) Version 1.4 (2006), the site can be classified as Soil Profile Type D for preliminary design purposes.

Based on the discussions above, the controlling fault is the Coast Ranges-Sierran Block Boundary Zone fault (CSB) with a peak bedrock acceleration (PBA) of about to 0.2g. The recommended ARS curve for this project can be estimated from the ARS curve presented in Figure B.8 of SDC for associated PBA value of 0.2g. The peak ground acceleration (PGA) for this site is 0.28g.

The seismic design parameters presented in Table 42 may be used for design. These values were estimated using the Caltrans Seismic Hazard Map (CSHM, Mualchin, 1996), procedures outlined in the Caltrans Seismic Design Criteria (SDC) Version 1.4 (2006), and Caltrans Guidelines for Structures Foundations Reports (CGSFR) (March 2006).

Table 4: Summary of Seismic Data

Causative Fault (Type of Fault)	COAST RANGES-SIERRAN BLOCK BDY ZNE (RE)
MCE[1] Magnitude	7.0
Distance to Fault	49 km
Design PBA[2]	0.2g
SDC Soil Profile Type	Type D
ARS Curve Recommendation[3]	SDC ARS Figures B.8 (2006)

Notes:

[1]MCE = Maximum Credible Earthquake.

[2]Design PBA = Design Peak Bedrock Acceleration, Based on Caltrans Seismic Hazard Map (1996) and verified by attenuation relationships by Sadigh et al. (1997).

According to the guidelines presented in Section 6.1.2.1 of the SDC and Section 2.5.1 of the CGSFR, for structures located within 15 km of a fault, the ARS curve needs to be adjusted to account for fault rupture directivity effects. Since the distance to the fault is more than 10 miles (15 km), no modification to ARS curve is needed. Based on the above, the recommended ARS curves (both spectral acceleration and displacement) are presented on Plate 5. The spectral acceleration and displacement values are also listed in Table 3.

Table 5: Recommended ARS Values (Soil Profile D)

Period (sec)	Spectral Acceleration (g)	Spectral Displacement (inch)
0.01	0.2801	0.0003
0.02	0.2801	0.0011
0.03	0.2801	0.0025
0.05	0.2801	0.0069
0.08	0.3698	0.0204
0.10	0.4658	0.0456
0.12	0.5375	0.0758
0.15	0.6397	0.1409
0.17	0.6857	0.1940
0.20	0.7155	0.2801
0.24	0.7332	0.4134
0.30	0.7389	0.6509
0.40	0.7137	1.1177
0.50	0.6584	1.6112
0.75	0.5232	2.8806
1.00	0.4172	4.0837
1.50	0.2600	5.7266
2.00	0.1638	6.4132
3.00	0.0808	7.1150
4.00	0.0461	7.2194

AS-BUILT FOUNDATION INFORMATION

Information regarding existing foundations for the Rio Linda Bridges was obtained from as-built plans prepared by Caltrans on August 1970 and the Foundation Investigation Memorandum by T. L. Sommers in 1963. These documents indicate the following:

- The bents are founded on 11 foot square reinforced concrete spread footings that are 2.5 feet in thickness. The bottom elevations of the foundations are 25.0 feet for Bent 2 and Bent 3, and 27.0 feet for Bent 4. A design bearing capacity of 4 tsf was recommended for the footings at the bents.

- The abutments are founded on 54 foot long by 2.5 foot wide spread footings. The bottom elevations of the footings are 52.5 feet at Abutment 1 and 53.0 feet at Abutment 5. A design bearing capacity of 1.5 tsf was recommended for the abutment footings.

FOUNDATION RECOMMENDATIONS

General

The Office of Bridge Design North have selected spread footings for abutment and bent foundations.

Spread Footing Data

We performed bearing capacity and settlement estimates following the guidelines of Caltrans BDS Section 4.

Table 6: Foundation Design Recommendations for Spread Footings[1,2]

Support Location	Footing Size (ft)		Bottom of Footing Elevation (ft)	Minimum Footing Embedment Depth (ft)	Total Permissible Support Settlement (inches)	WSD (LRFD Service-I Limit State Load Combination)		LRFD		
	B	L						Service	Strength $\varphi_b = 0.45$	Extreme Event $\varphi_b = 1.00$
						Permissible Gross Contact Stress (ksf)	Allowable Gross Bearing Capacity (ksf)	Permissible Net Contact Stress (ksf)	Factored Gross Nominal Bearing Resistance (ksf)	Factored Gross Nominal Bearing Resistance (ksf)
Abut 1	3.5	41.7	52.5	4.5	1	3.6	3.5	N/A	N/A	N/A
Bent 2	12.5	12.5	25	10	1	N/A	N/A	7.0	15.0	34.0
Bent 3	12.5	12.5	25	7.5	1	N/A	N/A	7.0	15.0	34.0
Bent 4	12.5	12.5	25	13	1	N/A	N/A	7.0	15.0	34.0
Abut 5	3.5	41.7	53	6	1	3.6	3.5	N/A	N/A	N/A

Notes:

1) *Recommendations are based on the foundation geometry and the load provided by Structure Design in the Foundation Design Data Sheet. The footing contact area is taken as equal to the effective footing area, where applicable.*
2) *See MTD 4-1 for definitions and applications of the recommended design parameters*

Table 7: Spread Footing Data Table					
Support Location	Working Stress Design (WSD)		Load and Resistance Factor Design (LRFD)		
	Permissible Gross Contact Stress (Settlement) (ksf)	Allowable Gross Bearing Capacity (ksf)	**Service** Permissible Net Contact Stress (Settlement) (ksf)	**Strength** Factored Gross Nominal Bearing Resistance $\varphi_b = 0.45$ (ksf)	**Extreme Event** Factored Gross Nominal Bearing Resistance $\varphi_b = 1.00$ (ksf)
Abut 1	3.6	3.5	N/A	N/A	N/A
Bent 2	N/A	N/A	7.0	15.0	34.0
Bent 3	N/A	N/A	7.0	15.0	34.0
Bent 4	N/A	N/A	7.0	15.0	34.0
Abut 5	3.6	3.5	N/A	N/A	N/A

Abutments and Wing Walls

Backfill

The abutment walls will be extended as shown on the General Plan. Structure backfill should be placed behind the abutments and wing walls, conforming to the requirements of the Caltrans Standard Specifications. The backfill material placed for abutment walls should consist of non-expansive soils (Expansion Index, ASTM D4829 < 50 or a Sand Equivalent, CTM 217 > 20). The zone for non-expansive backfill should be in conformance with Figure 5.4 of the Caltrans Guidelines for Structures Foundation Report (March, 2006 Version 2.0) "Typical Section: Expansive Soil Exclusion Zone in Bridge Embankment".

Lateral Earth Pressures

In accordance with the Caltrans Bridge Design Specification (BDS, 2004) Section 5.5.5.11, the abutments which do not deflect sufficiently to create an active wedge in the backfill soil, the lateral earth pressure distributions shall be the higher value between a triangular shaped pressure diagram based on At-Rest Earth Pressure Coefficient, K_0 and a trapezoidal shaped pressure distribution based on Active Earth Pressure Coefficient, K_a with maximum ordinate of $0.8K_a\gamma H$ (H=Restrained Height). We recommend using a Coulomb's active earth pressure coefficient, K_a of 0.33 and corresponding equivalent fluid pressure ($k_a\gamma$)) of 40 pcf (minimum required by Caltrans), and an at-rest earth pressure coefficient, K_0 of 0.50 for the analysis of abutments and wingwalls. The earth pressure coefficients were estimated with a wall friction angle equal to zero, backfill slope angle of zero, and backfill friction angle of 30^0.

In accordance with the Caltrans BDS Section 5.5.4, the effects of earthquake are considered in the design of retaining walls that support bridge abutments. The Monobe-Okabe analysis may be used to estimate seismic lateral earth pressures on a retaining wall. In accordance with the BDS Section 5.2.2.3, horizontal seismic coefficient can be taken as one-third of, A, the expected peak acceleration produced by the Maximum Credible Earthquake on bedrock at the site as defined in the Caltrans Seismic Hazard Map (1996 with errata). We recommend a horizontal seismic coefficient, k_h value of 0.09 (one-third of 0.28g) and corresponding additional seismic equivalent fluid pressure ($\Delta K_{AE}\gamma$) of 11 pcf for seismic force applied on the retaining wall. The seismic pressure should be applied as an inverted triangular shape pressure distribution. The resultant of the earthquake induced earth pressure may be assumed to act at a point that is 0.6H above the base of the wall. The vertical seismic acceleration coefficient, k_v can be considered as zero for the analysis.

In accordance with the Caltrans Seismic Design Criteria (2006) Section 7.8.1, the maximum passive pressure is 5 ksf for a 5.5 foot high abutment and varies proportionally for different heights.

We recommend a coefficient of friction value of 0.4 (assuming friction between concrete and soil) for friction between cast-in-place concrete foundations and the underlying soil.

Wall Drainage

The recommended lateral earth pressures assume that drainage is provided behind the walls to prevent the accumulation of hydrostatic pressures. Proper drainage should be designed behind the walls to allow drained conditions in the retained soils/rocks, in accordance with Caltrans Standard Plan (May 2006) BO-3.

CONSTRUCTION CONSIDERATIONS

- Observation and testing by qualified geotechnical staff should be performed during construction as applicable.
- Soft/loose soil was encountered in Boring RLBB-B2 during the subsurface investigation. All footing excavations are to be inspected and approved by the Engineer or a representative of the Geotechnical Design Branch North prior to placing any steel, forms or concrete into the footing excavation. If soft/loose soil is encountered at any support locations, it shall be removed and replaced with structure backfill or slurry cement backfill. The structure backfill material shall be placed and compacted to at least 95% Relative Compaction up to the planned foundation subgrade elevation in accordance with Section 19-3.06 and the slurry cement backfill shall be placed in accordance with Section 19-3.062. Concrete

placement for all foundation footings shall be neat against undisturbed native soils or approved structure backfill materials.

- The extraction wells currently under operation in the nearby McClellan Air Force Base may have influence over groundwater level at the Rio Linda bridge site.
- Excavations should be performed in accordance with Section 19-3 of Caltrans Standard Specifications and Standard Plan A62B. All trenches and temporary excavations should be excavated in accordance with CAL/OSHA safety requirements.
- All temporary slopes steeper than 1V:1.5H and higher than 1.5 m will require shoring. Shoring systems should be in accordance with Caltrans Trenching and Shoring Manual.
- Ponding of water adjacent to the structure should be avoided. During and after construction, positive drainage should be provided to direct surface water away from structures and all excavations toward suitable, non-erosive drainage devices.
- The Contractor should research utility locations and take necessary precautions to protect-in-place or relocate utilities as applicable, prior to excavation.

LIMITATIONS

The recommendations presented in this document are for the design and construction of the proposed Rio Linda Bridge Widening (Bridge No. 24-0203) in Sacramento County, California.

Soil and groundwater conditions were observed and interpreted at the exploration locations only. Conditions may vary between the exploration locations and seasonal fluctuations in the groundwater level may occur due to variations in rainfall and local groundwater management practice. If conditions encountered during construction differ from those described herein, our recommendations may be subject to modification.

The findings, conclusions, and recommendations were prepared in accordance with generally accepted geotechnical engineering practice. No warranties, expressed or implied, are made.

This document is intended for use by Caltrans, within a reasonable time from its issuance. This document is not designed as a specification.

The scope of our geotechnical services did not include any environmental site assessment for the presence or absence of hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Our evaluation of subsurface conditions at the site has considered subsurface soil and groundwater conditions present at the time of our investigation. The influence(s) of post-construction changes to these conditions may influence future performance of the proposed project.

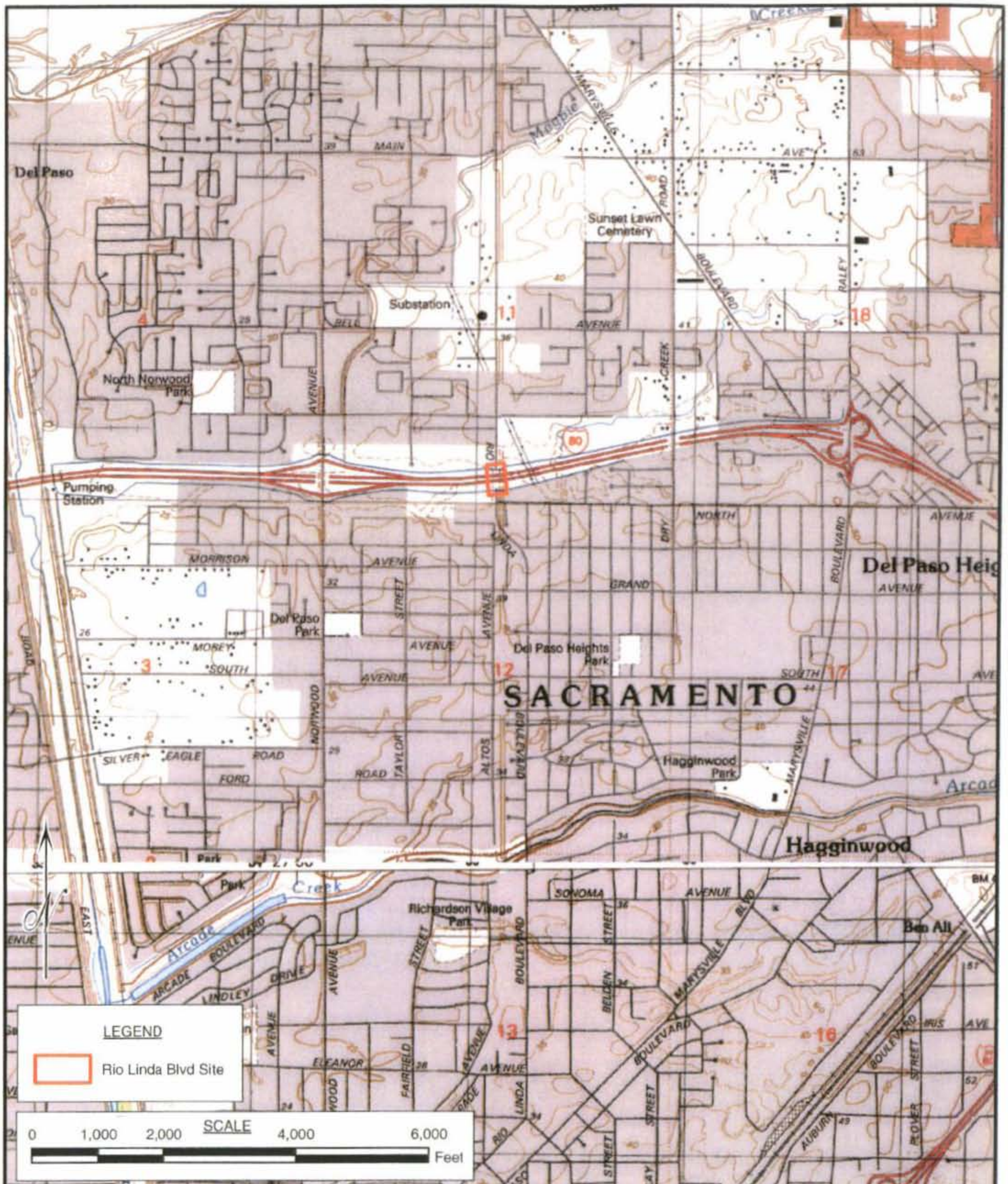
REFERENCE

Helley, E.J., (1985) "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California", U.S. Geological Survey Miscellaneous Field Studies Map MF-1790.

ATTACHMENTS:

Plate 1	Site Location Map
Plate 2	Boring Location Map
Plate 3	Geologic Map
Plate 4	Seismicity Map
Plate 5	Recommended ARS Curves

PLATES



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www.Kleinfelder.com

Graphic By: D. Anderson | 9/13/07

SITE LOCATION MAP

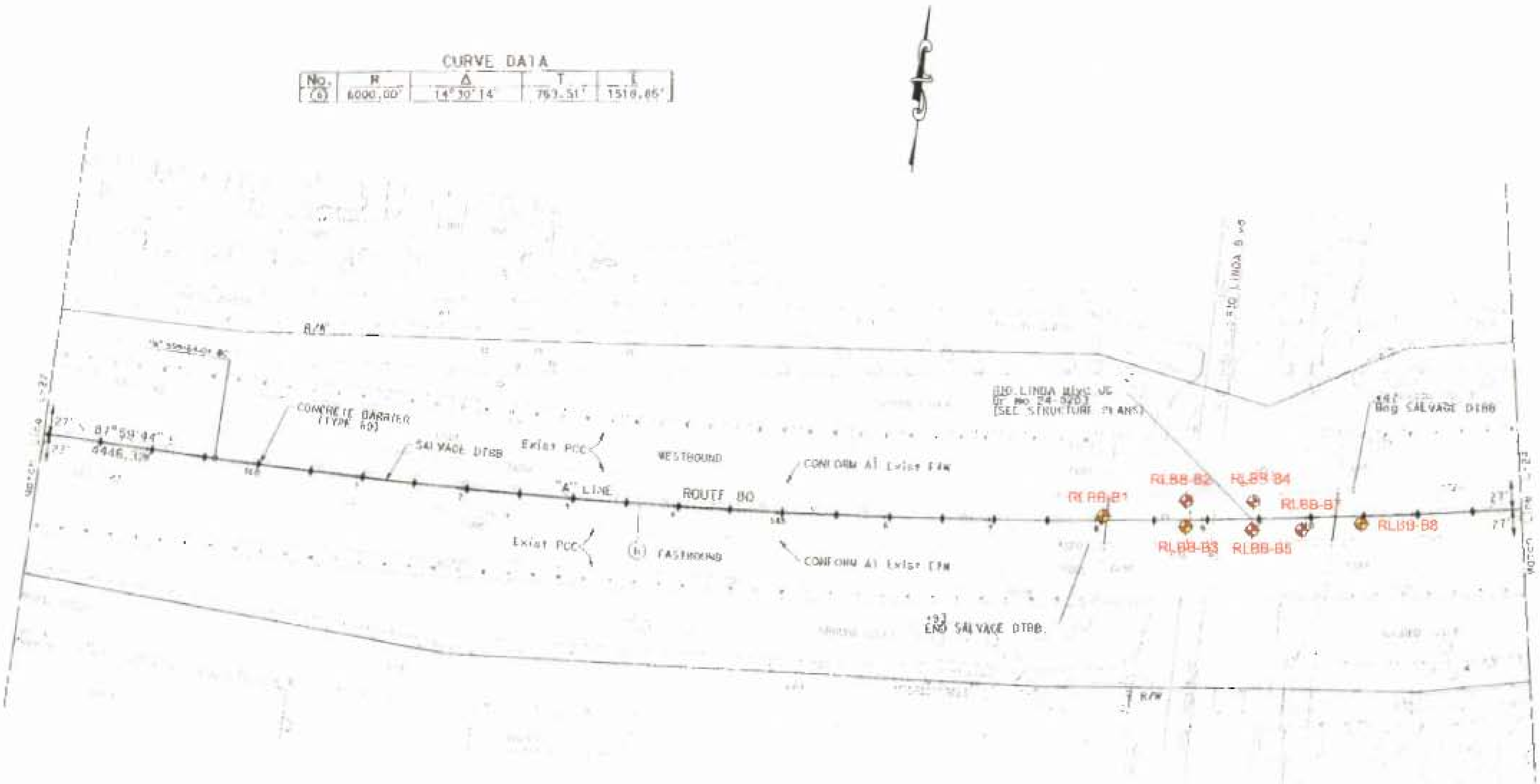
THE SACRAMENTO ROUTE 80 WIDENING PROJECT
RIO LINDA BOULEVARD UC WIDENING
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Project Number: 84591 | File Name: Hwy80 Rio Linda Site

Plate
1

CURVE DATA

No.	R	Δ	T	L
6	6000.00'	14°30'14"	763.51'	1518.85'

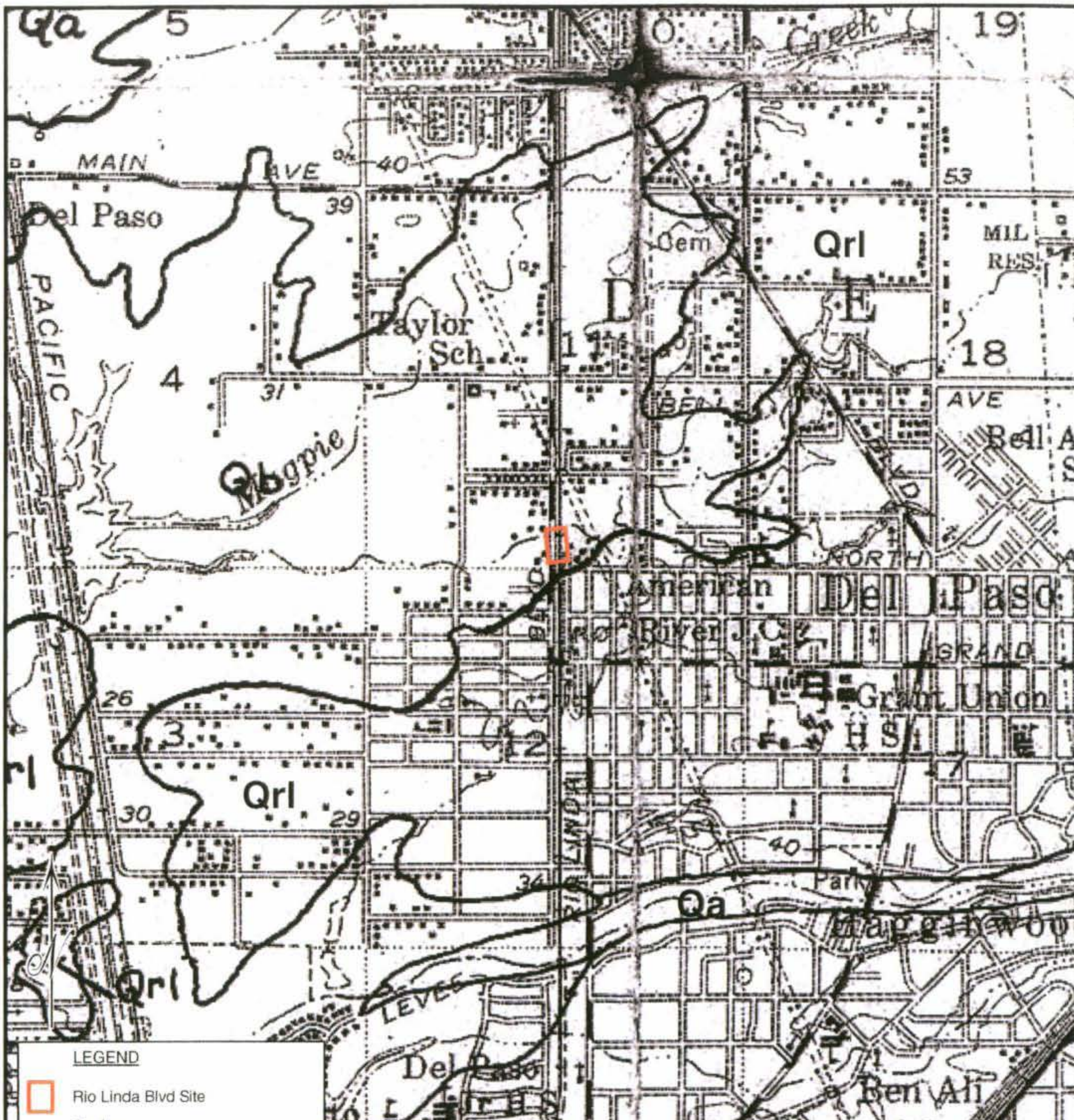


LEGEND

RLBB-B8 Approximate Boring Location

APPROXIMATE SCALE: 1 inch = 100 feet

KLEINFELDER	BORING LOCATION MAP SACRAMENTO ROUTE 80 HOV WIDENING PROJECT RIO LINDA BOULEVARD UC WIDENING EA-03-379701 SACRAMENTO COUNTY, CALIFORNIA	PLATE 2
Drawn By: D. ROSS Project No.: 84591	Date: 12/05/2007 Filename: 84591_2a	



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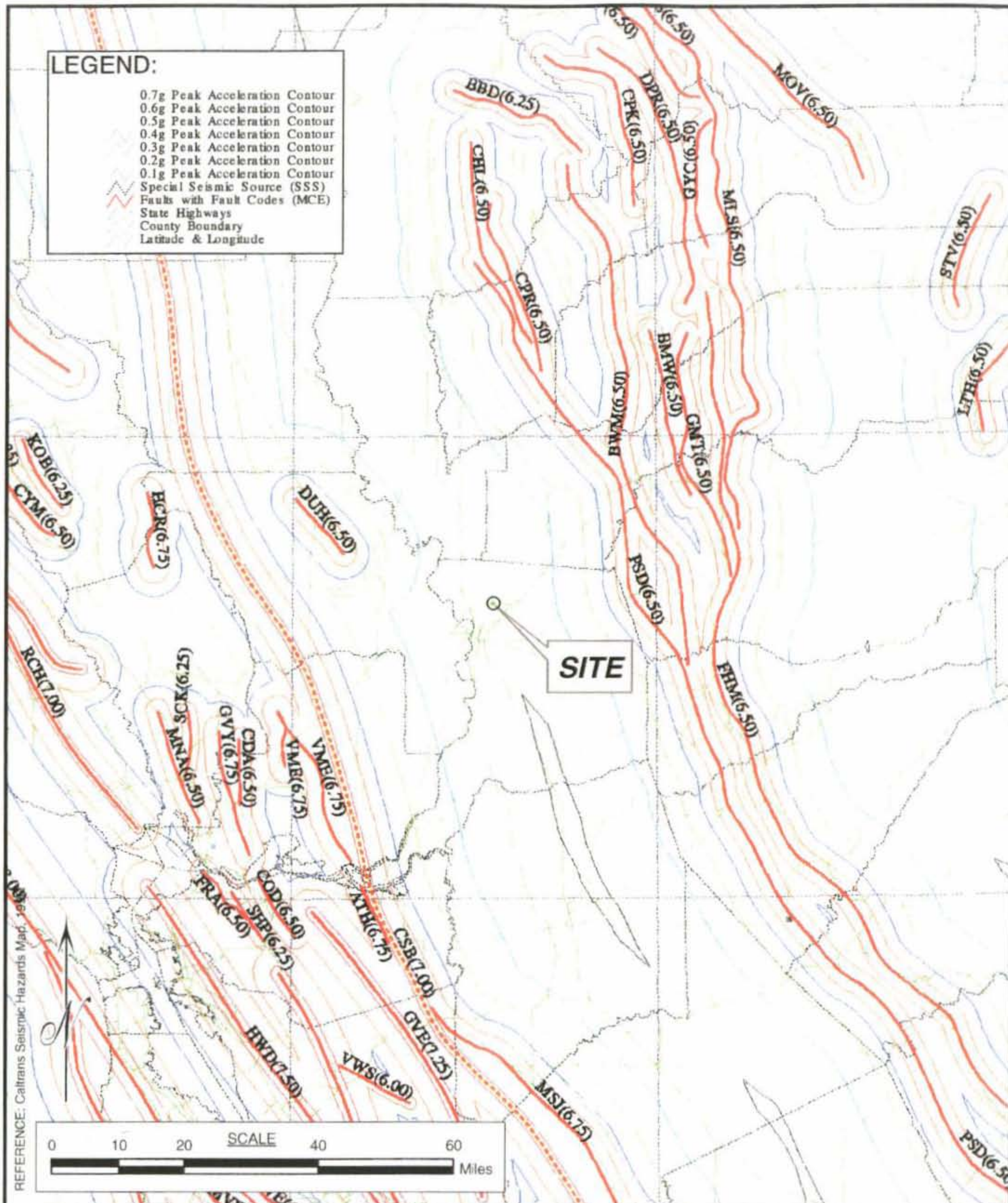
GEOLOGIC MAP

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
RIO LINDA BOULEVARD UC WIDENING
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Plate
3

Graphic By: D. Anderson	9/13/07	Project Number: 84591	File Name: Hwy80 Rio Linda Geo



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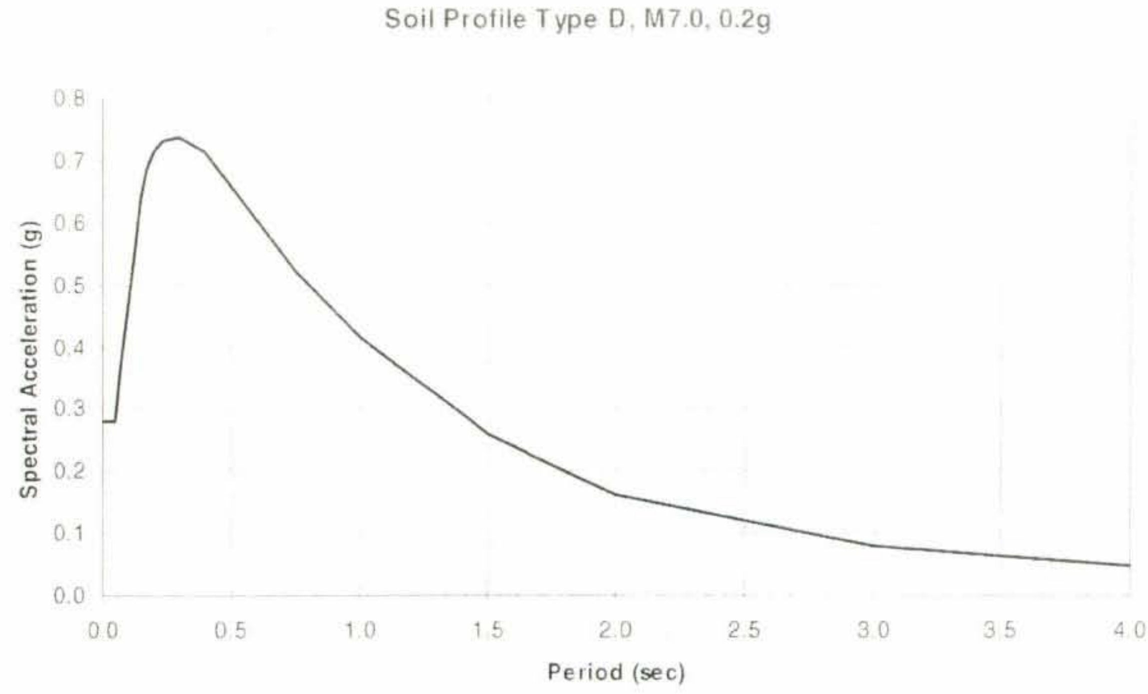
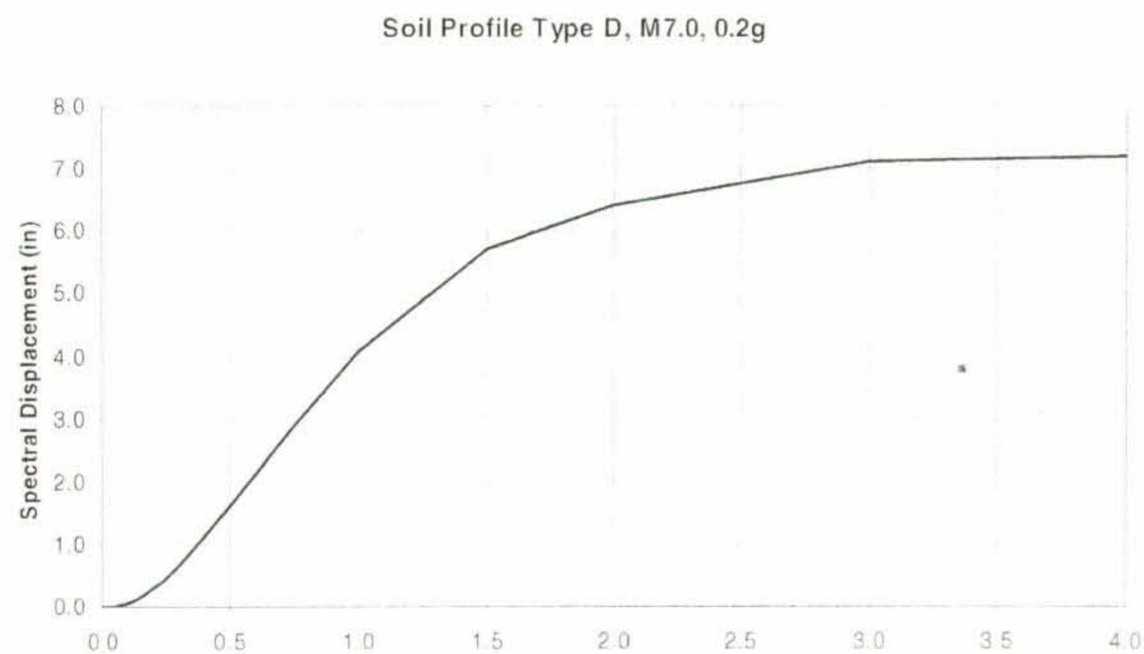
SEISMICITY MAP

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
RIO LINDA BOULEVARD UC WIDENING
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Plate 4

Graphic By: D. Anderson	9/13/07	Project Number: 84591	File Name: Hwy80 Rio Linda Seismic





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RECOMMENDED ARS CURVES

PROPOSED RIO LINDA BRIDGE WIDENING
SACRAMENTO, CALIFORNIA

Plate 5

Graphic By: D. Anderson	3/25/08	Project Number: 84591	File Name: 84591ars.fh11

Memorandum

Flex your power!
Be energy efficient!

To: MR. JEFF SIMS
BRANCH CHIEF
Division of Engineering Services
Structural Design-Mail Station 9
Office of Bridge Design North

Date: October 15, 2008

File: 03-SAC-80- PM M5.21
Natomas East Canal Bridge BOH
(Seismic Retrofit-Infill Walls)
Br. No. 24-0218
EA#03-379701

Attn: Eric Watson

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report for Infill Walls

Introduction

Per your request, the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation Report for the proposed Seismic Retrofit of Natomas East Canal Bridge BOH (Br. No. 24-0218) located on Interstate 80 at PM 5.21, in Sacramento County, California, in the City of Sacramento. The bridge site is plotted on the Location Map (Figure 1).

The following foundation recommendations are based on the Foundation Report for the widening of Natomas East Canal Bridge BOH (Br. No. 24-0218) dated September 15, 2008, the subsurface information gathered during a recent subsurface investigation (June 2007, July 2007 and September 2007) along with a review of the previous foundation reports, As-Built records and Log of Test Borings (LOTB) for the existing bridge. With regards to the current foundation recommendations given in this report, elevations are based on NGVD 29 vertical datum and horizontal coordinates are based on NAD83 horizontal datum, unless otherwise noted.

Project Description

The existing Natomas East Canal Bridge BOH (Br. No. 24-0218R/L) consists of a right and left structure. Both structures were built in 1970 and consist of a six lane divided highway, three lanes westbound and three lanes eastbound. The existing right and left structures are 785.0 feet in length and a minimum of 53.0 feet in width. The existing structures are continuous reinforced concrete box girder spans (8) with reinforced concrete two column bents and reinforced concrete open-end seat abutments. The existing structures are supported on Raymond Step Taper piles, steel shells filled with concrete. The existing structures span the Natomas East Canal, a levee west of the canal that includes a paved bike path, a levee east of the canal that includes two Western Pacific railroad tracks and maintenance road, and on the dry side of the east levee a pump house with an adjacent concrete lined canal.

The proposed seismic retrofit will consist of installing infill walls between the two existing columns at each pier location. The infill walls will be supported on driven steel piles.

Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Sacramento Valley of the Great Valley geomorphic province. California's Great Valley is a long flat valley, smoothed out between the rugged mountains of the Coast Ranges and the Sierra Nevada. The Great Valley, also known as the Central Valley, is approximately 404 miles long and averages approximately 49.7 miles in width. Most of the surface of the Great Valley is covered by Recent and Pleistocene alluvium. Sediments eroded from the Sierra Nevada and the Coast Ranges (to a lesser extent), are deposited on the floodplains and bottomlands as the mountain streams greatly decrease their velocity in the long flat valley. Rising dramatically from the relatively flat floor of the Sacramento Valley, the Sutter Buttes are the major topographic feature of the otherwise nearly flat Great Valley (Harden, 1998).

Based on the "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," prepared by Helley, E. J. and Harwood, D.S. 1985 (United States Geological Survey Miscellaneous Field Studies Map MF-1790) indicates the area consists of three geologic units. The three units mapped are Quaternary Alluvium (Qa), Quaternary Basin Deposits (Qb) and the Lower Member of the Quaternary Riverbank Formation (Qrl) (Figure 2).

Helley and Harwood describe the Quaternary Alluvium (Qa) deposits as Holocene age (approximately 11,000 years ago to present) as unweathered gravel, sand and silt deposited by present day stream and river systems. The thickness of the deposits varies from a few inches to 30 feet. The Quaternary Basin Deposits (Qb) are Holocene age and consist of fine-grained silt and clay derived from the same sources as modern alluvium. The thickness of these deposits varies from approximately 3 to 6 feet along the valley perimeter to as much as 200 feet in the center of the valley. The Quaternary Riverbank Formation (Qrl) is described as red semiconsolidated gravel, sand and silt. Helley and Harwood date the age of the Riverbank Formation between 130,000 and 140,000 years.

Field Investigation and Subsurface Conditions

The Office of Geotechnical Design-North conducted a subsurface investigation in June, July, and September 2007.

The 2007 subsurface investigation consisted of six mud rotary borings (Nos. B-1-07 through B-6-07). The mud rotary borings were advanced using a self-casing wireline drilling method extending down to a maximum depth of 152.5 ft, an approximate elevation of –96.4 ft near the abutment locations. The mud rotary borings were advanced using a self-casing wireline drilling method extending down to a maximum depth of 122.0 ft, an approximate elevation of –102.7 ft near the pier locations. The equipment used to drill Borings B-1-07, B-2-07 and B-3-07 consisted of an Acker drill rig equipped with an automatic hammer. The equipment used to drill Borings B-4-07, B-5-07 and B-6-07 consisted of an all terrain CME 750 drill rig equipped with an automatic hammer. Sampling was achieved by utilizing the Standard Penetration Test (SPT) sampler at 5.0-foot intervals in all borings except B-3-07. Sampling was achieved by utilizing a California Modified Split-Barrel Sampler in boring B-3-07. Selected soil samples were collected and submitted for laboratory testing.

The 2007 subsurface investigation revealed that the materials encountered near the existing abutment locations are generally separated into fill material overlying alluvium, basin deposits and/or soil interpreted as the Riverbank Formation. All Borings except B-3-07 appeared to terminate in the Riverbank Formation as indicated by the slightly to moderately cemented nature of the soil.

Near the existing Abutment 1 location, approximately 40.0 ft of fill material is encountered in Boring B-2-07. The fill material consists of medium dense silty sand with clay and clayey sand with gravel and firm to stiff sandy fat clay and fat clay with sand. Also included in the fill material are organics (rootlets, wood chips) and gypsum nodules and stringers. Below the fill material is medium dense to very dense interbedded layers of silt, silty sand and poorly graded sand. Some of the layers are weakly to moderately cemented. The maximum depth explored is 152.5 ft, an approximate elevation of –96.4 ft.

Near the existing Piers 3, 4 and 5 locations, approximately 17.0 to 20.8 ft of hard to soft sandy fat clay with silt, fat clay with sand, and sandy lean clay and medium dense clayey sand with organics (rootlets, wood chips) and some gypsum nodules and stringers are encountered in Borings B-4-07, B-5-07 and B-6-07. Below the clayey material is medium dense to very dense interbedded layers of silt, silty sand and poorly graded sand. Some of the layers are weakly to moderately cemented. The maximum depth explored is 122.0 ft, an approximate elevation of –102.7 ft.

Near the existing Abutment 9 location, approximately 49.0 ft of fill material is encountered in Boring B-1-07. The fill material consists of medium dense silty sand with gravel, clayey sand and poorly graded sand with clay and stiff sandy fat clay and fat clay with sand with organics (rootlets, weeds) and calcium carbonate/gypsum stringers. Below the fill material is medium dense to very dense interbedded layers of silt, silty sand, and poorly graded sand with minor amounts of stiff sandy lean clay. Some of the layers are weakly to moderately cemented. The maximum depth explored is 152.5 ft, an approximate elevation of –89.3 ft.

In addition to the latest 2007 subsurface investigation, the As-Built Log of Test Boring (LOTB) for Natomas East Canal Bridge and Overhead (Br. No. 24-0218) was used in the Foundation Report. Piers 2,6,7 and 8 were not accessible during the subsurface investigation and the As-Built LOTBs was used to evaluate these locations. According to the As-Built LOTB plan, the subsurface investigation was completed for the structure in May 1964. The investigation included five rotary sample borings (2.5 inch diameter). The material encountered during the 1964 subsurface investigation consisted of predominately dense to very dense interbedded layers of silt, silty sand and sand with some cementation from an approximate elevation of 10.0 ft to the maximum depth explored of approximately 68.0 ft, an elevation of –50.0 ft. The material encountered within the two levees from an approximate elevation of 38.5 ft to 10.0 ft consisted of very soft to stiff clayey silt with sand lenses and gypsum.

The elevations shown on the As-Built Log of Test Borings are based on the NVD 1929 vertical datum. For subsurface data and boring locations, please refer to both the Log of Test Borings and the As-Built Log of Test Borings for site-specific information and conditions.

The project site is located near the former McClellan Air Force Base, a 3,000acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. According to the EPA, over 300 identified sites within the former base are contaminated with solvents, metals and other hazardous wastes as the result of aircraft maintenance and other industrial activities at the base. Our Office does not practice hazardous mitigation of subsurface material, including ground water and therefore does not provide recommendations regarding mitigation. The Contractor should be made aware of the nearby Superfund site and the potential for hazardous subsurface materials.

Ground Water

During the 2007 subsurface investigation, ground water was measured at an approximate elevation of 13.4 ft in Boring B-5-07 on September 26, 2007 and at an approximate elevation of –6.8 ft in Boring B-5-07 on September 19, 2007. Ground water was not measured in Borings B-1-07, B-3-07, B-4-07, and B-6-07 and the borings were immediately backfilled. According to the As-Built LOTB, ground water was encountered during the 1964 subsurface investigation. Ground water was measured at an approximate elevation of 10.1 ft in Boring B-1 on May 15, 1963, an approximate elevation of 17.5 ft in Boring B-2 on May 15, 1963, an approximate elevation of 9.0 ft in Boring B-3 on May 15, 1963, an approximate elevation of 16.9 ft in Boring B-4 on May 28, 1964, and an approximate elevation of 2.5 ft in Boring B-5 on May 28, 1964.

The State Department of Water Resources web site (http://wdl.water.ca.gov) for wells monitoring ground water levels for the Sacramento Valley (Sacramento County) was reviewed. According to a nearby well (No. 09N05E14B001M), ground water levels varied between elevations –26.6 ft and –46.4 ft from 1997 to 2007.

Piers 2 through 5 are located within the main area of the channel and are the only piers that may be subjected to high surface water levels. Therefore, it is recommended that construction of the widening foundations be performed during the dry season when the channel water surface elevations are low. The subsurface investigation was completed when the channel water surface elevation was low. Ground water elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction. For more details, please refer to the LOTB and As-Built LOTB sheets.

The project site is near the former McClellan Air Force Base (AFB), a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. Part of the mitigation process includes drawing down the ground water with extraction wells.

The extraction wells currently under operation in the nearby former McClellan AFB may also have an influence on the nearby and future ground water levels. Depending on time of construction, the ground water levels may be higher.

Scour Evaluation

The Hydrology and Hydraulics Report) for the Natomas East Canal Bridge and Overhead (Br. No. 24-0218R/L) dated January 25, 2007 (2007 Final Hydraulics Report) was completed by the Office of Structure Maintenance and Investigations, Structure Hydraulics Branch. According to this report, Structure Hydraulics evaluated the scour potential for both structures after a 7/12/01 field inspection. It was determined that both existing structures are "not scour critical" and are coded with an Item 113 Code rating of "5", which indicates, "Bridge foundations determined to be stable for the calculated scour conditions, and that the scour is within the limits of the footing or the piles" (HEC-18, Evaluating Scour At Bridges, Fourth Edition). Included in the 2007 Final Hydraulics Report was a field inspection that determined the lateral channel migration (thalweg) was not likely to occur and the existing thalweg elevation is actually higher than the foundation plan original elevation. The channel was considered to be vertically and laterally stable. The review in the 2007 Final Hydraulics Report concluded there is no significant hydraulic skew, no contraction scour, no migration, no channelbed degradation, and no active streambed mining for the current structures. Due to historical indications, lateral thalweg migration was not assumed in the scour analysis.

Based on the scour analysis and current assumptions included in the 2007 Final Hydraulics Report mentioned above, the estimated maximum local pier scour depths for the new structure foundations are considered to be 4.0 ft at Pier 2 and 6.5 ft at Piers 3, 4, and 5.

According to the Final Hydraulic Report mentioned above, Abutment 1 is located above the estimated maximum water surface and Piers 6, 7, 8 and Abutment 9 are located on the "dry" side of the eastern levee; therefore, they are not subject to water flow during typical high-flow conditions.

For further information including site-specific scour assessment and mitigation measures, the Structures Hydraulics Branch should be contacted.

Corrosion Evaluation

Composite soil samples were collected from Borings B-1-07 through B-6-07 during the 2007 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite samples for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 550 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not included to define a corrosive site. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite samples were considered to be non-corrosive at this site. Refer to Table 1 below for specific test results.

Table 1: Corrosion Test Summary-Composite Samples for Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

SIC Corrosion Number	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Sulfate Content (PPM)	Chloride Content (PPM)
C640226	B-1-07	0.0-6.0	7.52	1748	N/A	N/A
C640227	B-1-07	26.0-32.5	7.61	2237	N/A	N/A
C640228	B-1-07	56.0-62.5	6.28	4043	N/A	N/A
C640229	B-1-07	86.0-92.5	6.76	3616	N/A	N/A
C640230	B-2-07	12.5-16.0	7.47	1744	N/A	N/A
C640231	B-2-07	41.0-42.5	7.67	1282	N/A	N/A
C640232	B-2-07	52.5-56.0	6.98	2214	N/A	N/A
C640233	B-2-07	62.5-66.0	7.12	2305	N/A	N/A

Laboratory Testing

Laboratory testing was performed on selected samples of the subsurface materials obtained from the 2007 subsurface investigation. Tests were performed to determine the corrosion and engineering properties of the subsurface materials for use in the foundation analysis. The tests performed included: mechanical analysis (sieve and hydrometer), Atterberg limits (liquid limit, plastic limit and plasticity index), unconsolidated undrained (UU) triaxial and soil corrosion (pH, sulfate, chloride, and resistivity). All tests were performed in general accordance with American Society for Testing and Materials (ASTM) standards or California Test Methods (CTM). Laboratory test results will be available upon request.

Seismic Data and Evaluation

The project site is not located within any Alquist-Priolo Earthquake Fault Zones (EFZs) as established by the California Geological Survey. No active faults are known to cross the project site. Therefore, the potential for ground rupture hazard due to fault movement is considered low since no known fault crosses the project site. Based on the Department of Transportation (Caltrans) 1996 Seismic Hazard Map, the controlling fault for the site is the Prairie Creek-Spenceville-Dentman (PSD), a normal fault. The PSD fault is located approximately 22 miles east of the site and is capable of generating a Maximum Credible Earthquake (MCE) moment magnitude of M_w=6.5. The 1996 Seismic Hazard Map shows that the PBA for this site is between the contour lines of 0.1g and 0.2g. Therefore, the estimated Peak Horizontal Bedrock Acceleration (PHBA) at the site is recommended to be about 0.2g.

Based on the 2007 and 1964 subsurface investigations for the bridge, the soil profile at the site may be classified as Type D, as defined in the Department's Seismic Design Criteria (SDC, 2006, Version 1.4). The recommended design Acceleration Response Spectrum (ARS) curve shown in Figure 3 was obtained from Figure B.7 of the SDC. According to the guidelines presented in Section 6.1.2.1 of the Seismic Design Criteria, for structures that are within 10 miles (15 km) of a fault, the ARS curve needs to be magnified. Since the distance to the fault is more than 10 miles, no modification to the ARS curve is needed.

As-Built Foundation Information

The As-Built records for the existing Natomas East Canal Bridge and Overhead (Br. No. 24-0218) indicate that the bridge foundations consist of Raymond step tapered steel shells filled with concrete. Class I piles were used at Abutment 1 and 9 locations and Class II piles were used at the pier locations. The Class I and Class II piles had a diameter of 12 inches at the butt and 8 inches at the tip, all with a design load of 90 kips. The As-Built pile tip elevations for the existing structures are listed below in Tables 2 and 3.

Table 2. "As-Built" step tapered steel shells filled with concrete with 90 kip Design Load for the right bridge of the Natomas Canal Bridge and Overhead (Br. No. 24-0218R).

Location	"As-Built" Estimated Pile Tip Elevation (ft)	"As-Built" Average Pile Tip Elevation (ft)	"As-Built" Specified PileTip Elevation (ft)
Abutment 1R	-5.0	-3.4	0.0
Pier 2R1	-5.0	-1.6	0.0
Pier 2R2	-5.0	-0.6	0.0
Pier 3R1	-3.0	-4.0	-3.0
Pier 3R2	-3.0	-5.6	-3.0
Pier 4R1	-10.0	-11.3	-5.0
Pier 4R2	-10.0	-10.4	-5.0
Pier 5R1	-15.0	-11.2	-10.0
Pier 5R2	-15.0	-11.0	-10.0
Pier 6R1	-10.0	-6.3	-5.0
Pier 6R2	-10.0	-6.3	-5.0
Pier 7R1	-20.0	-14.8	-15.0
Pier 7R2	-20.0	-14.8	-15.0
Pier 8R1	-20.0	-15.1	-15.0
Pier 8R2	-20.0	-14.9	-15.0
Abutment 9R	-20.0	-14.8	-15.0

Note:

1. As-Built Elevations shown above are based on the NGVD29 vertical datum.
2. The "As-Built" Estimated, Average and Specified Pile Tip Elevations were obtained from the Field Report of Foundation Conditions (dated February 18, 1969) for the Natomas East Canal Br. & O.H. (Br. No. 24-0218R).

Table 3. "As-Built" step tapered steel shells filled with concrete with 90 kip Design Load for the left bridge of the Natomas Canal Bridge and Overhead (Br. No. 24-0218L).

Location	"As-Built" Estimated Pile Tip Elevation (ft)	"As-Built" Average Pile Tip Elevation (ft)	"As-Built" Specified PileTip Elevation (ft)
Abutment 1L	-5.0	1.0	0.0
Pier 2L1	-5.0	-1.8	0.0
Pier 2L2	-5.0	-1.6	0.0
Pier 3L1	-5.0	-4.0	-3.0
Pier 3L2	-5.0	-4.3	-3.0
Pier 4L1	-5.0	-6.7	-5.0
Pier 4L2	-5.0	-7.2	-5.0
Pier 5L1	-15.0	-10.8	-10.0
Pier 5L2	-15.0	-10.5	-10.0
Pier 6L1	-10.0	-5.9	-5.0
Pier 6L2	-10.0	-6.4	-5.0
Pier 7L1	-15.0	-15.2	-15.0
Pier 7L2	-15.0	-14.1	-15.0
Pier 8L1	-20.0	-14.7	-15.0
Pier 8L2	-20.0	-15.1	-15.0
Abutment 9L	-20.0	-13.7	-15.0

Note:

1. As-Built Elevations shown above are based on the NGVD29 vertical datum.
2. The "As-Built" Estimated, Average and Specified Pile Tip Elevations were obtained from the Foundation Report (dated February 18, 1969) for the Natomas East Canal Br. & O.H. (Br. No. 24-0218R).

A settlement period of ninety days was recommended for the fill at Abutment 1 and 9 locations for both structures. A five-foot surcharge was applied to the Abutment 1 locations. A settlement period will not be necessary for the widening since the fill has been in place since the construction of the original structures in 1970.

Foundation Recommendations

The following foundation recommendations are for the seismic retrofit of the existing Natomas East Canal Bridge and Overhead (Br. No. 24-0218). The seismic retrofit of the existing structures will include the installation of newly constructed infill walls that will retrofit the existing piers of the left and right structures. Three options are recommended for the seismic retrofit of the left and right structures. The infill walls may be supported on driven Class 90 PP14X0.250, Alternative V closed-ended piles, driven Class 90 PP14X0.375, Alternative W open-ended piles or driven steel HP10X42 "H" piles. Due to the soft/loose soil conditions, spread footings are not recommended for support of the infill walls.

The computer program DRIVEN v1.2 was used to estimate the axial load capacity and nominal driving resistance of the three options of driven piles recommended for support of the infill walls. The DRIVEN program follows the guidelines of FHWA publication NHI-05-042 (2006). The DRIVEN program User's Manual is provided in FHWA-SA-98-074.

Option 1

At all infill wall locations, driven Class 90 PP14X0.250, Alternative V closed-ended piles are recommended for support. The specified pile tip elevations, shown below in Table 4, will provide piles with an ultimate geotechnical capacity that will meet the required nominal resistance in compression.

Table 4. Pile Data Table for the proposed Infill Walls of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Location	Pile Type	Design Load (kips)	Nominal Resistance		Bottom of Pile Cap Elevation (ft)	Design Pile Tip Elevation (ft)	Specified Pile Tip Elevation (ft)
			Compression (kips)	Tension (kips)			
Pier 2	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	18.5	-9.5 (1) (2)	-9.5
Pier 3	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	7.5	-20.5 (1) (2)	-20.5
Pier 4	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	7.0	-21.0 (1) (2)	-21.0
Pier 5	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	9.0	-19.0 (1) (2)	-19.0
Pier 6	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	27.5	-0.5 (1) (2)	-0.5
Pier 7	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	11.5	-16.5 (1) (2)	-16.5
Pier 8	Class 90 PP14X0.250 Alt. V (closed-ended)	90	180	0	-0.5	-28.5 (1) (2)	-28.5

Note: Design Pile Tip Elevation is controlled by the following demand: (1) Compression (2) Scour Potential exists to an approximate elevation of 5.0 ft at Pier 2 and an approximate elevation of 0.0 ft at Piers 3, 4, and 5.

Option 2

At all infill wall locations, driven Class 90 PP14X0.375, Alternative W open-ended piles are recommended for support. The specified pile tip elevations, shown below in Table 5, will provide piles with an ultimate geotechnical capacity that will meet the required nominal resistance in compression.

Table 5. Pile Data Table for the proposed Infill Walls of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Location	Pile Type	Design Load (kips)	Nominal Resistance		Bottom of Pile Cap Elevation (ft)	Design Pile Tip Elevation (ft)	Specified Pile Tip Elevation (ft)
			Compression (kips)	Tension (kips)			
Pier 2	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	18.5	-21.5 (1) (2)	-21.5
Pier 3	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	7.5	-32.5 (1) (2)	-32.5
Pier 4	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	7.0	-33.0 (1) (2)	-33.0
Pier 5	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	9.0	-31.0 (1) (2)	-31.0
Pier 6	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	27.5	-12.5 (1) (2)	-12.5
Pier 7	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	11.5	-28.5 (1) (2)	-28.5
Pier 8	Class 90 PP14X0.375 Alt. W (open-ended)	90	180	0	-0.5	-40.5 (1) (2)	-40.5

Note: Design Pile Tip Elevation is controlled by the following demand: (1) *Compression* (2) *Scour Potential exists to an approximate elevation of 5.0 ft at Pier 2 and an approximate elevation of 0.0 ft at Piers 3, 4, and 5.*

Option 3

At all infill wall locations, driven steel HP 10X42 "H" piles are recommended for support. The specified pile tip elevations, shown below in Table 6, will provide piles with an ultimate geotechnical capacity that will meet the required nominal resistance in compression.

Table 6. Pile Data Table for the proposed Infill Walls of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Location	Pile Type	Design Load (kips)	Nominal Resistance		Bottom of Pile Cap Elevation (ft)	Design Pile Tip Elevation (ft)	Specified Pile Tip Elevation (ft)
			Compression (kips)	Tension (kips)			
Pier 2	HP 10x42	90	180	0	18.5	-39.0 (1) (2)	-39.0
Pier 3	HP 10x42	90	180	0	7.5	-45.0 (1) (2)	-45.0
Pier 4	HP 10x42	90	180	0	7.0	-49.5 (1) (2)	-49.5
Pier 5	HP 10x42	90	180	0	9.0	-43.5 (1) (2)	-43.5
Pier 6	HP 10x42	90	180	0	27.5	-29.0 (1) (2)	-29.0
Pier 7	HP 10x42	90	180	0	11.5	-45.0 (1) (2)	-45.0
Pier 8	HP 10x42	90	180	0	-0.5	-54.0 (1) (2)	-54.0

Note: Design Pile Tip Elevation is controlled by the following demand: (1) *Compression* (2) *Scour Potential exists to an approximate elevation of 5.0 ft at Pier 2 and an approximate elevation of 0.0 ft at Piers 3, 4, and 5.*

General Notes to Designer

1. All support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to the foundation review.

2. If lateral demands exist on the support piles, the structural design engineer shall indicate on the plans, in the pile data table, the design pile tip elevations required to meet the lateral load demands. If the specified pile tip elevations given in the above pile data table are not adequate for lateral load demands; the Office of Geotechnical Design-North, Branch A shall be contacted for further recommendations.

3. A Type "A" excavation is to be shown on the plans at infill walls located at Pier 3, 4 and 5 locations.

4. A Type "D" excavation is to be shown on the plans at infill walls located at Pier 2 and 8 locations.

Construction Considerations

1. Ground water was encountered during the subsurface investigation. Ground water surface elevation is subject to seasonal fluctuations and may occur higher or lower than indicated on the Log of Test Boring Sheets (LOTB) depending on the conditions at time of construction. Refer to the Log of Test Boring Sheets for details.

2. It is anticipated that the Contractor will encounter ground water while excavating to the bottom of the pile cap/infill wall elevations at Piers 2, 3, 4, 5, and 8 locations. Piers 2 through 5 are located within the main area of the channel and may be subjected to high surface water levels. Pier 8 is located outside of the main area of the channel and is not expected to be subjected to high surface water levels. Piers 2, 3, 4, 5, and 8 may be affected by high ground water. Therefore, it is recommended the construction for the infill walls is performed during the dry season when the channel water surface elevations are low.

3. The extraction wells currently under operation in the nearby McClellan Air Force Base may have an influence on the current ground water levels. Depending on the time of construction, the ground water levels may be higher.

4. The Contractor should anticipate hard and erratic driving of the steel piles below an approximate elevation of 10.0 ft due to the presence of the very dense weakly to moderately cemented material. The Contractor should anticipate field cutting and splicing of the steel piles. Refer to the LOTB sheets for details.

5. The calculated geotechnical capacity of all driven steel piles is based on skin friction and end bearing.

6. Specialty equipment will be required for installation of the driven steel piles at all infill wall locations due to low overhead clearance, especially at Pier 2 and 6 locations. The Contractor should anticipate field cutting and splicing of the steel piles. Refer to the LOTB sheets for details.

7. At the Engineer's option, any steel piles driven within 6.0 feet of the specified pile tip elevation may be considered adequate and cut off if two times the required pile acceptance criteria is achieved. Refer to the Caltrans Standard Specifications 49-1.08 (2006) for information concerning the pile driving acceptance criteria.

The recommendations contained in this report are based on specific project information regarding design loads and structure locations that has been provided by the Office of Bridge Design North (OBDN). If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Jacqueline Martin (916) 227-1051 or Reid Buell (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

Project Information

Standard special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings for Natomas East Canal Bridge and Overhead, Br. No. 24-0218.

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Foundation Report for Natomas East Canal Bridge and Overhead (Seismic Retrofit-Infill Walls), Br. No. 24-0218, dated October 15, 2008.
B. Foundation Report for Natomas East Canal Bridge and Overhead (WIDEN), Br. No. 24-0218, dated September 15, 2008.

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R.E. Pending
Structure OE

REFERENCES

Bartow, J.A., and D.E. Marchang, 1979, Preliminary geologic map of Cenozoic deposits of the Clay are, California: U.S. Geological Survey Open File Report 79-667, (Scale 1 to 62,500).

Department of Water Resources (2008). Ground water level data. Available from the Department of Water Resources site, http://wdl.water.ca.gov.

Environmental Protection Agency (2007). McClellan Air Force Base cleanup and Redevelopment. [Data file]. Available from the Environmental Protection Agency site, http://www.epa.gov/region09/waste/sfund/mcclellan/index.html.

Federal Highway Administration (FHWA), Design and Construction of Driven Pile Foundations: Workshop Manual – Volume 1 (Pub. No. FHWA HI-97-013) published January 1997, Revised November1998.

Harden, Deborah R., 1998, California Geology, Prentice Hall, 252 pp.

Helley, E.J. and Harwood, D.S., 1985, Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California, United States Geological Survey (USGS), Map MF 1790, scale 1:62,500, 1 of 5 sheets.

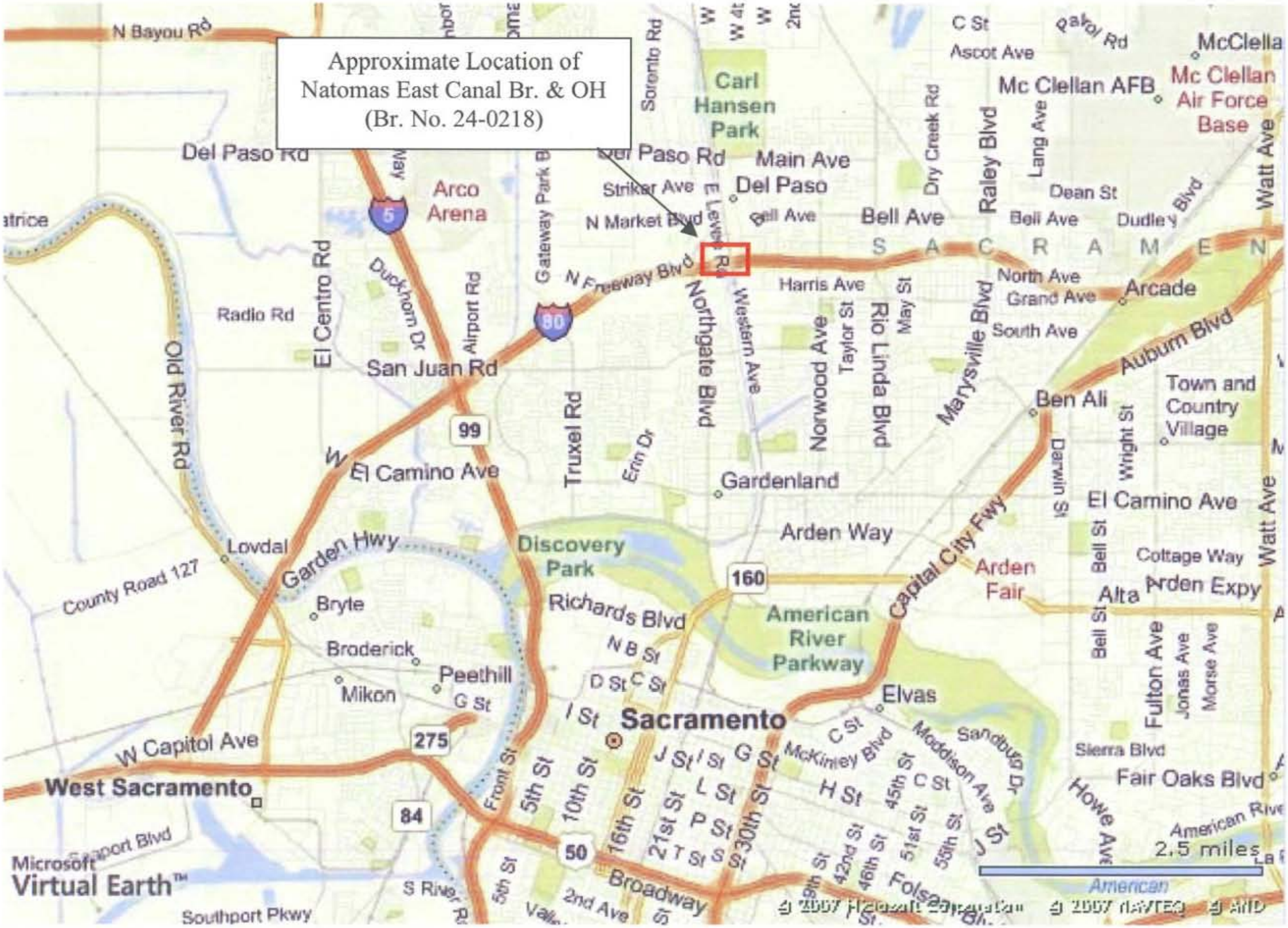
Marchand, D.E. and A. Allwardt, 1978, Preliminary Geologic Map Showing Quaternary Deposits of the Northeastern San Joaquin Valley, California: U.S. Geological Survey Miscellaneous Field Studies Map MF-945, scale 1:125,000.

Marchand, D.E. and A. Allwardt, 1981, Late Cenozoic stratigraphic units, northeastern San Joaquin Valley, California: U.S. Geological Survey Bulletin 1470, 70 p.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

State of California, Department of Transportation (Caltrans):

- Standard Plans, May 2006
- Standard Specifications, May 2006
- Bridge Standard Details Sheets, April 2000.
- Memo to Designers, Section 3-1, December 2000.
- CT-Corrosion Guidelines, September 2003, Version 1.0.



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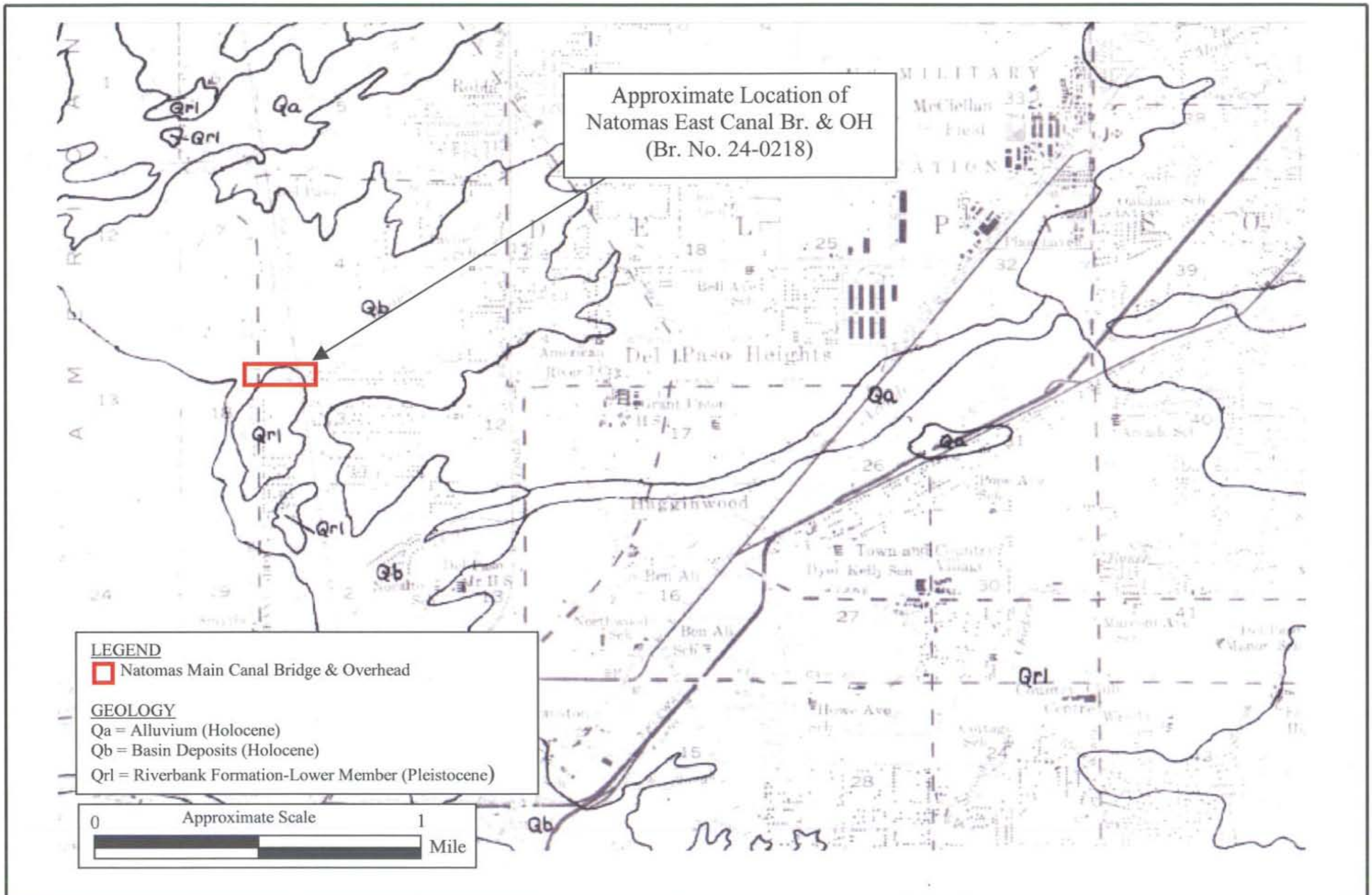
Geotechnical Design – North

EA: 03-379701	Location Map	
October 15, 2008		
03-SAC-80 PM M5.2 **Natomas East Canal Br. & OH, Br. No. 24-0218**		Figure 1



Caltrans

Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-379701	Geologic Map
October 15, 2008	
03-SAC-80 PM M5.21 Natomas East Canal Br. & OH, Br. No. 24-0218	Figure 2

Natomas East Canal Bridge OH (Widen)
Br. No. 24-0218
03-379701
October 15, 2008

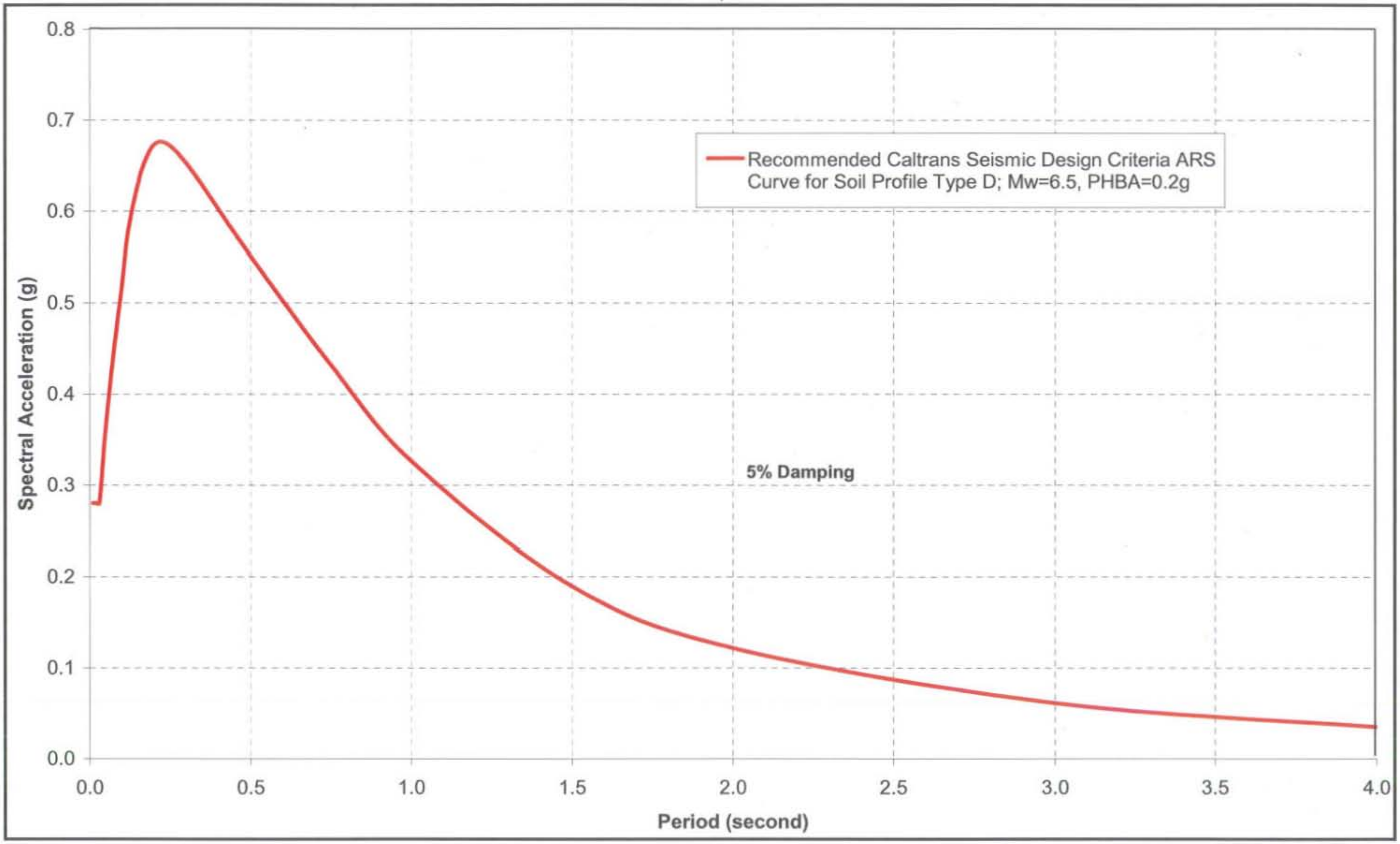


Figure 3. Acceleration Response Spectrum Recommended for Design

State of California | Business, Transportation and Housing Agency

Memorandum

Flex your power!
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To: MR. JEFF SIMS
BRANCH CHIEF
Division of Engineering Services
Structural Design-Mail Station 9
Office of Bridge Design North

Date: May 26, 2010

File: 03-SAC-80- PM M5.21
Natomas East Canal Bridge BOH
(Seismic Retrofit-Infill Walls)
Br. No. 24-0218
EA#03-379701

Attn: Eric Watson

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Amended Foundation Report for Infill Walls

The foundation report for the proposed Seismic Retrofit of the Natomas East Canal Bridge and Overhead (Br. No. 21-0218) was completed and sent to Structure Design on October 15, 2008. On May 19, 2010 an email was received from the Office of Structure Design stating that some of the agencies involved with this project are concerned about the proposed piles to be driven through the levees, specifically Pier 2 and Pier 5. The agencies have requested that the piles supporting the infill walls be installed in predrilled holes through the levees. This Amended Foundation Report will address the Construction Considerations for seismic retrofit for Pier 2 and Pier 5 that were originally included in the Foundation Report for Infill Walls dated October 15, 2008 for the Seismic Retrofit of the Natomas East Canal Bridge (Br. No. 21-0218).

Construction Considerations

1. All piles at the infill wall locations at Pier 2 and Pier 5 shall be driven in oversized predrilled holes according to the provisions of Section 49-1.06 of the Caltrans Standard Specifications. However, the space around the pile shall be backfilled (sealed) to ground surface with cement-bentonite slurry in place of pea gravel or dry sand as stated in the Caltrans Standard Specifications. The cement-bentonite slurry shall be placed by utilizing the tremie method.

Table 2. Elevations of the Predrilled Holes

Support Location	Predrilled Elevation (ft)
Pier 2	0.0
Pier 5	0.0

2. Generally soft soils were encountered to an approximate elevation of 8.0 feet in Borings B-4, B-5 and B-6 during the subsurface investigation. Unstable soils and caving conditions may be encountered. Temporary casing may be required. The casing shall not extend below elevation 0.0 feet. The temporary casing shall not be removed during or after grouting the predrilled hole.

If there are any questions concerning this addendum, please contact Jacqueline Martin at (916) 227-1051 or Reid Buell at (916) 227-1012.

Report by

Jacqueline Martin
JACQUELINE A MARTIN, P.G. NO. 8705
Engineering Geologist
Office of Geotechnical Design-North

REID BUELL, C.E.G. NO. 1481
Senior Engineering Geologist
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STATE OF CALIFORNIA

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MEMORANDUM

To: Jacqueline Martin, Caltrans – Office of Geotechnical Services

From: Emre Ortakci, EIT - Kleinfelder
Ken Sorensen, PE, GE – Kleinfelder

File: 90749

Date: September 15, 2008

REGISTERED PROFESSIONAL ENGINEER
KENNETH G. SORENSEN
No. GE 2520
Exp. 09-30-08
GEOTECHNICAL
STATE OF CALIFORNIA

Subject: **Foundation Report for**
Proposed Tie-Back Wall A at Longview Drive Overcrossing
(03-SAC-80-9.4)
The Sacramento 80 HOV Widening Project (EA 03-379701)
Sacramento County, California

INTRODUCTION

This memorandum presents geotechnical recommendations for design and specification development for the proposed Retaining Wall A in front of Abutment 4 of the Longview Drive Overcrossing (Bridge No. 24-0283). Kleinfelder performed this work under Task Order 049431 of Contracts 59A0494 and Task Order 58914 of Contract 59A0589 with the Department of Transportation, State of California (Caltrans). The location of the project site is shown on Plate 1.

PROJECT DESCRIPTION

The existing Longview Drive Overcrossing is a 491 foot long, three span, concrete box girder bridge that crosses over Interstate 80. The bridge is supported on two abutments and four bents. The proposed Retaining Wall A will be constructed at the cut section on the slope paving side of Abutment 4. The following table summarizes available foundation information for the existing Abutment 4.

Table 1: Existing Foundation Information – Longview Drive Overcrossing Abutment No. 4

Foundation Type (design load)	Approximate Elevation		Number of Piles
	Bottom of Abutment, (ft.)	Specified Pile Tip, (ft.)	
16-inch dia. CIDH Pile (45 ton)	56.5	40	35

The proposed project would widen mainline I-80 with additional lanes in the eastbound direction. A tieback wall designated as TBW-A (Bridge No. 24-0283) is proposed to be constructed beneath the east abutment of the Longview Drive Overcrossing to widen I-80 in the eastbound direction. The approximate limits of the proposed tieback wall are from Sta. 718+40 to Sta. 720+32 along the line passing parallel and 89.04 feet to the right of the "A2" line. The highest point of the proposed wall will be 10 feet above the ground surface level at Interstate 80's shoulder. The ground surface elevation at the base of the wall is about 43.50 feet. A site location map is shown on Plate 1.

SITE GEOLOGY AND SUBSURFACE CONDITIONS

Regional Setting and Area Geology

The Sacramento Valley is part of the Great Valley Geomorphic Province. This province consists of an asymmetrical synclinal trough about 400 miles long and 50 miles wide that was formed by the uplift and tilting of the Sierran Block. Since the Mesozoic, erosion from the adjacent mountains ranges has in-filled the valley trough with a thick sequence of marine, alluvial, volcaniclastic, basin and delta plain sediments deposited by ancient and modern rivers and their tributaries. The thickness of these sediments varies from a thin veneer at the edges of the valley to more than 15 km in the west central portion.

The Geologic Map (Plate3), prepared from Helley, E.J., and Harwood, D.S. (1985) "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," (United States Geological Survey Miscellaneous Field Studies Map MF-1790) shows three Quaternary age units mapped in the site vicinity. These formations are alluvium deposits (Qa), the Lower Member of the Riverbank Formation (Qrl) and the Turlock Lake Formation (Qtl).

Helley and Harwood (1985) indicate the site is underlain by the alluvium deposited along Arcade Creek. They show the contact between the alluvium deposits and the Riverbank Formation as having a northeast-southwest orientation, approximately paralleling the bridge about 200 feet north of the site. Helley and Harwood describe the alluvium deposits as Holocene age (11,000 years ago to present) unweathered gravel, sand, and silt deposited by present-day stream and river systems. Thickness varies for this unit within the Sacramento Valley from a few inches to 33 feet. The alluvium overlies the older Riverbank and Turlock Lake formations and is distinguished by relatively lower blow counts (N < 20).

The Riverbank Formation is described as semi-consolidated gravel, sand and silt with a reddish color. Helley and Harwood give the age of the Riverbank Formation between 130,000 and 450,000 years ago. The Riverbank formation often forms a "hard pan" layer several feet thick relatively close to the surface. All borings appear to terminate in the Riverbank Formation as indicated by the relatively high blow counts and moderately cemented nature of the soils at depth.

The Turlock Lake Formation is mapped about 0.8 miles east of the site and is described as deeply weathered and dissected arkosic gravels with sand and silt. The gravels consist of more resistant metamorphic rock fragments and quartz pebbles. The soils encountered generally conform to those expected from the geologic maps.

Site Topography

The project site is located along a portion of the I-80 freeway that is relatively flat. The ground surface elevation at the shoulder of the Interstate 80 is about the 43.5± feet. The Longview Drive approach to the bridge has an earth fill embankment that is about 21± feet thick. The as-built drawings for the Longview Drive Overcrossing structure indicate the slope of the embankment at the location of the proposed tie backwall is approximately 1.5H:1V. Plate 2 includes photographs showing the project site location.

Field Investigation and Subsurface Conditions

Three test borings designated as LDTB-B1 through LDTB-B3 were advanced using mud-rotary drilling methods. Borings were performed on July 18 and 25, 2007 by Caltrans drilling services and Spectrum of Stockton, California. All drilling and sampling operations were supervised by Kleinfelder staff. The test borings were performed using ACKER MPCA and CME-75 drill rigs. The borings were advanced from a ground surface elevation of 70.55± feet as shown on the As-built plans for Longview Drive Overcrossing.

Based on the results of the subsurface investigation, subsurface soils encountered in the upper 10 feet of the test borings consisted of fill composed of sandy lean clay, poorly graded sand, silt, clayey sand and silty sand. The soils encountered beneath the fill layer consisted of silty sands, silts, and lean clays extending to a depth of about 25 feet below the ground surface. Interbedded layers of clayey sand, silty sand and, poorly graded sand were encountered between depths of about 25 to 50 feet below the ground surface. A silt layer was encountered at a depth of about 50 feet to the maximum depth explored of about 51½ feet. The uncorrected Modified California Sampler N-values in the borings varied from 4 to 72 per foot with an average value of 27 per foot. The N-values in the borings indicate a very stiff to hard or medium dense soil condition. Based on the laboratory test results, the dry unit weight of the soil varies from 96 pcf to 118 pcf.

An As-built LOTB for the existing Longview Drive Overpass dated June, 08 1970 shows 2 rotary borings, 1 auger drilling and 6 CPT soundings. The maximum depths of the borings and the soundings range between 30 to 53 feet below the ground surface level which is marked at an elevation of 60 feet. The LOTB shows mainly sands and silts. There are some clayey sand and clayey silt layers are present in the profile. The rotary borings show SPT N-values between 23 and 100 per foot of penetration. The average blow count is larger at the bottom 25 feet of the profile.

These soil conditions appear consistent with Helley and Harwood's (1985) descriptions of the Riverbank Formation. Based on available information, the ground surface elevations of the borings are approximately 70.5 feet. No survey information for ground elevations at the boring sites is available at this time.

GROUNDWATER

Based on the as-built LOTBs for Longview Drive Overcrossing (Bridge No. 24-283) the groundwater level was measured at elevation -3± feet in August, 1970. A perched ground water zone was also encountered at elevation 53± feet.

A review of data from the State Department of Water Resources web site (http://wdl.water.ca.gov) for monitoring wells in the area indicates groundwater elevations in a nearby well (No. 09N005E12L001M) varied between El. -56.6 feet and El. –32.0 feet during the period between 1995 and 2007.

Mud rotary method was used for drilling and holes were backfilled immediately after completion. Therefore, no groundwater levels were recorded at test borings.

CORROSION POTENTIAL

Chemical analyses were performed on three (3) samples collected from the borings for Bridge No. 24-0283 (TBW-A) to evaluate corrosion potential of the on-site soils.

Testing was performed at the Caltrans Geotechnical Laboratory in Sacramento, California. The results of the corrosion tests are presented in Table 2.

TABLE 2: Corrosion Test Results

Location	Depth (ft)	Minimum Resistivity (Ohm-cm) (Caltrans Test Method 532)	pH (Caltrans Test Method 643)
LDTB-B1-5B	25.5	5604	7.92
LDTB-B2-6	25-26.5	3068	7.29
LDTB-B3-6	25-26.5	3074	7.74

Based on the Caltrans Corrosion Guidelines (2003 version 1.0), a site is considered corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: Chloride concentration is 500 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. Moreover, a minimum resistivity value for soil and/or water less than 1000 ohm-cm indicates the presence of high quantities of soluble salts and a higher propensity for corrosion. In the Caltrans Geotechnical Laboratory, a sample is tested for chloride and sulfate contents only if the test results for minimum resistivity and pH indicate potential for corrosivity.

Based on Caltrans guidelines and laboratory test results, the site may be considered as non-corrosive to steel and concrete.

Kleinfelder does not practice corrosion engineering and therefore does not provide recommendations regarding corrosion potential mitigation. The above information is provided to help facilitate the understanding of corrosion potential at a site.

LABORATORY TESTING

Laboratory testing of selected soil samples obtained from the test borings was performed at the Caltrans Geotechnical Laboratory in Sacramento, California. The purpose of the testing was to verify the field visual classifications and obtain information for subsequent engineering evaluations.

Tests performed included the following:

- Natural moisture content (ASTM D2216) and unit weight (ASTM D2937)
- Mechanical analyses (ASTM D422)
- Atterberg Limits tests (ASTM D4318)
- Unconsolidated Undrained (UU) Triaxial Tests

FAULTING AND SEISMICITY

The nearest fault is the Prairie Creek-Spenceville-Dentman fault, located approximately 15 miles east of the site. The Prairie Creek-Spenceville-Dentman fault is a normal fault capable of generating earthquakes with a maximum credible earthquake (MCE) magnitude of 6.5. Based on Caltrans Seismic Hazard Map and Report (CSHM, Mualchin, 1996 with errata dated November 2004), the site is located between 0.1g and 0.2g Peak Bedrock Acceleration (PBA) contours. We recommend PBA value of 0.2g and corresponding Peak Ground Acceleration (PGA) of 0.28g for the analysis and design of the proposed Longview Drive Tieback Wall. The PGA is estimated based on site soil class D. The fault and PBA map is shown on Plate 4.

The tieback wall site does not lie within an Alquist-Priolo Special Studies Zone (CDMG, 1997). No active faults are mapped crossing the project site nor do any fault project towards the site. Therefore, the possibility of primary surface rupture or deformation at the site is considered low.

Seismically Induced Ground Failure

Based on the results of subsurface investigation program, the subsurface soils encountered in the test borings within the retained height of the tieback wall consisted of fill of sandy lean clay, sand silt and silty sand. The N-values from the borings indicate a very stiff to hard or medium dense soil condition to the maximum explored elevation of 19.0 feet. Based on available groundwater information from the existing LOTBs, the groundwater level is approximately 40 feet below the bottom of the proposed excavation. The potential for liquefaction is considered to be negligible.

Lateral spreading is a potential hazard commonly associated with liquefaction where extensional ground displacement and settlement occur as a response to lateral migration of subsurface liquefiable material. This condition typically occurs adjacent to free faces such as slopes and creek channels. Because of the negligible potential for liquefaction at the site, the potential for lateral spreading is also considered negligible.

AS-BUILT FOUNDATION INFORMATION

The following foundation reports and as-built plans were reviewed:

- State of California Department of Public Works Division of Highways, As-built plans for Longview Drive Overcrossing, Contract No. 03-082734, Document No. 30000962, dated June 8, 1970.

- State of California Department of Transportation, Planning Study for Longview Drive OC. Retaining Wall (Bridge No. 24-0283), dated October 16, 2006.
- California Department of Transportation Division of Structure Maintenance and Investigations for Longview Drive OC. dated February, 07,2007

FOUNDATION RECOMMENDATIONS

General

The Structures Design Branch have selected a tieback retaining wall system to retain the cut section in front of Abutment No. 4 of the Longview Drive Overcrossing (Bridge No.24-0283).

Soil Parameters

Based on the results of subsurface investigation and laboratory testing programs, we recommend the following soil parameters be used for the design of the tieback wall:

Table 3: Generalized Soil Parameters-
Longview Drive Overcrossing Tieback Wall
(Bridge No.24-0283)

Soil Type	Approximate Elevations (ft)	Total Unit Weight (pcf)	Drained Angle of Internal Friction (ϕ)	Undrained Shear Strength, S_U (psf)
Fill: Silty Sand, Sandy Silt, Sandy Lean Clay, Clayey Sand	El. 70.5 (approx.at the top of the bridge) to El. 55.5	115	34	N/A
Predominantly stiff Silt, Lean Clay	55.5– 51.5	125	N/A	1500
Predominantly Silt, Sand, Sandy Silt, Poorly Graded Sand	51.5-30.5	125	34	N/A

In accordance with the Caltrans Bridge Design Specifications (BDS) (April 2000), the permanent anchored walls in stiff to hard soils should be designed with P_{TOTAL}

(total lateral load applied to the wall), based on drained friction angle of the cohesive soils and the lateral earth pressure distributions should be based on Article 5.5.5.7.1 of BDS.

Tieback Length/Inclination

We recommend the unbonded free length for tieback anchors be at least 15 feet. The encased free length should extend a minimum of 5 feet beyond the existing piles of the abutments. Drilling to install the tieback below the footprint of existing bridge abutment should be cased minimum of 5 feet beyond the abutment footprint to prevent ground loss underneath the existing footing.

A 15 degree inclination with the horizontal is typical for tieback anchor installation. However, the presence of CIDH piles at Abutment 4 should be considered in selecting the tieback angle of inclination and locations. Caltrans Right of Way (ROW) limits near the project site should be considered in designing the tiebacks.

Lateral Earth Pressures

We recommend using a Coulomb's active earth pressure coefficient of 0.61 (with a wall friction angle equal to zero and a backslope gradient of 1.5H:1V which corresponds to and angle of 33.69^0 from the horizontal). We recommend using an equivalent fluid pressure of 73 pcf for the development of the lateral earth pressure diagram for the tieback wall. Caltrans BDS Section 5.5.5.7 can be used for the distribution of the lateral earth pressures behind the wall.

Surcharge pressures due to dead loads (abutment, etc.) or live loads should be included in the lateral earth pressures, if applicable.

Vertical Support

In accordance with the Caltrans BDS Section 5.2.1.3, only minimal embedment of the wall may be required (where soldier piles are not used) where competent and stable foundation material is located at the base of the wall face. We recommend an allowable bearing capacity of 3,000 psf for the wall face. The recommended bearing pressure is based on a minimum embedment of 1.5 feet of the wall face (shotcrete) and assuming that the pavement box and concrete barrier would prevent any loss of passive resistance in the long term. The allowable bearing pressure may be increased with deeper embedment by an additional value of 1,400 psf per foot of embedment (above the ground water level). The coefficient of friction between the wall and shotcrete is provided for a temporary support condition only. We recommend using a coefficient of friction of 0.36 (assuming friction between wall and shotcrete $\delta=2/3\phi$) for temporary support of shotcrete panels. If composite drainage panels are provided behind the shotcrete, the friction between the shotcrete and soil should be neglected.

Drainage

The recommended lateral earth pressures assume that drainage is provided behind the walls to prevent the accumulation of hydrostatic pressures. Proper drainage should be designed behind the walls to allow drained conditions in the retained soils. Otherwise the walls should be designed to resist hydrostatic pressures.

CONSTRUCTION CONSIDERATIONS

- During excavation, erosion and surficial sloughing may occur. Excavations during the wet season may require erosion protection.
- Vertical cut sections should not be deeper than 5 feet without shoring or installing, tensioning, and testing of tiebacks. Excavations should be performed in accordance with Section 19-3 of Caltrans Standard Specifications and Standard Plan A62B. All trenches and excavations should be excavated in accordance with Cal/OSHA safety requirements.
- The maximum allowable level of excavation below each tieback level without installing and testing tiebacks should not be more than 1 foot since over excavation will result in overstressing of preceding tiebacks or undue settlement.
- Each tieback anchor should be proof tested after installation and adequate grout setup. Due to presence of clay soil, a creep test should be performed on a minimum of one tieback anchor per each row of tiebacks. In accordance with Caltrans Memo to the Designers 5-12, the test load for each tieback should be 1.5 times the design load for permanent earth retaining structures. We recommend a lock off load subsequent to successful testing of 1.0 times the design load to restrict movement of the tieback wall.
- The tiebacks should be installed at the center of the space between existing abutment piles. A maximum tolerance of 6 inches in the lateral direction should be allowed for deviating the tieback from the center of the space between piles.
- The subgrade should be prepared in accordance with Caltrans Standard Specifications (1999) Section 19-3. Over-excavation may be required if loose or unsuitable soils are encountered at the subgrade elevations.

- The Contractor should research utility locations and take necessary precautions to protect-in-place or relocate utilities as applicable, prior to excavation.

- Ponding of water adjacent to the structure should be avoided. During and after construction, positive drainage should be provided to direct surface water away from structures and all excavations toward suitable, nonerosive drainage devices. Drainage should be collected by perforated pipes and directed to a sump, storm drain, weep hole(s), or other suitable location for disposal.

- The vertical clearance of the tiebacks from the existing abutment should be considered during the design of the anchors.

LIMITATIONS

The recommendations presented in this document are for the design and construction of the proposed Tieback Wall TBW-A (Bridge No.24-0283) along eastbound Interstate 80 in Sacramento County, California, as described in the text of this report.

Soil and groundwater conditions were observed and interpreted at the exploration locations only. Conditions may vary between the exploration locations and seasonal fluctuations in the groundwater level may occur due to variations in rainfall and local groundwater management practice. If conditions encountered during construction differ from those described herein, our recommendations may be subject to modification.

The findings, conclusions, and recommendations were prepared in accordance with generally accepted geotechnical engineering practice. No warranties, expressed or implied, are made.

This document is intended for use by Caltrans, within a reasonable time from its issuance. This document is not designed as a specification.

The scope of our geotechnical services did not include any environmental site assessment for the presence or absence of hazardous/toxic materials in the soil, surface water, groundwater, or atmosphere, or the presence of wetlands.

Our evaluations of subsurface conditions at the site have considered subsurface soil and groundwater conditions present at the time of our investigation. The influence(s) of post-construction changes to these conditions may influence future performance of the proposed project.

REFERENCE

Helley, E.J., (1985) "Geologic Map of the Late Cenozic Deposits of the Sacramento Valley and Northern Sierran Foothills, California", U.S. Geological Survey Miscellaneous Field Studies Map MF-1790.

ATTACHMENTS:

Plate 1 Site Location Map

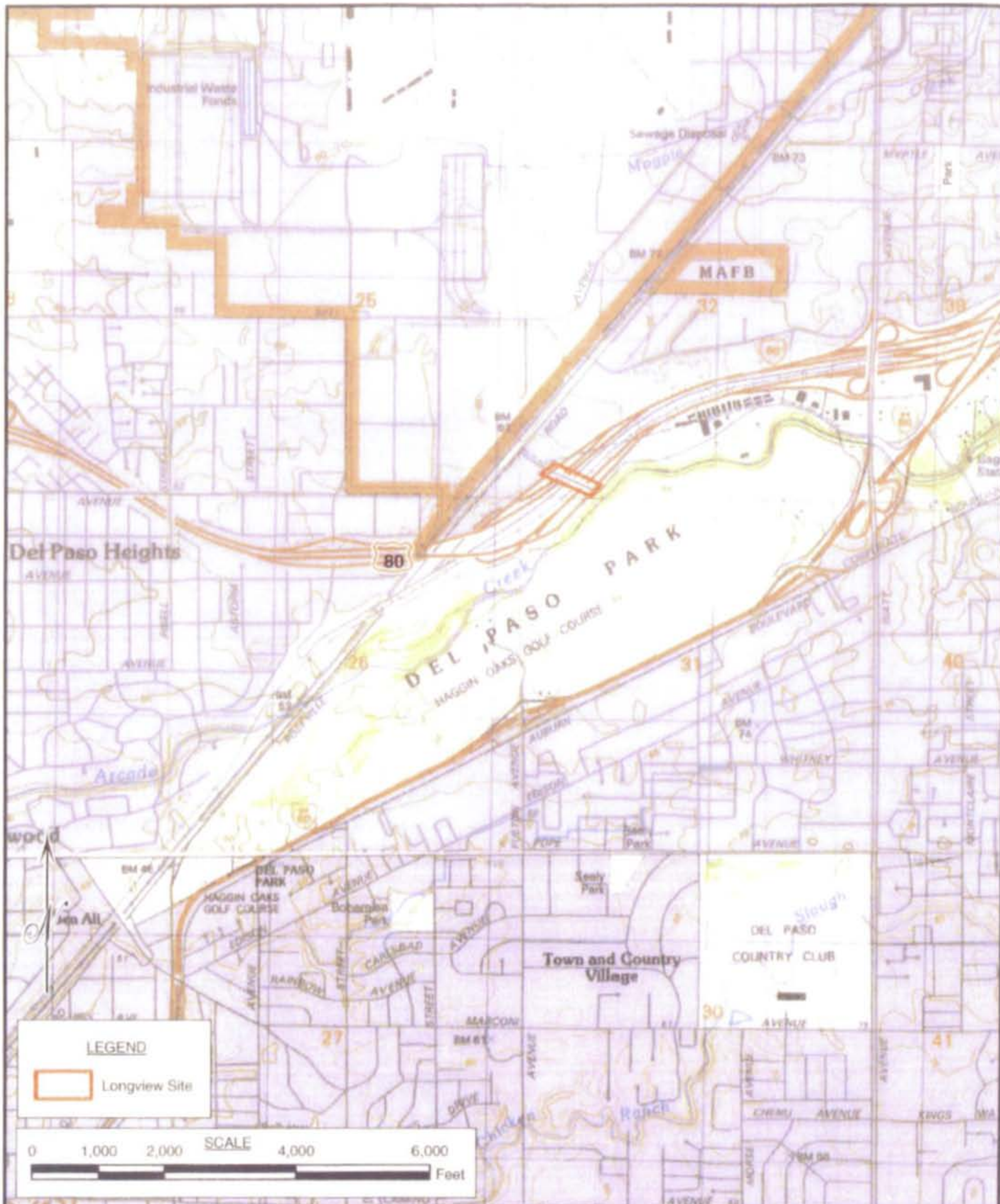
Plate 2 Site Photographs

Plate 3 Geologic Map

Plate 4 Fault and PBA Map

Plate 5 Boring Location Map

PLATES



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SITE LOCATION MAP

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
LONGVIEW DRIVE OC RETAINING WALL
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Plate 1

Graphic By: D. Anderson	9/13/07	Project Number: 84591	File Name: Hwy80 Longview Site

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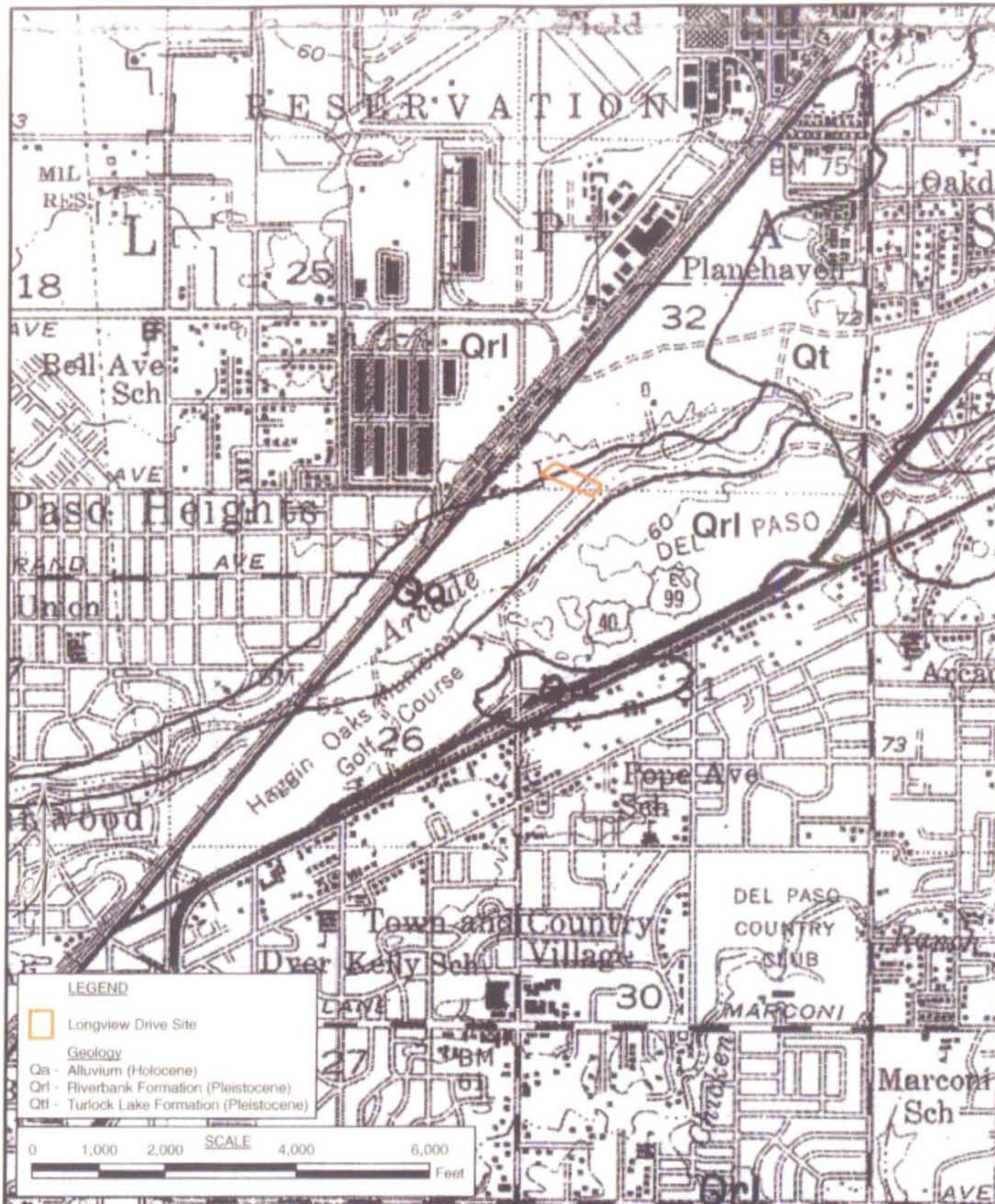
SITE PHOTOGRAPHS

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
LONGVIEW DRIVE OC RETAINING WALL
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Plate 2

Graphic By: D. Anderson	12/05/07	Project Number: 84591	File Name: 84591fto.fh11



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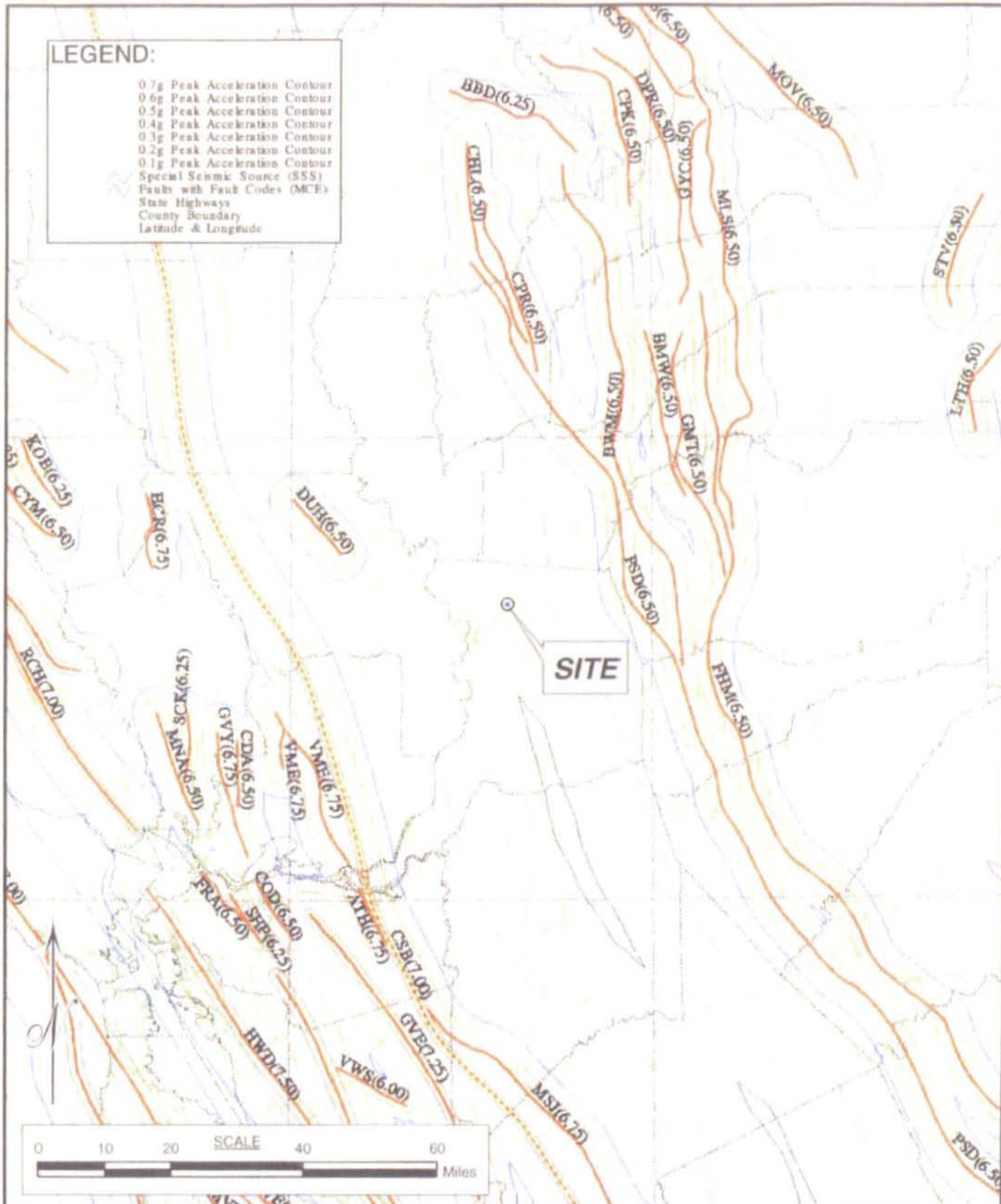
GEOLOGIC MAP

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
LONGVIEW DRIVE OC RETAINING WALL
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Plate 3

Graphic By: D. Anderson | 9/13/07 | Project Number: 84591 | File Name: Hwy80 Longview Geo



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Graphic By: D. Anderson 9/13/07

FAULT AND PBA MAP

THE SACRAMENTO ROUTE 80 HOV WIDENING PROJECT
LONGVIEW DRIVE OC RETAINING WALL
EA-03-379701
SACRAMENTO COUNTY, CALIFORNIA

Project Number: 84591 | File Name: Hwy80 Longview Seismic

Plate 4

CURVE DATA

NO.	R	Δ	T	L
9	4500.00'	42°10'17"	1735.11'	3312.11'
16	3906.92'	33°53'39"	1190.52'	2311.19'
17	4093.80'	33°13'53"	1221.62'	2374.37'
18	4500.00'	6°09'00"	241.74'	483.07'
19	1800.00'	5°50'34"	91.88'	183.59'
20	4175.00'	4°07'01"	150.07'	300.00'

KLEINFELDER		BORING LOCATION MAP	PLATE
Drawn By: D. ROSS	Date: 12/05/2007	SACRAMENTO ROUTE 80 HOV WIDENING PROJECT LONGVIEW DRIVE OC RETAINING WALL EA-03-379701 SACRAMENTO COUNTY, CALIFORNIA	5
Project No.: 84591	Filename: 84591_2a		

Memorandum

Flex your power!
Be energy efficient!

To: MR. JEFF SIMS
BRANCH CHIEF
Division of Engineering Services
Structural Design-Mail Station 9
Office of Bridge Design North

Date: September 15, 2008

File: 03-SAC-80- PM M8.67
Winters Street UC (WIDEN)
Br. No. 24-0205
EA#03-379701

Attn: Eric Watson

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report

Introduction

Per your request dated April 4, 2007, the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation Report for the proposed median widening of Winters Street UC (Br. No. 24-0205) located on Interstate 80 at PM 8.67, in Sacramento County, California, in the City of Sacramento. The bridge site is plotted on the Location Map (Figure 1).

The following foundation recommendations are based on the subsurface information gathered during a recent subsurface investigation (July 2007 through September 2007) along with a review of the previous foundation reports, As-Built records, Log of Test Borings (LOTB) for the existing bridge and the revised loads received from the Office of Bridge Design North on July 3, 2008. With regards to the current foundation recommendations given in this report, elevations are based on NGVD 29 vertical datum and horizontal coordinates are based on NAD83 horizontal datum, unless otherwise noted.

Project Description

The existing Winters Street Undercrossing (Br. No. 24-0205R/L) consists of a right and left structure. Both structures were built in 1970 and consist of a six lane divided highway, three lanes westbound and three lanes eastbound. The existing right and left structures are 146.0 feet in length and 53.0 feet in width. The existing structures are prestressed concrete box girder single spans with reinforced concrete open-end diaphragm abutments with wingwalls supported on concrete Cast-In-Drilled-Hole (CIDH) piles.

The new proposed widening structure will consist of a prestressed box girder single span supported on CIDH piles. The new proposed median widening structure will be a separate structure that is 42.0 feet in width. The new proposed median widening structure will be integrated into the right and left structures by closure pours, giving the overall structure a total width of 148.0 feet.

Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Sacramento Valley of the Great Valley geomorphic province. California's Great Valley is a long flat valley, smoothed out between the rugged mountains of the Coast Ranges and the Sierra Nevada. The Great Valley, also known as the Central Valley, is approximately 404 miles long and averages approximately 49.7 miles in width. Most of the surface of the Great Valley is covered by Recent and Pleistocene alluvium. Sediments eroded from the Sierra Nevada and the Coast Ranges (to a lesser extent), are deposited on the floodplains and bottomlands as the mountain streams greatly decrease their velocity in the long flat valley. Rising dramatically from the relatively flat floor of the Sacramento Valley, the Sutter Buttes are the major topographic feature of the otherwise nearly flat Great Valley (Harden, 1998).

Based on the "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," prepared by Helley, E. J. and Harwood, D.S. 1985 (United States Geological Survey Miscellaneous Field Studies Map MF-1790) indicates the area consists of three geologic units. The three units mapped are Quaternary Alluvium (Qa), Quaternary Basin Deposits (Qb) and the Lower Member of the Quaternary Riverbank Formation (Qrl) (Figure 2).

Helley and Harwood describe the Quaternary Alluvium (Qa) deposits as Holocene age (approximately 11,000 years ago to present) as unweathered gravel, sand and silt deposited by present day stream and river systems. The thickness of the deposits varies from a few inches to 30 feet. The Quaternary Basin Deposits (Qb) are Holocene age and consist of fine-grained silt and clay derived from the same sources as modern alluvium. The thickness of the deposits varies from approximately 3 to 6 feet along the valley perimeter to as much as 200 feet in the center of the valley. The Quaternary Riverbank Formation (Qrl) is described as red semiconsolidated gravel, sand and silt. Helley and Harwood date the age of the Riverbank Formation between 130,000 and 140,000 years old.

Field Investigation and Subsurface Conditions

The Office of Geotechnical Design-North conducted a subsurface investigation in July 2007.

The 2007 subsurface investigation consisted of two mud rotary borings (Nos. B-1-07 and B-2-07). The mud rotary borings were advanced using a self-casing wireline drilling method extending down to a maximum depth of 102.5 ft, an approximate elevation of –21.2 ft. The equipment used to drill the borings consisted of an Acker drill rig equipped with an automatic hammer. Sampling was achieved by utilizing the Standard Penetration Test (SPT) sampler at 5.0 foot intervals. Selected soil samples were bagged for laboratory testing. The 2007 subsurface investigation revealed that the materials encountered near the existing abutment locations are generally separated into fill material overlying alluvium, basin deposits and/or soil interpreted as the Riverbank Formation. Both Borings B-1-07 and B-2-07 appeared to terminate in the Riverbank Formation as indicated by the weakly to moderately cemented nature of the soil.

Near the existing Abutment 1 location, approximately 26.0 ft of fill material was encountered in Boring B-2-07. The fill material consisted of medium dense silty and clayey sand with gravel. Included in the fill material were hard cobbles of sandstone, at approximate elevation 67.8 ft and a two-inch layer of asphalt concrete, from an approximate elevation of 74.0 ft to 73.8 ft. Below the fill material was medium dense to very dense interbedded layers of silt, silty sand and poorly graded sand. Some of the layers were weakly to moderately cemented. The maximum depth explored was 102.5 ft, an approximate elevation of –21.2 ft.

Near the existing Abutment 2 location, approximately 28.3 ft of fill material was encountered in Boring B-1-07. The fill material consisted of medium dense silty and clayey sand with gravel. Included in the fill material at an approximate elevation of 57.7 ft to 59.7 ft was a layer (approx. 1.5 ft thick) of hard concrete. Below the fill material was medium dense to very dense interbedded layers of silt, silty sand and poorly graded sand. Some of the layers were weakly to moderately cemented. The maximum depth explored was 102.5 ft, an approximate elevation of –17.3 ft.

In addition to the latest 2007 subsurface investigation, the As-Built Log of Test Boring (LOTB) for Winters Street UC (Br. No. 24-0205) was used in the Foundation Report. According to the As-Built LOTB plan, the subsurface investigation was completed for the structure in May 1963. The investigation included one rotary sample boring (2.5 inch diameter) and two cone penetrometers (2.25 inch). The material encountered during the 1963 subsurface investigation consisted of dense to very dense interbedded layers of silt, silty sand and sand. According to the As-Built information, this material was interpreted as the Victor Formation. In 1981, Marchand and Allwardt proposed the Victor Formation name to be abandoned and divided into different units: Turlock Lake, Riverbank, and Modesto Formations. Their recommendations have been followed by most later workers (see Marchand and Allwardt 1978, Bartow and Marchand 1979 and Helley and Harwood 1985) and are followed in the report. The Riverbank Formation is the mapped unit in the project area.

The elevations shown on the As-Built Log of Test Borings are based on the NGVD 1929 vertical datum.

For subsurface data and boring locations, please refer to both the Log of Test Borings and the As-Built Log of Test Borings for site-specific information and conditions. These sheets will be forwarded once completed.

The project site is located near the former McClellan Air Force Base, a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. According to the EPA, over 300 identified sites within the former base are contaminated with solvents, metals and other hazardous wastes as the result of aircraft maintenance and other industrial activities at the base. Our Office does not practice hazardous mitigation of the subsurface material, including ground water and therefore does not provide recommendations regarding mitagation. The Contractor should be made aware of the nearby Superfund site and the potiential for hazardous subsurface materials.

Ground Water

During the 2007 subsurface investigation, a slotted pipe was installed for ground water measurements in Boring B-1-07. On September 26, 2007, a measurement for ground water was taken and none was detected. Ground water was not measured in Boring B-2-07 and the boring was immediately backfilled. According to the As-Built LOTB, ground water was not encountered during the 1963 subsurface investigation.

The State Department of Water Resources web site (http://wdl.water.ca.gov) for wells monitoring ground water levels for the Sacramento Valley (Sacramento County) was reviewed. According to a nearby well (No. 09N05E14B001M), ground water levels varied between elevations –35.8 ft and –47.0 ft from 1997 to 2007.

The project site is near the former McClellan Air Force Base (AFB), a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. Part of the mitigation process includes drawing down the ground water with extraction wells. The extraction wells currently under operation in the nearby former McClellan AFB may also have an influence on the nearby and future ground water levels. Depending on time of construction, the ground water levels may be higher.

Ground water elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction. For more details, please refer to the LOTB and As-Built LOTB sheets.

Scour Evaluation

There is no scour potential at the site, since the bridge does not span any water channels.

Corrosion Evaluation

Composite soil samples were collected from Borings B-1-07 and B-2-07 during the 2007 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite samples for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 550 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not included to define a corrosive site. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed.

The results of the laboratory tests determined that the composite samples were considered to be non-corrosive at this site. Refer to Table 1 below for specific test results.

Table 1: Corrosion Test Summary-Composite Samples for Winters Street UC (Br. No. 24-0205).

SIC Corrosion Number	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Sulfate Content (PPM)	Chloride Content (PPM)
C640234	B-1-07	21.0-24.5	7.13	3193	N/A	N/A
C640235	B-1-07	51.0-57.5	6.89	3297	N/A	N/A
C640236	B-1-07	66.0-72.5	6.90	6188	N/A	N/A
C640237	B-2-07	0.0-6.0	7.15	3784	N/A	N/A
C640238	B-2-07	16.0-22.5	7.47	3353	N/A	N/A
C640239	B-2-07	71.0-77.5	6.98	6728	N/A	N/A

Laboratory Testing

Laboratory testing was performed on selected samples of the subsurface materials obtained from the 2007 subsurface investigation. Tests were performed to determine the corrosion and engineering properties of the subsurface materials for use in the foundation analysis. The tests performed included: mechanical analysis (sieve and hydrometer), Atterberg limits (liquid limit, plastic limit and plasticity index), and soil corrosion (pH, sulfate, chloride, and resistivity). All tests were performed in general accordance with American Society for Testing and Materials (ASTM) standards or California Test Methods (CTM). Laboratory test results will be available upon request.

Seismic Data and Evaluation

The project site is not located within any Alquist-Priolo Earthquake Fault Zones (EFZs) as established by the California Geological Survey. No active faults are known to cross the project site. Therefore, the potential for ground rupture hazard due to fault movement is considered low since no known fault crosses the project site. Based on the Department of Transportation (Caltrans) 1996 Seismic Hazard Map, the controlling fault for the site is the Prairie Creek-Spenceville-Dentman (PSD), a normal fault. The PSD fault is located approximately 19 miles east of the site and is capable of generating a Maximum Credible Earthquake (MCE) moment magnitude of M_w=6.5. The 1996 Seismic Hazard Map shows that the PBA for this site is between the contour lines of 0.1g and 0.2g. Therefore, the estimated Peak Horizontal Bedrock Acceleration (PHBA) at the site is recommended to be about 0.2g. Liquefaction potential at this site is considered to be insignificant.

Based on the 2007 and 1963 subsurface investigations for the bridge, the soil profile at the site may be classified as Type D, as defined in the Department's Seismic Design Criteria (SDC, 2006, Version 1.4). The recommended design Acceleration Response Spectrum (ARS) curve shown in Figure 3 was obtained from Figure B.7 of the SDC. According to the guidelines presented in Section 6.1.2.1 of the Seismic Design Criteria, for structures that are within 10 miles

(15 km) of a fault, the ARS curve needs to be magnified. Since the distance to the fault is more than 10 miles, no modification to the ARS curve is needed.

As-Built Foundation Information

The As-Built records for the existing Winters Street Undercrossing (Br. No. 24-0205) indicate that the bridge foundations consist of 16 inch diameter Cast-In-Drilled-Hole (CIDH) with a design load of 90 kips at all support locations. The As-Built average pile tip elevations for the existing right and left structures are listed below in Tables 2 and 3.

Table 2. "As-Built" 16 inch diameter CIDH Piles with 90 kip Design Load for the Winters Street Undercrossing (Br. No. 24-0205R)-Right Bridge.

Location	"As-Built" Specified Pile Tip Elevation (ft)	"As-Built" Average Pile Tip Elevation (ft)
Abutment 1	45.0	43.7
Abutment 2	45.0	44.1

Note:

1. As-Built Elevations shown above are based on the NGVD29 vertical datum.
2. The Specified Pile Tip Elevations were obtained from the Amended Foundation Memo (dated November 18, 1966) for the Winters Street Undercrossing (Br. No. 24-0205R/L).
3. The "As-Built" Average Pile Tip Elevations were obtained from the Pile Quantity and Driving Records for the Winters Street Undercrossing (Br. No. 24-0205R/L) dated November 18, 1968.

Table 2. "As-Built" 16 inch diameter CIDH Piles with 90 kip Design Load for the Winters Street Undercrossing (Br. No. 24-0205R/L)-Left Bridge.

Location	"As-Built" Specified Pile Tip Elevation (ft)	"As-Built" Average Pile Tip Elevation (ft)
Abutment 1	45.0	43.8
Abutment 2	45.0	43.4

Note:

1. As-Built Elevations shown above are based on the NGVD29 vertical datum.
2. The Specified Pile Tip Elevations were obtained from the Amended Foundation Memo (dated November 18, 1966) for the Winters Street Undercrossing (Br. No. 24-0205R/L).
3. The "As-Built" Average Pile Tip Elevations were obtained from the Pile Quantity and Driving Records for the Winters Street Undercrossing (Br. No. 24-0205R/L) dated November 18, 1968.

According to the original Foundation Recommendations Report for the existing Winters Street UC (Br. No. 24-0205R/L) dated October 9, 1963, spread footings were recommended at all support locations of the structure. At the abutments, spread footings were to be designed for a soil pressure of 4.0 tsf and placed at or below elevation 53.0 ft. At the bents, spread footings were to be designed for a soil pressure of 5.0 tsf placed at or below elevation 35.0 ft. The foundations were amended later in a foundation report dated November 18, 1966. The CIDH piles listed in Table 2 were recommended in place of the spread footings.

Foundation Recommendations

The following foundation recommendations are for the new proposed median widening of the Winters Street Undercrossing (Br. No. 24-0205). At all support locations, 16 inch diameter Cast-In-Drilled-Hole (CIDH) piles are recommended for support. The specified tip elevations are shown below in Table 4.

The computer program SHAFT v5.0 was used to estimate the axial load capacity and settlement of the drilled shafts. The SHAFT program follows the guidelines of FHWA publication IF-99-025 (1999).

The proposed pile tip elevations were based on the cut-off elevation and factored loads provided by the Office of Bridge Design North dated July 3, 2008.

Table 4. Abutment Foundations Design Recommendations for the proposed widening of Winters Street Undercrossing (Br. No. 24-0205).

Abutment Foundations Design Recommendations (Br. No. 24-0205)									
Support Location	Pile Type	Cut-off Elevation (ft)	LRFD Service-1 Limit State Load (kips) per Support		LRFD Service-1 Limit State Total Load (kips) per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	16" CIDH	66.8	1758	1300	140	280	27.0(a)	27.0	N/A
Abut 2	16" CIDH	68.2	1758	1300	140	280	29.0(a)	29.0	N/A

Notes:

1) *Design tip elevations are controlled by: (a) Compression.*
2) *There is no design tip elevation for Settlement.*
3) *The Design tip elevations for Lateral Load will be provided by Design.*

Table 5. Pile Data Table for the proposed widening of Winters Street Undercrossing (Br. No. 24-0205).

PILE DATA TABLE (BR. No. 24-0505)						
Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	16" CIDH	280	0	27.0(a-1)	27.0	N/A
Abut 2	16" CIDH	280	0	29.0(a-1)	29.0	N/A

Notes:

1) *Design pile tip elevations are controlled by: (a) Compression.*
2) *There is no design tip elevation for Settlement.*

General Notes to Designer

1. All support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to the foundation review.

2. If lateral demands exist on the support piles, the structural design engineer shall indicate on the plans, in the pile data table, the design pile tip elevations required to meet the lateral load demands. If the specified pile tip elevations given in the above pile data table are not adequate for lateral load demands; the Office of Geotechnical Design-North, Branch A shall be contacted for further recommendations.

Construction Considerations

1. Cast-In-Drilled-Hole (CIDH) concrete piles shall be installed in accordance with the State of California, Department of Transportation, Standard Specifications and Special Provisions.

2. Caving conditions in the fill material and upper native material may be encountered during CIDH pile construction. Temporary casing may be required to control caving during construction (refer to the Standard Specifications Section 49-4 and all applicable sections). If temporary casing is used, it must be removed during pile construction.

3. Difficult drilling may be encountered during foundation installation due to the presence of concrete rubble in the fill material and hard cobbles in the soil layers. In Boring B-2-07 (near Abutment 1), a layer of hard asphalt concrete (AC) was encountered in the fill material from an approximate elevation of 74.8 ft. to 73.8 ft. In Boring B-2-07 (near Abutment 1), hard cobbles of sandstone were encountered in the fill material at an approximate elevation 67.8 ft. In Boring B-1-07 (near Abutment 2), a layer of hard concrete was encountered in the fill material from an approximate elevation of 59.7 ft. to 57.7 ft. The Contractor should anticipate encountering cobbles and having to remove, drill through or break up concrete in and near the contact of the fill material during construction of the CIDH piles.

4. Ground water was not encountered during the 2007 or the 1963 subsurface investigations. Dry, open hole construction techniques may be employed in the construction of the CIDH piles. Ground water surface elevation is subject to seasonal fluctuations that may occur higher or lower than indicated on the Log of Test Boring Sheets (LOTB) depending on the conditions and time of construction. Refer to the Log of Test Boring Sheets for details.

5. The extraction wells currently under operation in the nearby McClellan Air Force Base may have an influence of the current ground water levels. Depending on time of construction, the ground water levels may be higher.

6. The calculated geotechnical capacity of the CIDH piles is based upon skin friction only. No end bearing was considered.

7. CIDH piling excavation shall not be left open any longer than necessary for placement of rebar cage and concrete. Concrete pour for construction shall be done immediately after pile has reached specified pile tip elevation.

The recommendations contained in this report are based on specific project information regarding design loads and structure locations that has been provided by the Office of Bridge Design North (OBDN). If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Jacqueline Martin (916) 227-1051 or Reid Buell (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

Project Information

Standard special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings for Winters Street Undercrossing, Br. No. 24-0205.

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Foundation Report for Winters Street Undercrossing, Bridge No. 24-0205, dated September 15, 2008.

Report by:

Jacqueline Martin

JACQUELINE MARTIN
Engineering Geologist
Office of Geotechnical Design-North

Supervised by:

Reid Buell

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Senior Engineering Geologist
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cc: OGDSN
GS File Room
Reid Buell
R.E. Pending
Structure OE

REFERENCES

Bartow, J.A., and D.E. Marchand, 1979, Preliminary geologic map of Cenozoic deposits of the Clay area, California: U.S. Geological Survey Open-File Report 79-667, (scale 1 to 62,500).

Department of Water Resources (2008). Ground water level data. Available from the Department of Water Resources site, http://wdl.water.ca.gov.

Environmental Protection Agency (2007). McClellan Air Force Base cleanup and Redevelopment. [Data file]. Available from the Environmental Protection Agency site, http://www.epa.gov/region09/waste/sfund/mcclellan/index.html.

Federal Highway Administration (FHWA), Drilled Shafts: Construction Procedures and Design Methods (Pub. No. FHWA IF-99-025) published August 1999.

Harden, Deborah R., 1998, California Geology, Prentice Hall, 252 pp.

Helley, E.J. and Harwood, D.S., 1985, Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California, United States Geological Survey (USGS), Map MF 1790, scale 1:62,500, 1 of 5 sheets.

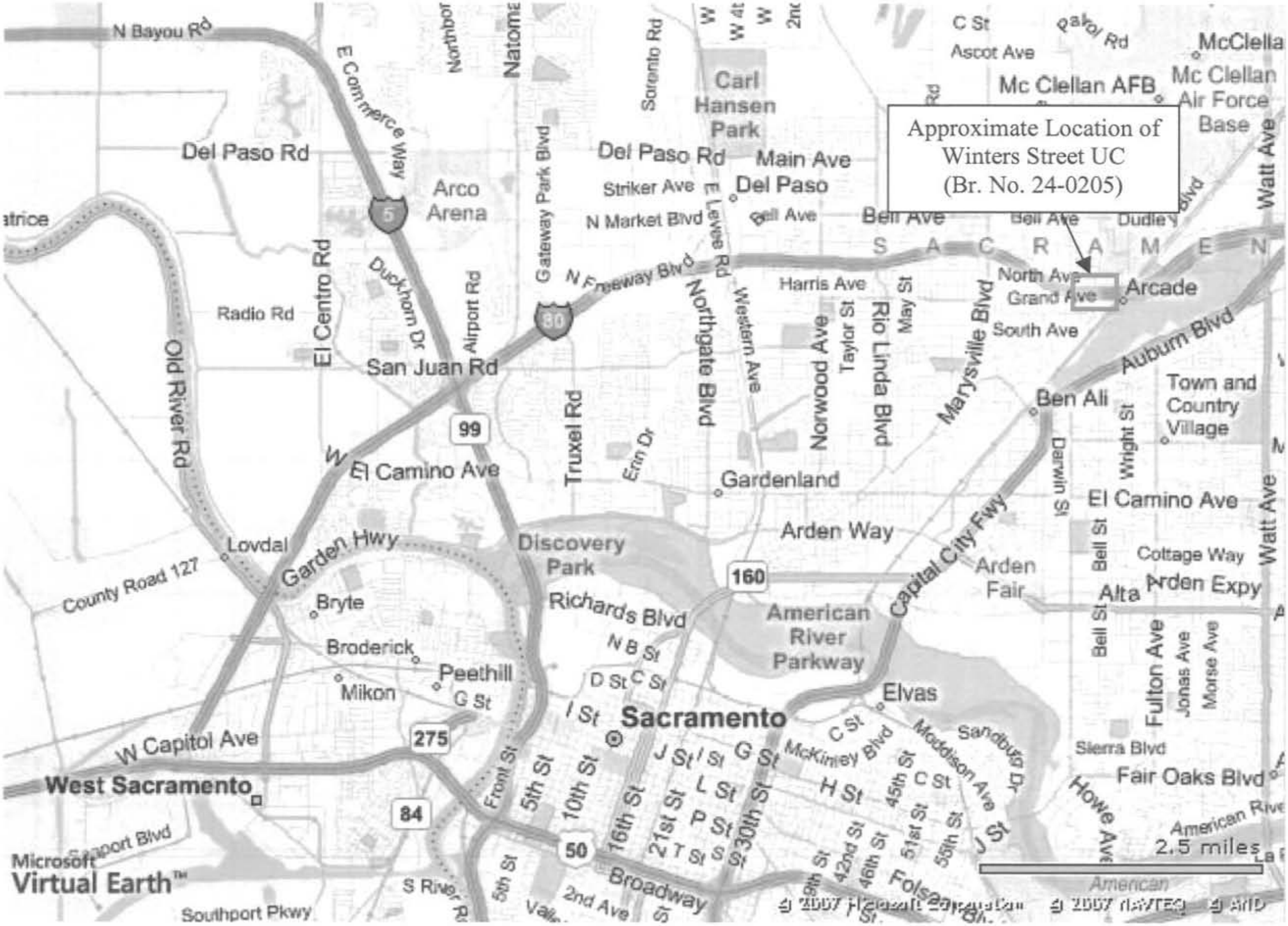
Marchand, D.E. and A. Allwardt, 1978, Preliminary Geologic Map Showing Quaternary Deposits of the Northeastern San Joaquin Valley, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-945, scale 1:125,000.

Marchand, D.E. and A. Allwardt, 1981, Late Cenozoic stratigraphic units, northeastern San Joaquin Valley, California: U.S. Geological Survey Bulletin 1470, 70 p.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

State of California, Department of Transportation (Caltrans):

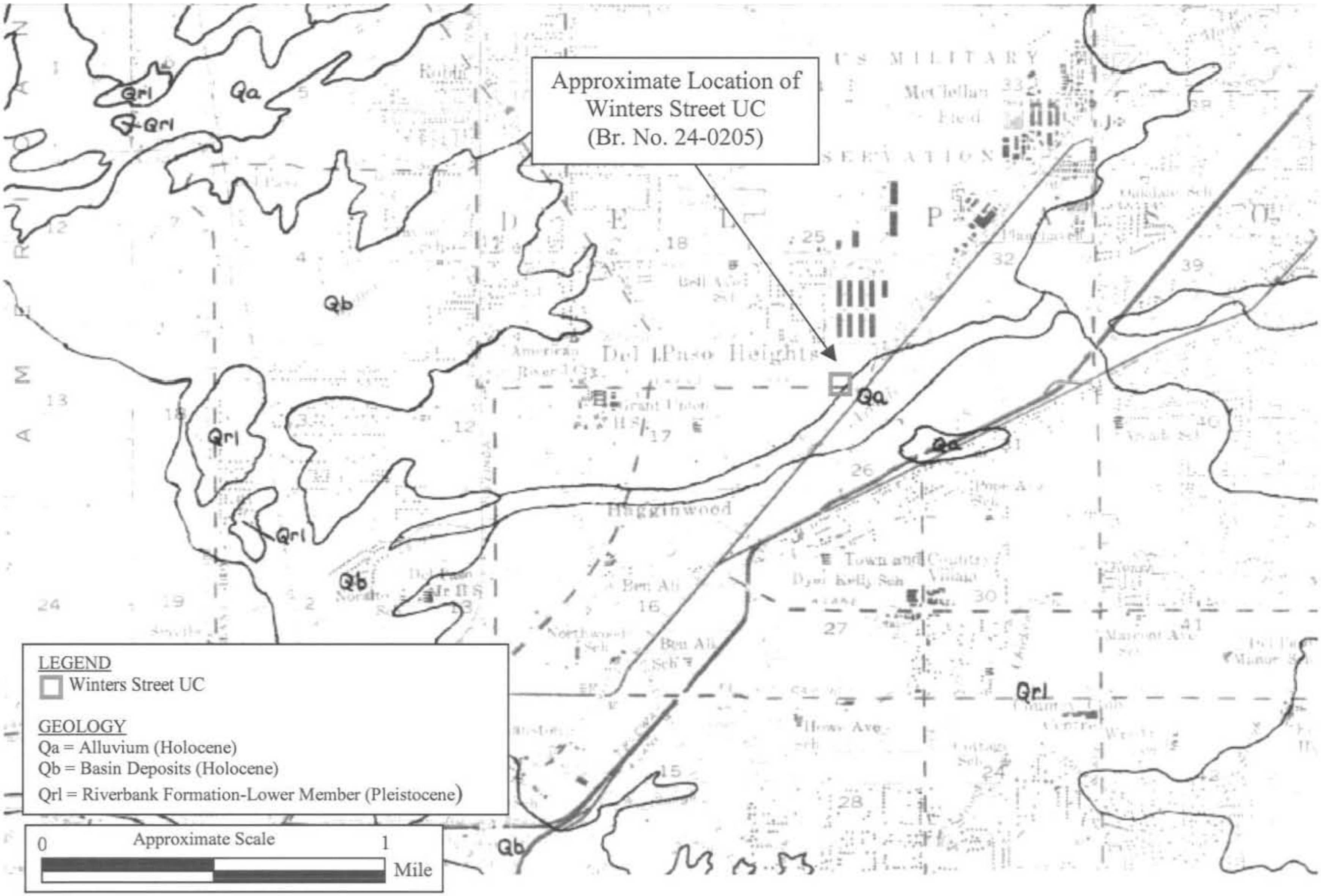
- Standard Plans, May 2006
- Standard Specifications, May 2006
- Bridge Standard Details Sheets, April 2000.
- Memo to Designers, Section 3-1, December 2000.
- CT-Corrosion Guidelines, September 2003, Version 1.0.



Caltrans	**Division of Engineering Services** Geotechnical Services Geotechnical Design – North

EA: 03-379701	Location Map
September 15, 2008	

03-SAC-80 PM M8.67 **Winters Street UC, Br. No. 24-0205**	Figure 1



Caltrans

Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-379701	Geologic Map
September 15, 2008	
03-SAC-80 PM M8.67 Winters Street UC, Br. No. 24-0205	Figure 2

Winters Street UC (Widen)
Br. No. 24-0205
03-379701
September 15, 2008

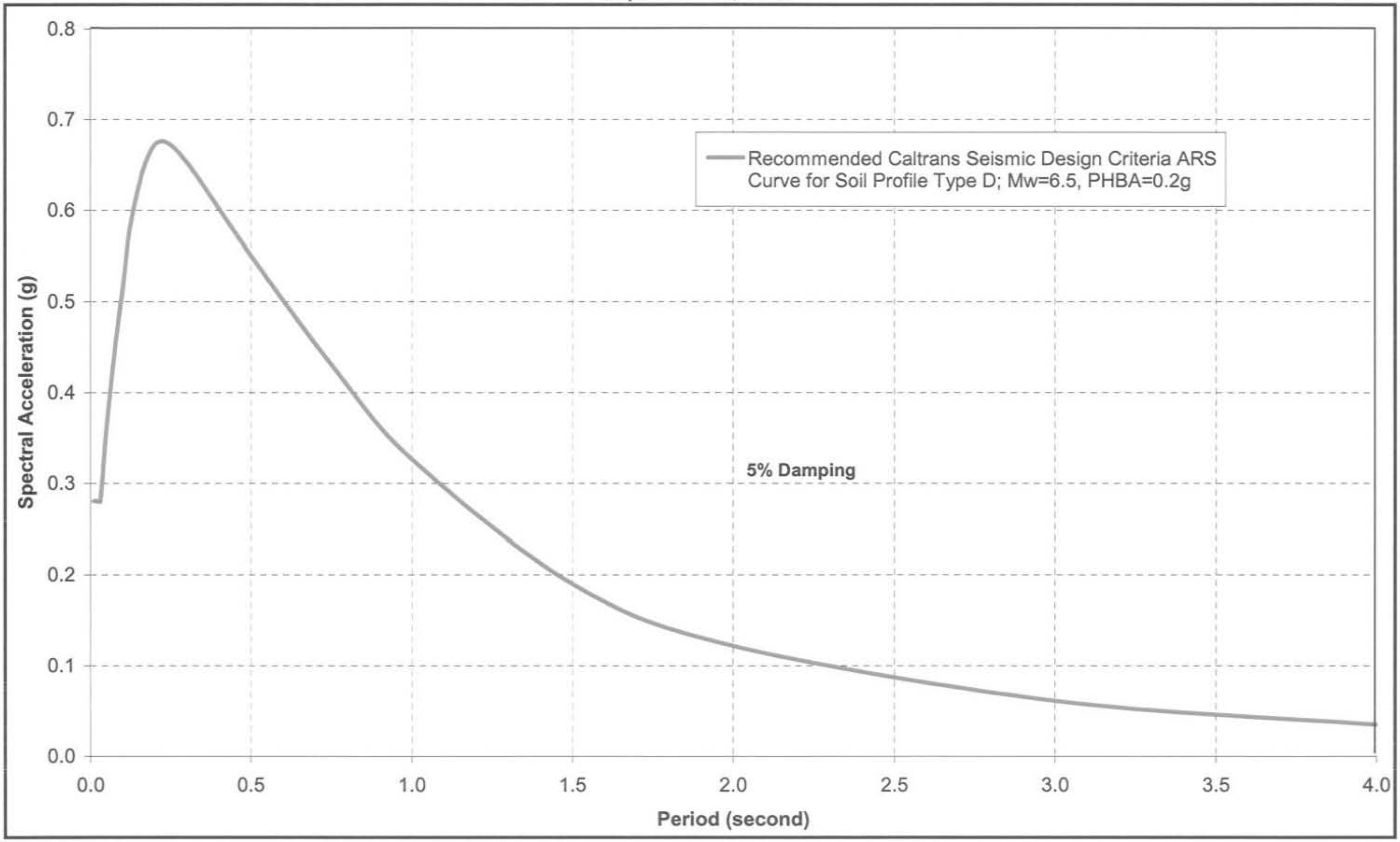


Figure 3. Acceleration Response Spectrum Recommended for Design

Memorandum

To: MR. JEFF SIMS
BRANCH CHIEF
Division of Engineering Services
Structural Design-Mail Station 9
Office of Bridge Design North

Date: September 15, 2008

File: 03-SAC-80- PM M5.21
Natomas East Canal Bridge BOH (WIDEN)
Br. No. 24-0218
EA#03-379701

Attn: Eric Watson

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Foundation Report

Introduction

Per your request dated April 4, 2007, the Office of Geotechnical Design-North (OGD-N), Branch A has prepared the Foundation Report for the proposed median widening of Natomas East Canal Bridge BOH (Br. No. 24-0218) located on Interstate 80 at PM 5.21, in Sacramento County, California, in the City of Sacramento. The bridge site is plotted on the Location Map (Figure 1).

The following foundation recommendations are based on the subsurface information gathered during a recent subsurface investigation (June 2007, July 2007 and September 2007) along with a review of the previous foundation reports, As-Built records, Log of Test Borings (LOTB) for the existing bridge and the revised loads received from the Office of Bridge Design North on July 3, 2008. With regards to the current foundation recommendations given in this report, elevations are based on NGVD 29 vertical datum and horizontal coordinates are based on NAD83 horizontal datum, unless otherwise noted.

Project Description

The existing Natomas East Canal Bridge BOH (Br. No. 24-0218R/L) consists of a right and left structure. Both structures were built in 1970 and consist of a six lane divided highway, three lanes westbound and three lanes eastbound. The existing right and left structures are 785.0 feet in length and a minimum of 53.0 feet in width. The existing structures are continuous reinforced concrete box girder spans (8) with reinforced concrete two column bents and reinforced concrete open-end seat abutments. The existing structures are supported on Raymond Step Taper piles, steel shells filled with concrete. The existing structures span the Natomas East Canal, a levee west of the canal that includes a paved bike path, a levee east of the canal that includes two Western Pacific railroad tracks and maintenance road, and on the dry side of the east levee a pump house with an adjacent concrete lined canal.

The new proposed widening structure will consist of a prestressed box girder single span supported on driven steel "H" piles. The new proposed median widening structure will be a separate structure that is 42.0 feet in width. The new proposed median widening structure will be integrated into the right and left structures by closure pours, giving the overall structure a total width of 148.0 feet.

Site Geology and Subsurface Conditions

Regional Setting and Area Geology

The project site is located within the Sacramento Valley of the Great Valley geomorphic province. California's Great Valley is a long flat valley, smoothed out between the rugged mountains of the Coast Ranges and the Sierra Nevada. The Great Valley, also known as the Central Valley, is approximately 404 miles long and averages approximately 49.7 miles in width. Most of the surface of the Great Valley is covered by Recent and Pleistocene alluvium. Sediments eroded from the Sierra Nevada and the Coast Ranges (to a lesser extent), are deposited on the floodplains and bottomlands as the mountain streams greatly decrease their velocity in the long flat valley. Rising dramatically from the relatively flat floor of the Sacramento Valley, the Sutter Buttes are the major topographic feature of the otherwise nearly flat Great Valley (Harden, 1998).

Based on the "Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California," prepared by Helley, E. J. and Harwood, D.S. 1985 (United States Geological Survey Miscellaneous Field Studies Map MF-1790) indicates the area consists of three geologic units. The three units mapped are Quaternary Alluvium (Qa), Quaternary Basin Deposits (Qb) and the Lower Member of the Quaternary Riverbank Formation (Qrl) (Figure 2).

Helley and Harwood describe the Quaternary Alluvium (Qa) deposits as Holocene age (approximately 11,000 years ago to present) as unweathered gravel, sand and silt deposited by present day stream and river systems. The thickness of the deposits varies from a few inches to 30 feet. The Quaternary Basin Deposits (Qb) are Holocene age and consist of fine-grained silt and clay derived from the same sources as modern alluvium. The thickness of the deposits varies from approximately 3 to 6 feet along the valley perimeter to as much as 200 feet in the center of the valley. The Quaternary Riverbank Formation (Qrl) is described as red semiconsolidated gravel, sand and silt. Helley and Harwood date the age of the Riverbank Formation between 130,000 and 140,000 years old.

Field Investigation and Subsurface Conditions

The Office of Geotechnical Design-North conducted a subsurface investigation in June, July 2007 and September 2007.

The 2007 subsurface investigation consisted of six mud rotary borings (Nos. B-1-07 through B-6-07). The mud rotary borings were advanced using a self-casing wireline drilling method extending down to a maximum depth of 152.5 ft, an approximate elevation of –96.4 ft near the abutments locations. The mud rotary borings were advanced using a self-casing wireline drilling method extending down to a maximum depth of 122.0 ft, an approximate elevation of –102.7 ft near the pier locations. The equipment used to drill Borings B-1-07, B-2-07 and B-3-07 consisted of an Acker drill rig equipped with an automatic hammer. The equipment used to drill Borings B-4-07, B-5-07 and B-6-07 consisted of an all terrain CME 750 drill rig equipped with an automatic hammer. Sampling was achieved by utilizing the Standard Penetration Test (SPT) sampler at 5.0-foot intervals in all borings except B-3-07. Sampling was achieved by utilizing a California Modified Split-Barrel Sampler in boring B-3-07. Selected soil samples were collected and submitted for laboratory testing.

The 2007 subsurface investigation revealed that the materials encountered near the existing abutment locations are generally separated into fill material overlying alluvium, basin deposits and/or soil interpreted as the Riverbank Formation. All Borings except B-3-07 appeared to terminate in the Riverbank Formation as indicated by the slightly to moderately cemented nature of the soil.

Near the existing Abutment 1 location, approximately 40.0 ft of fill material is encountered in Boring B-2-07. The fill material consists of medium dense silty sand with clay and clayey sand with gravel and firm to stiff sandy fat clay and fat clay with sand. Also included in the fill material are organics (rootlets, wood chips) and gypsum nodules and stringers. Below the fill material is medium dense to very dense interbedded layers of silt, silty sand and poorly graded sand. Some of the layers are weakly to moderately cemented. The maximum depth explored is 152.5 ft, an approximate elevation of –96.4 ft.

Near the existing Piers 3, 4 and 5 locations, approximately 17.0 to 20.8 ft of hard to soft sandy fat clay with silt, fat clay with sand, and sandy lean clay and medium dense clayey sand with organics (rootlets, wood chips) and some gypsum nodules and stringers are encountered in Borings B-4-07, B-5-07 and B-6-07. Below the clayey material is medium dense to very dense interbedded layers of silt, silty sand and poorly graded sand. Some of the layers are weakly to moderately cemented. The maximum depth explored is 122.0 ft, an approximate elevation of –102.7 ft.

Near the existing Abutment 9 location, approximately 49.0 ft of fill material is encountered in Boring B-1-07. The fill material consists of medium dense silty sand with gravel, clayey sand and poorly graded sand with clay and stiff sandy fat clay and fat clay with sand with organics (rootlets, weeds) and calcium carbonate/gypsum stringers. Below the fill material is medium dense to very dense interbedded layers of silt, silty sand, and poorly graded sand with minor amounts of stiff sandy lean clay. Some of the layers are weakly to moderately cemented. The maximum depth explored is 152.5 ft, an approximate elevation of –89.3 ft.

In addition to the latest 2007 subsurface investigation, the As-Built Log of Test Boring (LOTB) for Natomas East Canal Bridge and Overhead (Br. No. 24-0218) was used in the Foundation Report. Piers 2,6,7 and 8 were not accessible during the subsurface investigation and the As-Built LOTBs was used to evaluate these locations. According to the As-Built LOTB plan, the subsurface investigation was completed for the structure in May 1964. The investigation included five rotary sample borings (2.5 inch diameter). The material encountered during the 1964 subsurface investigation consisted of predominately dense to very dense interbedded layers of silt, silty sand and sand with some cementation from an approximate elevation of 10.0 ft to the maximum depth explored of approximately 68.0 ft, an elevation of –50.0 ft. The material encountered within the two levees from an approximate elevation of 38.5 ft to 10.0 ft consisted of very soft to stiff clayey silt with sand lenses and gypsum.

The elevations shown on the As-Built Log of Test Borings are based on the NGVD 1929 vertical datum. For subsurface data and boring locations, please refer to both the Log of Test Borings and the As-Built Log of Test Borings for site-specific information and conditions.

The project site is located near the former McClellan Air Force Base, a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. According to the EPA, over 300 identified sites within the former base are contaminated with solvents, metals and other hazardous wastes as the result of aircraft maintenance and other industrial activities at the base. Our Office does not practice hazardous mitigation of the subsurface material, including ground water and therefore does not provide recommendations regarding mitagation. The Contractor should be made aware of the nearby Superfund site and the potiential for hazardous subsurface materials.

Ground Water

During the 2007 subsurface investigation, ground water was measured at an approximate elevation of 13.4 ft in Boring B-5-07 on September 26, 2007 and at an approximate elevation of –6.8 ft in Boring B-5-07 on September 19, 2007. Ground water was not measured in Borings B-1-07, B-3-07, B-4-07, and B-6-07 and the borings were immediately backfilled. According to the As-Built LOTB, ground water was encountered during the 1964 subsurface investigation. Ground water was measured at an approximate elevation of 10.1 ft in Boring B-1 on May 15, 1963, an approximate elevation of 17.5 ft in Boring B-2 on May 15, 1963, an approximate elevation of 9.0 ft in Boring B-3 on May 15, 1963, an approximate elevation of 16.9 ft in Boring B-4 on May 28, 1964, and an approximate elevation of 2.5 ft in Boring B-5 on May 28, 1964.

The State Department of Water Resources web site (http://wdl.water.ca.gov) for wells monitoring ground water levels for the Sacramento Valley (Sacramento County) was reviewed. According to a nearby well (No. 09N05E14B001M), ground water levels varied between elevations –26.6 ft and –46.4 ft from 1997 to 2007.

Piers 2 through 5 are located within the main area of the channel and are the only piers that may be subjected to high surface water levels. Therefore, it is recommended the construction for the widening foundations are performed during the dry season when the channel water surface elevations are low. The subsurface investigation was completed when the channel water surface elevation was low. Ground water elevations are subject to seasonal fluctuations and may occur at higher or lower elevations depending on the conditions at time of construction. For more details, please refer to the LOTB and As-Built LOTB sheets.

The project site is near the former McClellan Air Force Base (AFB), a 3,000 acre facility located in Sacramento. The former McClellan AFB was placed on the Environmental Protection Agency's (EPA) Superfund list in 1987. The Superfund site is currently undergoing mitigation. Part of the mitigation process includes drawing down the ground water with extraction wells. The extraction wells currently under operation in the nearby former McClellan AFB may also have an influence on the nearby and future ground water levels. Depending on time of construction, the ground water levels may be higher.

Scour Evaluation

The Hydrology and Hydraulics Report for the Natomas East Canal Bridge and Overhead (Br. No. 24-0218R/L) dated January 25, 2007 (2007 Final Hydraulics Report) was completed by the Office of Structure Design and Earthquake Engineering, Structure Hydrology and Hydraulics Branch. According to this report, Structure Hydraulics evaluated the scour potential for both structures after a 7/12/01 field inspection. It was determined that both existing structures are "not scour critical" and are coded with an Item 113 Code rating of "5", which indicates, "Bridge foundations determined to be stable for the calculated scour conditions, and that the scour is within the limits of the footing or the piles" (HEC-18, Evaluating Scour At Bridges, Fourth Edition). Included in the 2007 Final Hydraulics Report was a field inspection that determined the lateral channel migration (thalweg) was not likely to occur and the existing thalweg elevation is actually higher than the foundation plan original elevation. The channel was considered to be vertically and laterally stable. The 2007 Final Hydraulics Report concluded there is no significant hydraulic skew, no contraction scour, no migration, no channelbed degradation, and no active streambed mining for the current structures. Due to historical indications, lateral thalweg migration was not assumed in the scour analysis.

Based on the scour analysis and current assumptions included in the 2007 Final Hydraulics Report mentioned above, the estimated maximum local pier scour depths for the new structure foundations are considered to be 4.0 ft at Pier 2 and 6.5 ft at Piers 3, 4, and 5.

According to the Final Hydraulic Report mentioned above, Abutment 1 is located above the estimated maximum water surface and Piers 6, 7, 8 and Abutment 9 are located on the "dry" side of the eastern levee; therefore, they are not subject to water flow during typical high-flow conditions.

For further information including site-specific scour assessment and mitigation measures, the Structure Hydrology and Hydraulics Branch should be contacted.

Corrosion Evaluation

Composite soil samples were collected from Borings B-1-07 through B-6-07 during the 2007 subsurface investigation. The Office of Testing and Technology Services, Corrosive Technology Branch tested the composite samples for corrosive potential. The Corrosion Technology Branch considers a site to be corrosive if one or more of the following conditions exist for the representative soil and/or water samples taken at the site: chloride concentration is 550 ppm or greater, sulfate concentration is 2000 ppm or greater, or the pH is 5.5 or less. The minimum resistivity serves only as an indicator parameter for the possible presence of soluble salts and is not included to define a corrosive site. It is the practice of the Corrosion Technology Branch that if the minimum resistivity of the sample is greater than 1000 ohm-cm, the sample is considered to be non-corrosive and testing to determine the sulfate and chloride content is not performed. The results of the laboratory tests determined that the composite samples were considered to be non-corrosive at this site. Refer to Table 1 below for specific test results.

Table 1: Corrosion Test Summary-Composite Samples for Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

SIC Corrosion Number	Boring Number	Sample Depth (ft)	pH	Minimum Resistivity (Ohm-Cm)	Sulfate Content (PPM)	Chloride Content (PPM)
C640226	B-1-07	0.0-6.0	7.52	1748	N/A	N/A
C640227	B-1-07	26.0-32.5	7.61	2237	N/A	N/A
C640228	B-1-07	56.0-62.5	6.28	4043	N/A	N/A
C640229	B-1-07	86.0-92.5	6.76	3616	N/A	N/A
C640230	B-2-07	12.5-16.0	7.47	1744	N/A	N/A
C640231	B-2-07	41.0-42.5	7.67	1282	N/A	N/A
C640232	B-2-07	52.5-56.0	6.98	2214	N/A	N/A
C640233	B-2-07	62.5-66.0	7.12	2305	N/A	N/A

Laboratory Testing

Laboratory testing was performed on selected samples of the subsurface materials obtained from the 2007 subsurface investigation. Tests were performed to determine the corrosion and engineering properties of the subsurface materials for use in the foundation analysis. The tests performed included: mechanical analysis (sieve and hydrometer), Atterberg limits (liquid limit, plastic limit and plasticity index), unconsolidated undrained (UU) triaxial and soil corrosion (pH, sulfate, chloride, and resistivity). All tests were performed in general accordance with American Society for Testing and Materials (ASTM) standards or California Test Methods (CTM). Laboratory test results will be available upon request.

Seismic Data and Evaluation

The project site is not located within any Alquist-Priolo Earthquake Fault Zones (EFZs) as established by the California Geological Survey. No active faults are known to cross the project site. Therefore, the potential for ground rupture hazard due to fault movement is considered low since no known fault crosses the project site. Based on the Department of Transportation (Caltrans) 1996 Seismic Hazard Map, the controlling fault for the site is the Prairie Creek-Spenceville-Dentman (PSD), a normal fault. The PSD fault is located approximately 22 miles east of the site and is capable of generating a Maximum Credible Earthquake (MCE) moment magnitude of M_w=6.5. The 1996 Seismic Hazard Map shows that the PBA for this site is between the contour lines of 0.1g and 0.2g. Therefore, the estimated Peak Horizontal Bedrock Acceleration (PHBA) at the site is recommended to be about 0.2g.

Based on the 2007 and 1964 subsurface investigations for the bridge, the soil profile at the site may be classified as Type D, as defined in the Department's Seismic Design Criteria (SDC, 2006, Version 1.4). The recommended design Acceleration Response Spectrum (ARS) curve shown in Figure 3 was obtained from Figure B.7 of the SDC. According to the guidelines presented in Section 6.1.2.1 of the Seismic Design Criteria, for structures that are within 10 miles (15 km) of a fault, the ARS curve needs to be magnified. Since the distance to the fault is more than 10 miles, no modification to the ARS curve is needed.

As-Built Foundation Information

The As-Built records for the existing Natomas East Canal Bridge and Overhead (Br. No. 24-0218) indicate that the bridge foundations consist of Raymond step tapered steel shells filled with concrete. Class I piles were used at Abutment 1 and 9 locations and Class II piles were used at the pier locations. The Class I and Class II piles had a diameter of 12 inches at the butt and 8 inches at the tip, all with a design load of 90 kips. The As-Built pile tip elevations for the existing structures are listed below in Tables 2 and 3.

Table 2. "As-Built" step tapered steel shells filled with concrete with 90 kip Design Load for the right bridge of the Natomas East Canal Bridge and Overhead (Br. No. 24-0218R).

Location	"As-Built" Estimated Pile Tip Elevation (ft)	"As-Built" Average Pile Tip Elevation (ft)	"As-Built" Specified PileTip Elevation (ft)
Abutment 1R	-5.0	-3.4	0.0
Pier 2R1	-5.0	-1.6	0.0
Pier 2R2	-5.0	-0.6	0.0
Pier 3R1	-3.0	-4.0	-3.0
Pier 3R2	-3.0	-5.6	-3.0
Pier 4R1	-10.0	-11.3	-5.0
Pier 4R2	-10.0	-10.4	-5.0
Pier 5R1	-15.0	-11.2	-10.0
Pier 5R2	-15.0	-11.0	-10.0
Pier 6R1	-10.0	-6.3	-5.0
Pier 6R2	-10.0	-6.3	-5.0
Pier 7R1	-20.0	-14.8	-15.0
Pier 7R2	-20.0	-14.8	-15.0
Pier 8R1	-20.0	-15.1	-15.0
Pier 8R2	-20.0	-14.9	-15.0
Abutment 9R	-20.0	-14.8	-15.0

Note:

1. As-Built Elevations shown above are based on the NGVD29 vertical datum.
2. The "As-Built" Estimated, Average and Specified Pile Tip Elevations were obtained from the Field Report of Foundation Conditions (dated February 18, 1969) for the Natomas East Canal Br. & O.H. (Br. No. 24-0218R).

Table 3. "As-Built" step tapered steel shells filled with concrete with 90 kip Design Load for the left bridge of the Natomas East Canal Bridge and Overhead (Br. No. 24-0218L).

Location	"As-Built" Estimated Pile Tip Elevation (ft)	"As-Built" Average Pile Tip Elevation (ft)	"As-Built" Specified PileTip Elevation (ft)
Abutment 1L	-5.0	1.0	0.0
Pier 2L1	-5.0	-1.8	0.0
Pier 2L2	-5.0	-1.6	0.0
Pier 3L1	-5.0	-4.0	-3.0
Pier 3L2	-5.0	-4.3	-3.0
Pier 4L1	-5.0	-6.7	-5.0
Pier 4L2	-5.0	-7.2	-5.0
Pier 5L1	-15.0	-10.8	-10.0
Pier 5L2	-15.0	-10.5	-10.0
Pier 6L1	-10.0	-5.9	-5.0
Pier 6L2	-10.0	-6.4	-5.0
Pier 7L1	-15.0	-15.2	-15.0
Pier 7L2	-15.0	-14.1	-15.0
Pier 8L1	-20.0	-14.7	-15.0
Pier 8L2	-20.0	-15.1	-15.0
Abutment 9L	-20.0	-13.7	-15.0

Note:

1. As-Built Elevations shown above are based on the NGVD29 vertical datum.
2. The "As-Built" Estimated, Average and Specified Pile Tip Elevations were obtained from the Foundation Report (dated February 18, 1969) for the Natomas East Canal Br. & O.H. (Br. No. 24-0218R).

A settlement period of ninety days was recommended for the fill at Abutment 1 and 9 locations for both structures. A five-foot surcharge was applied to the Abutment 1 locations. A settlement period will not be necessary for the widening since the fill has been in place since the construction of the original structures in 1970.

Foundation Recommendations

Bridge Widening Foundations

The following foundation recommendations are for the new proposed median widening of the Natomas East Canal Bridge and Overhead (Br. No. 24-0218). The proposed widening may be supported on driven steel HP 10X57 piles at Abutments 1 and 9 according to the Table 4 below.

The computer program DRIVEN v1.2 was used to estimate the axial load capacity and nominal driving resistance of the driven steel HP 10X57 piles. The DRIVEN program follows the guidelines of FHWA publication NHI-05-042 (2006). The DRIVEN program User's Manual is provided in FHWA-SA-98-074.

The proposed pile tip elevations were based on the cut-off elevation and factored loads provided by the Office of Bridge Design dated July 3, 2008.

Table 4. Abutment Foundations Design Recommendations for the proposed widening of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Abutment Foundations Design Recommendations (Br. No. 24-0218)									
Support Location	Pile Type	Cut-off Elevtion (ft)	LRFD Service-1 Limit State Load (kips) per Support		LRFD Service-1 Limit State Total Load (kips) per Pile (Compression)	Nominal Resistance (kips)	Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
			Total	Permanent					
Abut 1	HP 10X57	46.5	1120	585	140	280	-14.0(a),	-14.0	280
Abut 9a	HP 10X57	53.5	1070	560	140	280	-8.0(a),	-8.0	280
Abut 9b	HP 10X57	52.5	1070	560	140	280	-8.0(a),	-8.0	280

Notes:

1) *Design tip elevations are controlled by: (a) Compression.*
2) *There is no design tip elevation for Settlement.*
3) *Unsuitable soil layers (very soft and/or scourable) that do not contribute to the design nominal resistance exist at Pier 2, 3,4 and 5 extending to elevation 8.0 ft.*
4) *Design tip elevations for Lateral Load will be provided by Design.*

The proposed widening may be supported on driven steel HP 10X57 at all pier locations according to the Table 5 below.

The computer program DRIVEN v1.2 was used to estimate the axial load capacity and nominal driving resistance of the driven steel HP 10X57 piles. The DRIVEN program follows the guidelines of FHWA publication NHI-05-042 (2006). The DRIVEN program User's Manual is provided in FHWA-SA-98-074.

The proposed pile tip elevations were based on the cut-off elevation and factored loads provided by the Office of Bridge Design dated July 3, 2008.

Table 4. Pier Foundations Design Recommendations for the proposed widening of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Pier Foundations Design Recommendations (Br. No. 24-0218)											
Support Location	Pile Type	Cut-off Elevation (ft)	Service-1 Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Event				
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp. (φ=1.0)	Tension (φ=1.0)			
Pier 2	HP 10X57	18.5	1415	1”	196	0	196	0	-43.0(a-I) -43.0(a-II)	-43.0	280
Pier 3	HP 10X57	7.5	1455	1”	196	0	196	0	-54.0(a-I) -54.0(a-II)	-54.0	280
Pier 4	HP 10X57	7.0	1515	1”	196	0	196	0	-54.5(a-I) -54.5(a-II)	-54.5	280
Pier 5	HP 10X57	9.0	1460	1”	196	0	196	0	-52.5(a-I) -52.5(a-II)	-52.5	280
Pier 6	HP 10X57	27.5	1460	1”	196	0	196	0	-34.0(a-I) -34.0(a-II)	-34.0	280
Pier 7	HP 10X57	11.5	1465	1”	196	0	196	0	-50.0(a-I) -50.0(a-II)	-50.0	280
Pier 8	HP 10X57	-0.5	1500	1”	196	0	196	0	-61.0(a-I) -61.0(a-II)	-61.0	280

Notes:

1) *Design tip elevations are controlled by: (a-I) Compression (Strength Limit) and (a-II) Compression (Extreme Event).*
2) *There is no design tip elevation for Settlement.*
3) *Unsuitable soil layers (very soft and/or scourable) that do not contribute to the design nominal resistance exist at Pier 2, 3,4 and 5 extending to elevation 8.0 ft.*
4) *Design tip elevations for Lateral Load will be provided by Design.*

Table 5. Pile Data Table for the proposed widening of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

PILE DATA TABLE (BR. No. 24-0218)						
Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevations (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Abut 1	HP 10X57	280	0	-14.0(a)	-14.0	280
Pier 2	HP 10X57	280	0	-43(a)	-43.0	280
Pier 3	HP 10X57	280	0	-54.0(a)	-54.0	280
Pier 4	HP 10X57	280	0	-54.5(a)	-54.5	280
Pier 5	HP 10X57	280	0	-52.5(a)	-52.5	280
Pier 6	HP 10X57	280	0	-34.0(a)	-34.0	280
Pier 7	HP 10X57	280	0	-50(a)	-50.0	280
Pier 8	HP 10X57	280	0	-61.0(a)	-61.0	280
Abut 9a	HP 10X57	280	0	-8.0(a)	-8.0	280
Abut 9b	HP 10X57	280	0	-8.0(a)	-8.0	280

Notes:

1) *Design tip elevations for Abutments are controlled by: (a) Compression.*
2) *Design tip elevations for Piers are controlled by: (a) Compression.*
3) *There is no design tip elevation for Settlement.*
4) *Unsuitable soil layers (very soft and/or scourable) that do not contribute to the design nominal resistance exist at Pier 2, 3,4 and 5 extending to elevation 8.0 ft.*

General Notes to Designer

1. All support locations are to be plotted on the Log of Test Borings, in plan view, as stated in "Memo to Designers" 4-2. The plotting of support locations should be made prior to the foundation review.

2. If lateral demands exist on the support piles, the structural design engineer shall indicate on the plans, in the pile data table, the design pile tip elevations required to meet the lateral load demands. If the specified pile tip elevations given in the above pile data table are not adequate for lateral load demands; the Office of Geotechnical Design-North, Branch A shall be contacted for further recommendations.

3. A type "A" excavation is to be shown on the plans at Pier 3, 4, and 5 locations.

4. A type "D" excavation is to be shown on the plans at Pier 2 and 8 locations.

Construction Considerations

1. Ground water was encountered during the subsurface investigation. Ground water surface elevation is subject to seasonal fluctuations and may occur higher or lower than indicated on the Log of Test Boring Sheets (LOTB) depending on the conditions at time of construction. Refer to the Log of Test Boring Sheets for details.

2. It is anticipated that the Contractor will encounter ground water while excavating to the bottom of the pile cap elevations at Piers 2, 3, 4, 5, and 8 locations. Piers 2 through 5 are located within the main area of the channel and may be subjected to high surface water levels. Pier 8 is located outside of the main area of the channel and is not expected to be subjected to high surface water levels. Piers 2, 3, 4, 5, and 8 may be affected by high ground water. Therefore, it is recommended the construction for the widening foundations are performed during the dry season when the channel water surface elevations are low.

3. The extraction wells currently under operation in the nearby McClellan Air Force Base may have an influence of the current ground water levels. Depending on time of construction, the ground water levels may be higher.

4. The Contractor should anticipate hard and erratic driving of the steel "H" piles below an approximate elevation of 10.0 ft due to the presence of the very dense weakly to moderately cemented material. The Contractor should anticipate field cutting and splicing of the steel "H" piles. Refer to the LOTB sheets for details.

5. The calculated geotechnical capacity of all driven steel "H" piles is based on skin friction and end bearing.

6. At the Engineer's option, any steel piles driven within 3.0 meters of the specified pile tip elevation may be considered adequate and cut off if three times the required pile acceptance criteria is achieved. Refer to the Caltrans Standard Specifications 49-1.08 (2006) for information concerning the pile driving acceptance criteria.

The recommendations contained in this report are based on specific project information regarding design loads and structure locations that has been provided by the Office of Bridge Design North (OBDN). If any conceptual changes are made during final project design, the Office of Geotechnical Design - North, Branch A should review those changes to determine if the foundation recommendations provided in this report are still applicable. Any questions regarding the above recommendations should be directed to Jacqueline Martin (916) 227-1051 or Reid Buell (916) 227-1012, of the Office of Geotechnical Design-North, Branch A.

Project Information

Standard special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. Log of Test Borings for Natomas East Canal Bridge and Overhead, Br. No. 24-0218.

Data and Information included in the Information Handout provided to the bidders and Contractors are:

A. Foundation Report for Natomas East Canal Bridge and Overhead, Br. No. 24-0218, dated September 15, 2008.

Report by:

Jacqueline Martin

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R.E. Pending
Structure OE

REFERENCES

Bartow, J.A., and D.E. Marchand, 1979, Preliminary geologic map of Cenozoic deposits of the Clay area, California: U.S. Geological Survey Open-File Report 79-667, (scale 1 to 62,500).

Department of Water Resources (2008). Ground water level data. Available from the Department of Water Resources site, http://wdl.water.ca.gov.

Environmental Protection Agency (2007). McClellan Air Force Base cleanup and Redevelopment. [Data file]. Available from the Environmental Protection Agency site, http://www.epa.gov/region09/waste/sfund/mcclellan/index.html.

Federal Highway Administration (FHWA), Design and Construction of Driven Pile Foundations: Workshop Manual – Volume 1 (Pub. No. FHWA HI-97-013) published January 1997, Revised November1998.

Harden, Deborah R., 1998, California Geology, Prentice Hall, 252 pp.

Helley, E.J. and Harwood, D.S., 1985, Geologic Map of the Late Cenozoic Deposits of the Sacramento Valley and Northern Sierran Foothills, California, United States Geological Survey (USGS), Map MF 1790, scale 1:62,500, 1 of 5 sheets.

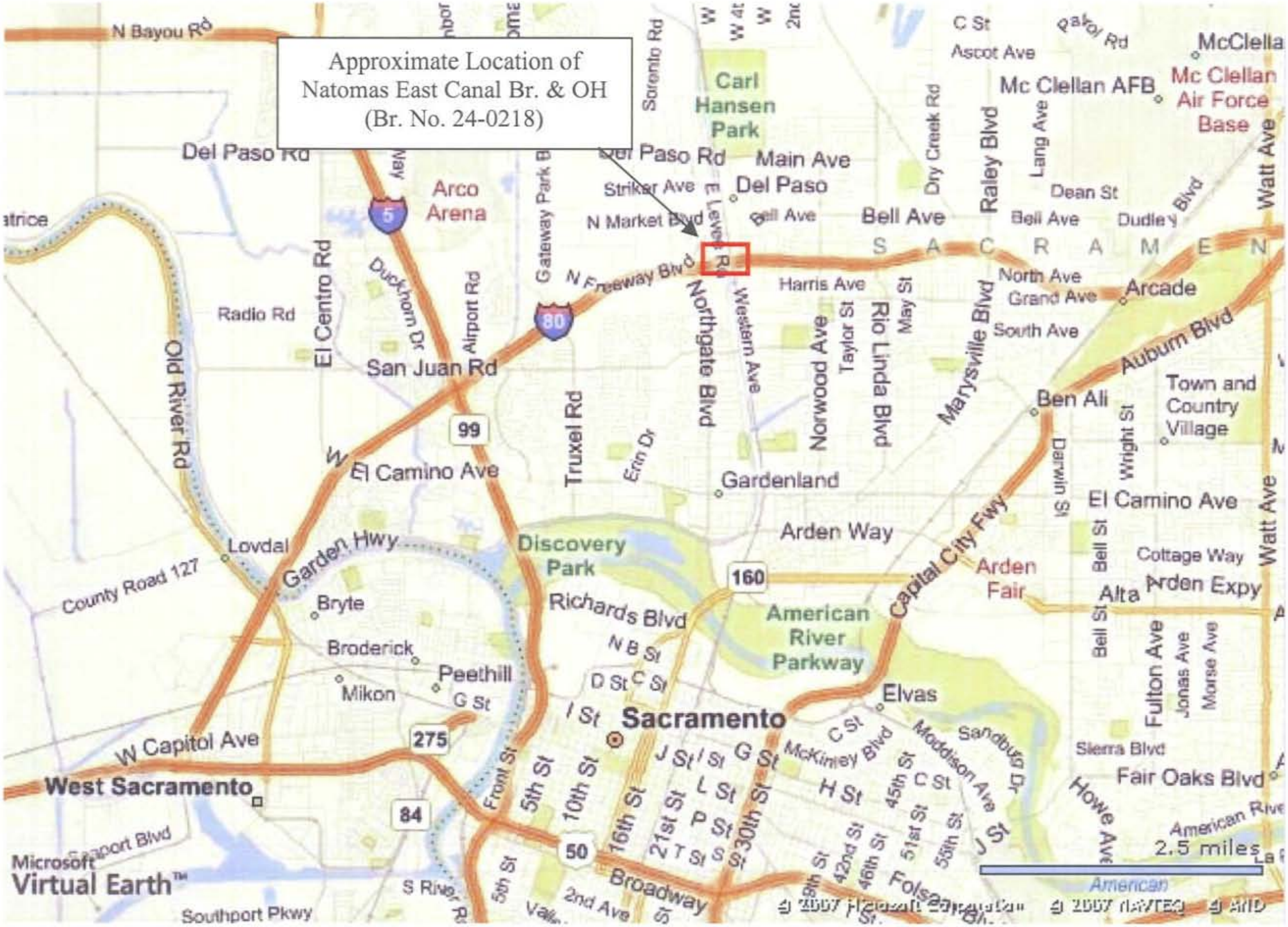
Marchand, D.E. and A. Allwardt, 1978, Preliminary Geologic Map Showing Quaternary Deposits of the Northeastern San Joaquin Valley, California: U.S. Geological Survey, Miscellaneous Field Studies Map MF-945, scale 1:125,000.

Marchand, D.E. and A. Allwardt, 1981, Late Cenozoic stratigraphic units, northeastern San Joaquin Valley, California: U.S. Geological Survey Bulletin 1470, 70 p.

Seismic Design Criteria (2006), California Department of Transportation, Version 1.4.

State of California, Department of Transportation (Caltrans):

- Standard Plans, May 2006
- Standard Specifications, May 2006
- Bridge Standard Details Sheets, April 2000.
- Memo to Designers, Section 3-1, December 2000.
- CT-Corrosion Guidelines, September 2003, Version 1.0.



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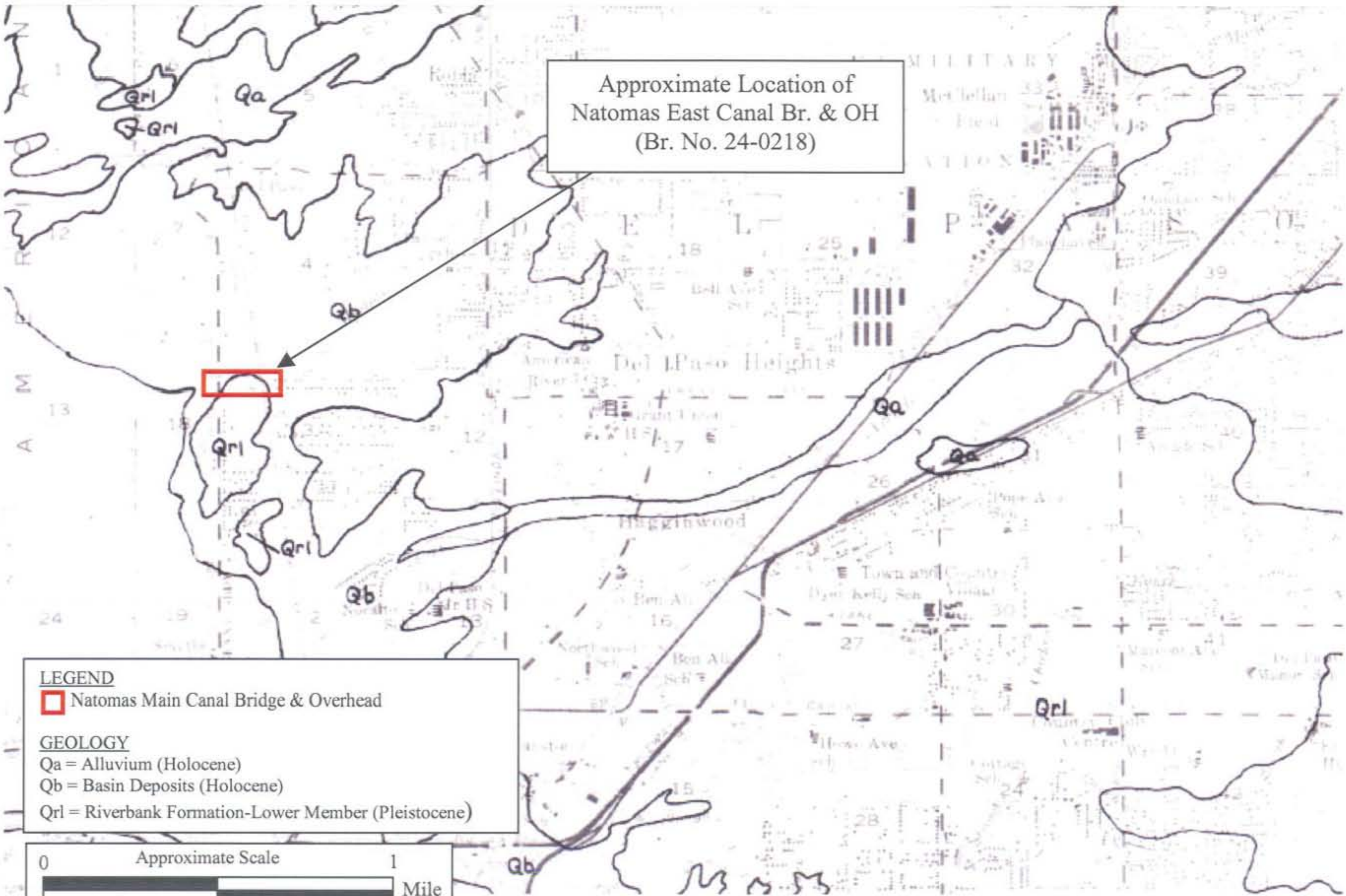
Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-379701	Location Map
September 15, 2008	

03-SAC-80 PM M5.2 **Natomas East Canal Br. & OH, Br. No. 24-0218**	Figure 1



Caltrans

Division of Engineering Services
Geotechnical Services
Geotechnical Design – North

EA: 03-379701	Geologic Map
September 15, 2008	
03-SAC-80 PM M5.21 Natomas East Canal Br. & OH, Br. No. 24-0218	Figure 2

Natomas East Canal Bridge OH (Widen)
Br. No. 24-0218R
03-379701
September 15, 2008

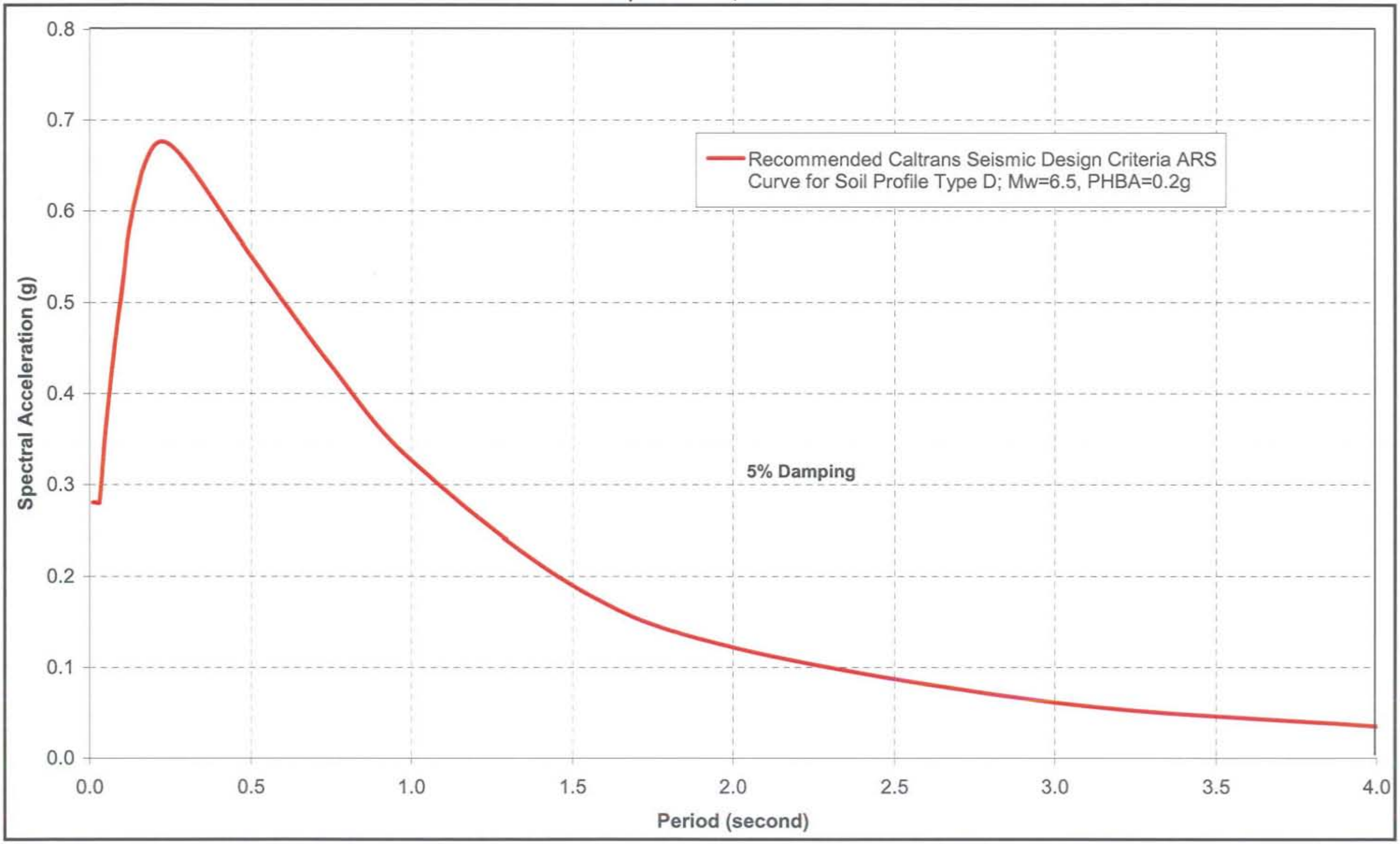


Figure 3. Acceleration Response Spectrum Recommended for Design

Memorandum

Flex your power!
Be energy efficient!

To: MR. JEFF SIMS
BRANCH CHIEF
Division of Engineering Services
Structural Design-Mail Station 9
Office of Bridge Design North

Date: May 26, 2010

File: 03-SAC-80- PM M5.21
Natomas East Canal Bridge BOH
(WIDEN)
Br. No. 24-0218
EA#03-379701

Attn: Eric Watson

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Amended Foundation Report

The foundation report for the Natomas East Canal Bridge and Overhead (Br. No. 21-0218) was completed and sent to Structure Design on September 15, 2008. On May 19, 2010 an email was received from the Office of Structure Design stating that some of the agencies involved with this project are concerned about the proposed piles to be driven through the levees, specifically Pier 2 and Pier 5. The agencies have requested that the piles be installed in predrilled holes through the levees. This Amended Foundation Report will address the Foundation Recommendations and Construction Considerations for Pier 2 and Pier 5 that were originally included in the Foundation Report dated September 15, 2008 for the Natomas East Canal Bridge (Br. No. 21-0218).

Foundation Recommendations

The proposed widening may be supported on driven steel HP 10X57 at Pier 2 and 5 locations according to Table 1 below.

Table 1. Pier Foundations Design Recommendations for the proposed widening of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Support Location	Pile Type	Cut-Off Elevation (ft)	Service-1 Limit State Load per Support (kips)	Total Permissible Support Settlement (inches)	Required Factored Nominal Resistance (kips)				Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance Required (kips)
					Strength Limit		Extreme Limit				
					Comp. (φ=0.7)	Tension (φ=0.7)	Comp. (φ=1.0)	Tension (φ=1.0)			
Pier 2	HP 10X57	17.0	1415	1"	196	0	196	0	-47.0 (a-I) -47.0 (a-II)	-47.0	280
Pier 5	HP 10X57	7.5	1460	1"	196	0	196	0	-54.5 (a-I) -54.5 (a-II)	-54.5	280

Notes: 1) Design Tip Elevations are controlled by: (a-I) Compression (Strength Limit) and (a-II) Compression (Extreme Event).
2) There is no Design Tip Elevation for Settlement.
3) Unsuitable soil layers (very soft and/or scourable) that do not contribute to the design nominal resistance exist at Pier 2 and Pier 5 extending to elevation 0.0 ft.
4) Design Tip Elevations for Lateral Load will be provided by Design.

Table 2. Pile Data Table for the proposed widening of Natomas East Canal Bridge and Overhead (Br. No. 24-0218).

Support Location	Pile Type	Nominal Resistance (kips)		Design Tip Elevation (ft)	Specified Tip Elevation (ft)	Nominal Driving Resistance (kips)
		Compression	Tension			
Pier 2	HP 10X57	280	0	-47.0	-47.0	280
Pier 5	HP 10X57	280	0	-54.5	-54.5	280

Notes: 1) Design Tip Elevations for Piers are controlled by: (a) Compression.
2) There is no Design Tip Elevation for Settlement.
3) Unsuitable soil layers (very soft and/or scourable) that do not contribute to the design nominal resistance exist at Pier 2 and Pier 5 extending to elevation 0.0 ft.

Construction Considerations

1. All piles at Pier 2 and Pier 5 of the new proposed bridge shall be driven in oversized predrilled holes according to the provisions of Section 49-1.06 of the Caltrans Standard Specifications. However, the space around the pile shall be backfilled (sealed) to ground surface with cement-bentonite slurry in place of pea gravel or dry sand as stated in the Caltrans Standard Specifications. The cement-bentonite slurry shall be placed by utilizing the tremie method.

Table 2. Elevations of the Predrilled Holes

Support Location	Predrilled Elevation (ft)
Pier 2	0.0
Pier 5	0.0

2. Generally soft soils were encountered to an approximate elevation of 8.0 feet in Borings B-4, B-5 and B-6 during the subsurface investigation. Unstable soils and caving conditions may be encountered. Temporary casing may be required. The casing shall not extend below elevation 0.0 feet. The temporary casing shall not be removed during or after grouting the predrilled hole.

If there are any questions concerning this addendum, please contact Jacqueline Martin at (916) 227-1051 or Reid Buell at (916) 227-1012.

Report by

PROFESSIONAL GEOLOGIST
JACQUELINE A. MARTIN
No. 8705
Exp. 10/31/10
STATE OF CALIFORNIA

Jacqueline A. Martin

JACQUELINE A MARTIN, P.G. NO. 8705
Engineering Geologist
Office of Geotechnical Design-North

Reid Buell

REID BUELL, C.E.G. NO. 1481
Senior Engineering Geologist
Office of Geotechnical Design-North

REGISTERED GEOLOGIST
REID L. BUELL
No. 1481
Exp. 4/30/2011
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

c: R.E. Pending
GS File Room
Reid Buell
OGDS-N
Structure OE

State of California | Business, Transportation and Housing Agency

Memorandum

Flex your power!
Be energy efficient!

To: MR. CYRUS HUI, DESIGN SENIOR
North Region Design South
District 3

Date: June 9, 2010

File: 03-SAC-80 PM 5.21
03-379701
Natomas East Canal Bridge BOH
Br. # 24-0218

Attention: Ms. Amy Fong

From: **DEPARTMENT OF TRANSPORTATION**
DIVISION OF ENGINEERING SERVICES
Geotechnical Services – MS 5
Office of Geotechnical Design – North

Subject: Addendum to Foundation Report

At your request, the Office of Geotechnical Design North (OGD-N) prepared this addendum to the "Foundation Report", dated 9/15/08 for the above-referenced project and structure. This report discusses the slope stability for placement of Rock Slope Protection (RSP) on the existing levee slopes of the Natomas East Canal. The RSP is being placed to limit scour potential adjacent to pier 2 & 5 as a portion of the proposed bridge widening project.

Proposed Work

Based on our review of the layout sheets and cross sections provided by the Office of Structure Design (dated 5/28/10), it is our understanding that an approximately 10,000 sq/ft area surrounding pier 2 and an approximately 14,500 sq/ft area around pier 5 will be covered with RSP. Per the plans, it is proposed to excavate the RSP placement areas to a depth of 6 inches to clear and grub the areas of organics. In addition, a 2ft. X 2ft. key will be excavated at the base of the slope where RSP is to be placed. After the areas are cleared and the key is excavated, a 9 inch thick layer of RSP backing #3 will be placed with an additional 22 inch thick layer of RSP backing #1 on top. All RSP will be placed via Method B.

Stability Analysis

Five stability analyses were performed analyzing existing and proposed slope conditions utilizing GeoSlope SLOPE/W software. Runs one and two depict the existing levee slope in conditions with and without water in the canal. Runs 3-5 depict the levee slope with the proposed RSP in conditions without and varying water levels in the canal. Each analysis output depicts the minimum Factor of Safety (FS) determined and five additional color shaded zones with an increase in FS of 0.1 in each zone. The results of the stability analysis are provided in Recommendations section below and attached as Plates 3-7. Boring B-1-07 located at project Station 503+53 was utilized to identify the subsurface soil types. NAVFAC "Foundations and Earth Structures Design Manual 7.02", Table 1 page 7.2-39 was utilized to determine γ, φ, and c for each soil type used in our analysis. The intent of the analyses was to determine if placement of RSP would decrease the stability of the existing levee walls. Cross-section C-C' as shown on plan sheets provided was utilized for all analysis. This section was selected as it is the longest run of RSP on the slope and the slope with the steepest slope ratio where RSP is proposed. A copy of the plan sheet and boring log utilize for our analyses are attached as plates 1 & 2.

Conclusions and Recommendations

General

Based upon our findings of our analyses, and interaction with District Design, we are providing the following slope stability results below for the proposed placement of the RSP.

Stability Results

Based on the results of our Stability Analyses, placement of the RSP on the existing levee slopes will increase the overall stability of the slopes. Factors of Safety for each analysis run are presented in the table below; further information regarding the analyses can be seen on Plates 3-7 attached.

Stability Run #	Site Condition	Minimum Factor of Safety obtained
1	Existing Levee Slope dry canal	1.6
2	Existing Levee Slope high water level in canal	1.7
3	Levee Slope with RSP placed dry canal	1.9
4	Levee Slope with RSP placed high water level in canal	3.1
5	Levee Slope with RSP placed low water level in canal	1.7

Project Information

Standard Special Provisions S5-280, "Project Information," discloses to bidders and contractors a list of pertinent information available for their inspection prior to bid opening. The following is an excerpt from SSP S5-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information Handout will be provided in Acrobat (.pdf) format to the addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:

A. None

Data and information included in the Information Handout provided to the bidders and Contractors are:

A. *"Foundation Report"* for Natomas East Canal Bridge BOH (Widening) Br# 28-0218, dated September 15, 2010
B. *"Addendum to Foundation Report"* for Natomas East Canal Bridge BOH (Widening) Br# 28-0218, dated June 9, 2010

Data and information available for inspection at the District Office:

A. None

Data and information available for inspection at the Transportation Laboratory:

A. None

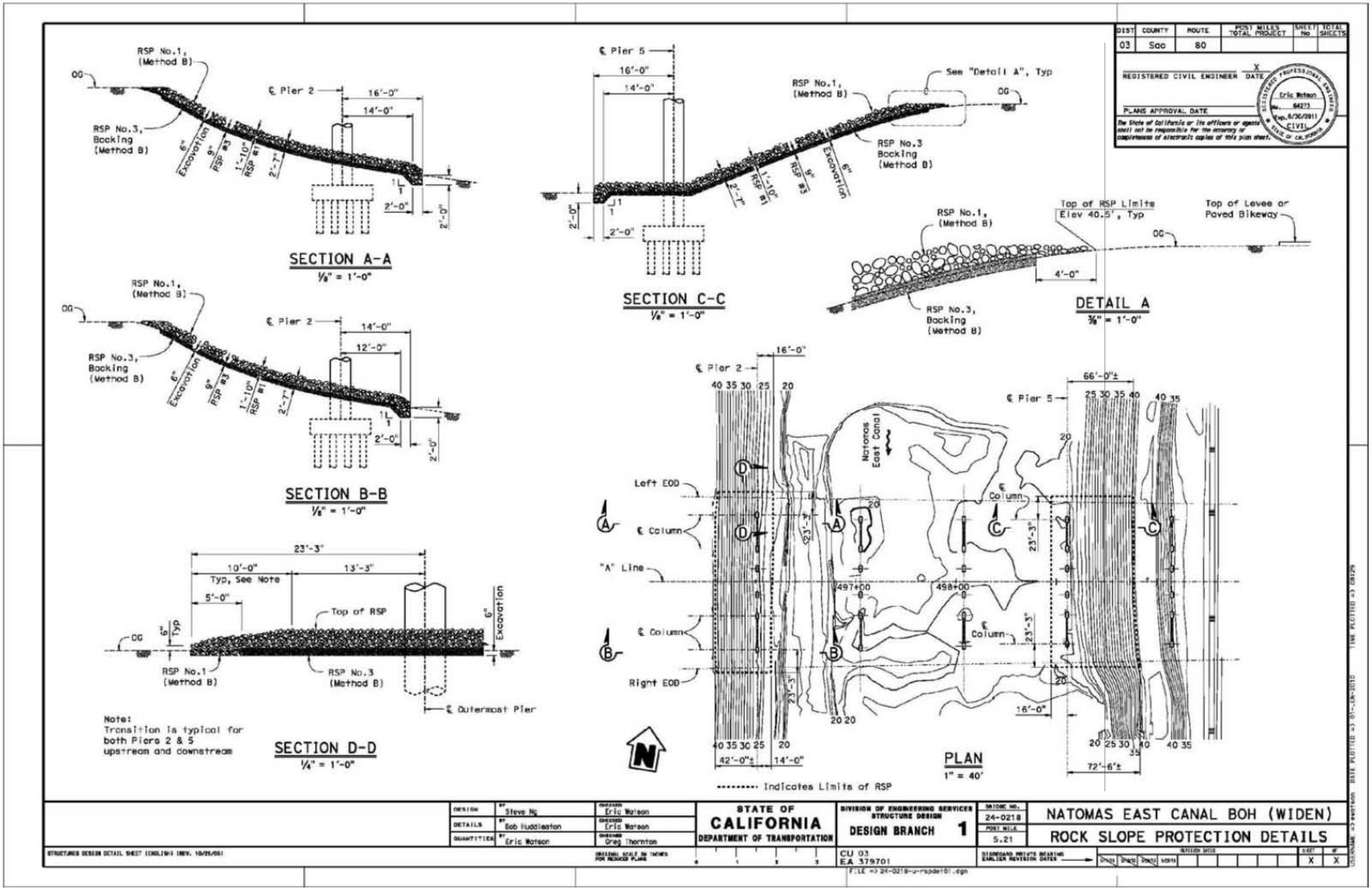
If any conceptual changes are made during final project design, the Office of Geotechnical Design North should review those changes to determine if these recommendations and conclusions are still applicable.

If you have any additional questions, please call me at (916) 227-1041.

PROFESSIONAL GEOLOGIST · W.P. WEBSTER No. 2485 CERTIFIED ENGINEERING GEOLOGIST Exp. 2-28-11 · STATE OF CALIFORNIA

William Webster CEG. #2485
Engineering Geologist
Geotechnical Design - North

c: BWinder PM
OGDN Files
MWillian GS Corporate
DBrittsan
JMartin
RBuell
RE Pending File
KHolden DES Office Engineer
JPeterson DME D-3
JSims
EWatson



CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-379701	Layout Sheet Utilized for Analyses
Date: June 2010	

03-SAC-80 PM 5.21 ADDENDUM TO FOUNDATION REPORT	Plate No. 1

DIST	COUNTY	ROUTE	POST MILES TOTAL PROJECT	SHEET No	TOTAL SHEETS
03	Sac	80			

9-12-08
CERTIFIED ENGINEERING GEOLOGIST

PLANS APPROVAL DATE

The State of California or its officers or agents shall not be responsible for the accuracy or completeness of electronic copies of this plan sheet.

PROFESSIONAL GEOLOGIST
Reid Buell
No. 1481
Exp. 4-30-09
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

This LOTB sheet was generally prepared in accordance with the Caltrans Soil & Rock Logging, Classification, & Presentation Manual (June 2007).

FOR PLAN VIEW, SEE "LOG OF TEST BORINGS 1 OF 7"

6.0 ft Lt Sta 503+53.5
℄ Rte 80

B-1-07

63.20'

SILTY SAND with GRAVEL (SM), medium dense, brown, dry, fine to coarse grained subangular and angular sand and gravel, trace organics (rootlets and weeds). (FILL)

CLAYEY SAND (SC), medium dense, dark yellowish brown, moist, fine grained sand, trace fine grained subangular gravel size cemented clay. (FILL)

SILTY SAND (SM), medium dense, dark yellowish brown, moist, fine grained sand trace fine grained subangular gravel size cemented clay. (FILL)

CLAYEY SAND (SC), medium dense, light yellowish brown, moist, fine grained sand, weakly cemented, trace calcium carbonate and gypsum stringers (2 to 4 mm thick). (FILL)

Poorly graded SAND with CLAY (SP-SC), medium dense, strong brown, fine grained sand, weakly cemented, trace oxide staining. (FILL)

CLAYEY SAND (SC), medium dense, strong brown and light yellowish brown, moist, fine grained sand, weakly cemented, trace fine grained subangular gravel size cemented clay, trace fine grained gravel size moderately hard cemented gypsum nodules. (FILL)

-from elevation 30.2' to 29.2', greenish gray with fine grained subrounded gravel (5%).

SANDY fat CLAY (CH), very stiff, very dark gray and greenish gray, moist, fine grained sand, trace fine grained subangular gravel size gypsum nodules, organics. (FILL)

Fat CLAY (CH) with sand, very stiff, very dark gray and black, moist, fine grained sand, high plasticity clay, organics. (FILL)

CLAYEY SAND (SC), medium dense, grayish brown and brown, moist, fine grained sand, weakly cemented, trace oxide staining.

Well graded SAND with CLAY (SW-SC), medium dense, grayish brown, moist, fine to medium grained sand.

SILTY SAND (SM), dense, dark yellowish brown, moist, fine grained sand, slightly micaceous, weakly cemented.

SILTY CLAYEY SAND (SC-SM), medium dense, light yellowish brown, moist, fine grained sand, weakly cemented, trace black mineral (manganese oxide).

SANDY lean CLAY (CL), stiff, light yellowish brown and strong brown, moist, fine grained sand, weakly to moderately cemented, trace calcium carbonate and gypsum stringers (2 to 4 mm thick), trace oxide staining.

SILTY SAND (SM), dense, dark brown, wet, fine to medium grained sand, slightly micaceous.

SILT (ML) with very fine grained sand, medium dense to very dense, yellowish brown, moist, weakly to moderately cemented, trace oxide staining.

Poorly graded SAND (SP), very dense to dense, greenish gray, moist, fine grained sand.

SILT (ML) with lenses of fine grained sand (approximately 4 to 6 inches thick), dense, grayish brown, moist, fine grained sand, weakly cemented.

-at elevation -47.8', becomes very dense and moderately cemented.

Poorly graded SAND (SP), medium dense, dark brown, moist, fine grained sand, micaceous.

Well graded SAND (SW), dense, dark grayish brown, moist, fine to coarse grained subangular and subrounded sand.

SILT (ML) with SAND, very dense, dark yellowish brown, moist, fine grained sand, weakly to moderately cemented.

Poorly graded SAND (SP), medium dense, grayish brown, moist, fine grained sand, slightly micaceous.

SILT with SAND (ML), dense, dark yellowish brown, moist, fine grained sand, weakly cemented.
-at elevation -84.9', becomes medium dense, uncemented, heavy oxide staining.

06-27-07
Terminated at El -89.3'
ERi=74%

503+00 505+00 507+00

PROFILE
HOR. 1" = 20'
VER. 1" = 10'

ENGINEERING SERVICES		GEOTECHNICAL SERVICES	STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION	DIVISION OF ENGINEERING SERVICES STRUCTURE DESIGN DESIGN BRANCH 1	BRIDGE NO. 24-0218 POST MILES 5.2	NATOMAS EAST CANAL BRIDGE OH LOG OF TEST BORINGS 4 OF 7
FUNCTIONAL SUPERVISOR NAME: R. Bibbens	DRAWN BY: F. Nguyen 3/08 CHECKED BY: J. Martin	FIELD INVESTIGATION BY: J. Martin	CU 03 EA 379701			SHEET 22 OF 25

GDS CIVIL LOG OF TEST BORINGS SHEET
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS 0 1 2 3
DISREGARD PRINTS BEARING EARLIER REVISION DATES
FILE => 24-0218-z-lltb04.dgn

CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-379701

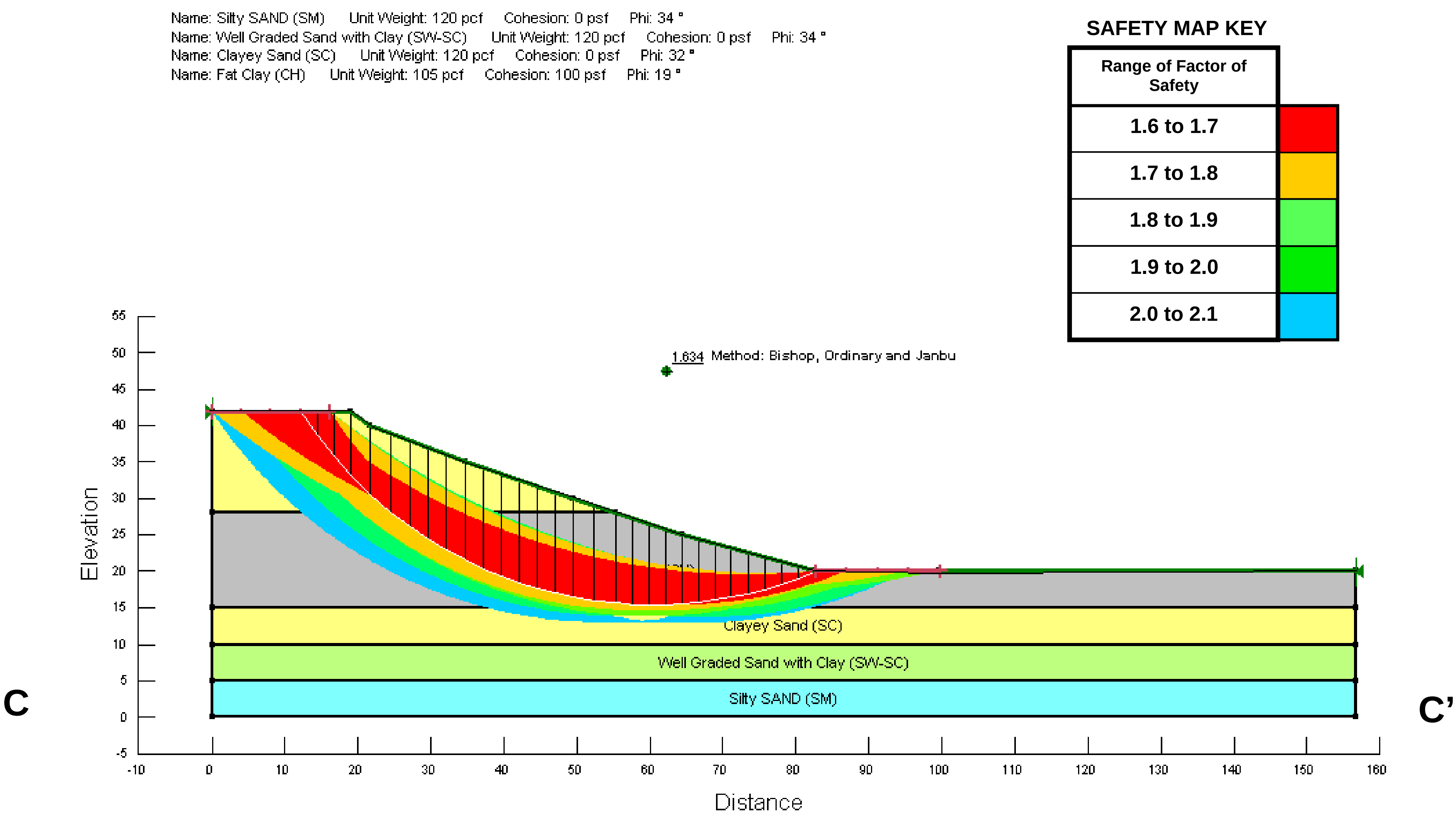
Date: June 2010

Log of Test Boring Utilized for Analyses

03-SAC-80 PM 5.21
ADDENDUM TO FOUNDATION REPORT

Plate No. 2

Slope Stability Analysis
Natomas East Canal BOH Cross Section C-C' without RSP



SAFETY MAP KEY

Range of Factor of Safety
1.6 to 1.7
1.7 to 1.8
1.8 to 1.9
1.9 to 2.0
2.0 to 2.1

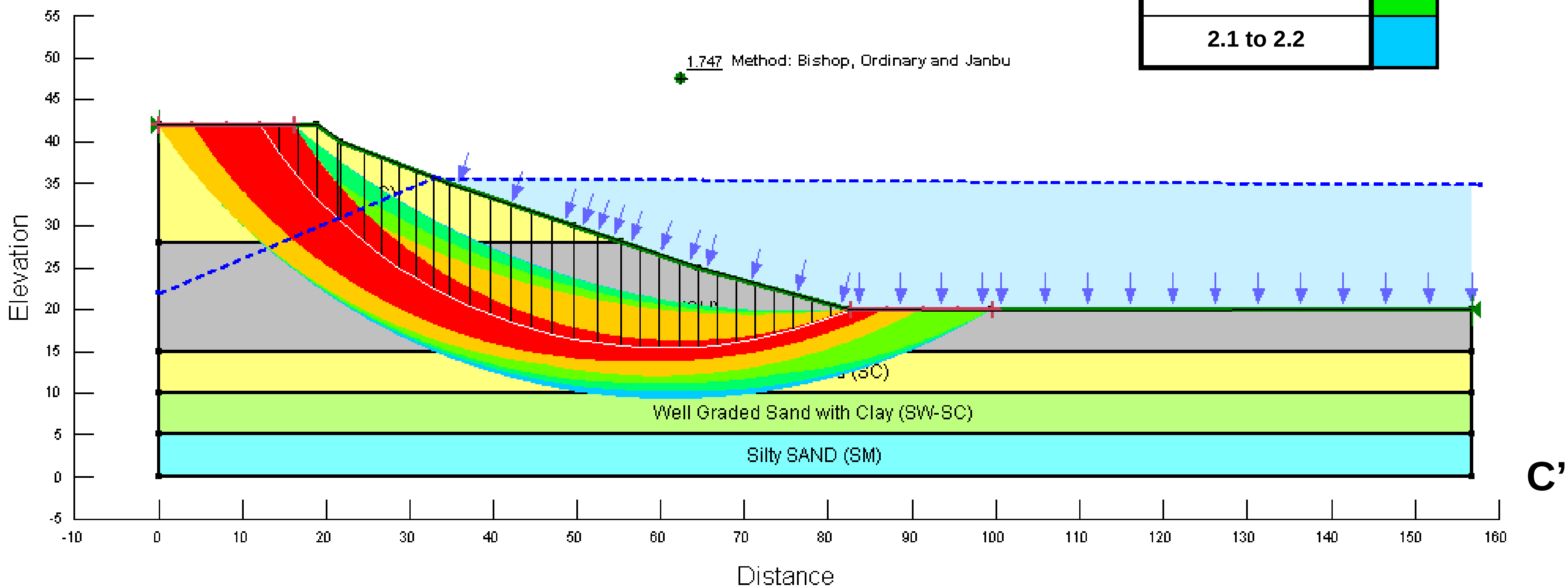
CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 01-379701 Date: June 2010	**Baseline Slope Stability Model X-SECTION C-C'**
	03-SAC-80 PM 5.21 ADDENDUM TO FOUNDATION REPORT	Plate No. 3

Slope Stability Analysis
Natomas East Canal BOH Cross Section C-C' without RSP

Name: Silty SAND (SM) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Well Graded Sand with Clay (SW-SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Clayey Sand (SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 32 °
Name: Fat Clay (CH) Unit Weight: 105 pcf Cohesion: 100 psf Phi: 19 °

SAFETY MAP KEY

Range of Factor of Safety	
1.7 to 1.8	red
1.8 to 1.9	orange
1.9 to 2.0	light green
2.0 to 2.1	green
2.1 to 2.2	blue



CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-379701

Date: June 2010

Baseline Slope Stability Model X-SECTION C-C'

03-SAC-80 PM 5.21
ADDENDUM TO FOUNDATION REPORT

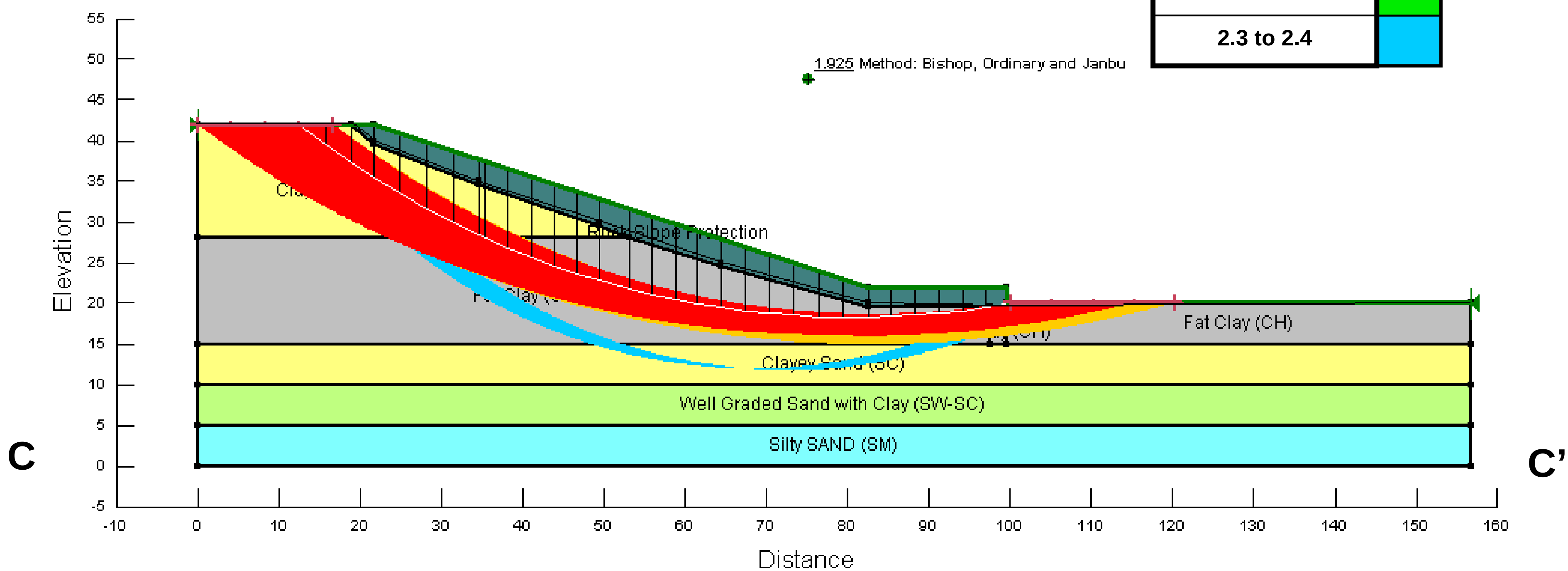
Plate No. 4

Slope Stability Analysis
Natomas East Canal BOH Cross Section C-C' with RSP

Name: Silty SAND (SM) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Well Graded Sand with Clay (SW-SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Clayey Sand (SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 32 °
Name: Fat Clay (CH) Unit Weight: 105 pcf Cohesion: 100 psf Phi: 19 °
Name: Rock Slope Protection Unit Weight: 136 pcf Cohesion: 0 psf Phi: 38 °

SAFETY MAP KEY

Range of Factor of Safety
1.9 to 2.0
2.0 to 2.1
2.1 to 2.2
2.2 to 2.3
2.3 to 2.4



CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-379701

Date: June 2010

Baseline Slope Stability Model
X-SECTION C-C'

03-SAC-80 PM 5.21
ADDENDUM TO FOUNDATION REPORT

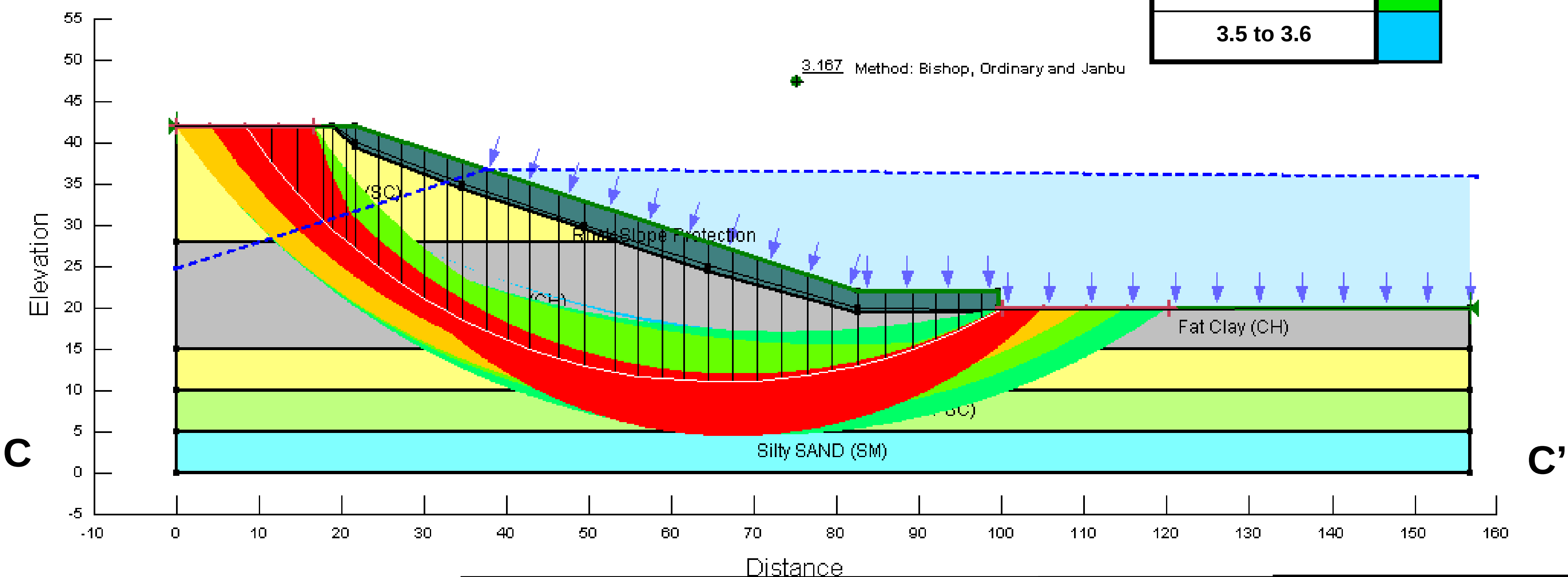
Plate No. 5

Slope Stability Analysis
Natomas East Canal BOH Cross Section C-C' with RSP

Name: Silty SAND (SM) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Well Graded Sand with Clay (SW-SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Clayey Sand (SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 32 °
Name: Fat Clay (CH) Unit Weight: 105 pcf Cohesion: 100 psf Phi: 19 °
Name: Rock Slope Protection Unit Weight: 136 pcf Cohesion: 0 psf Phi: 38 °

SAFETY MAP KEY

Range of Factor of Safety	
3.1 to 3.2	(red)
3.2 to 3.3	(orange)
3.3 to 3.4	(light green)
3.5 to 3.5	(green)
3.5 to 3.6	(blue)



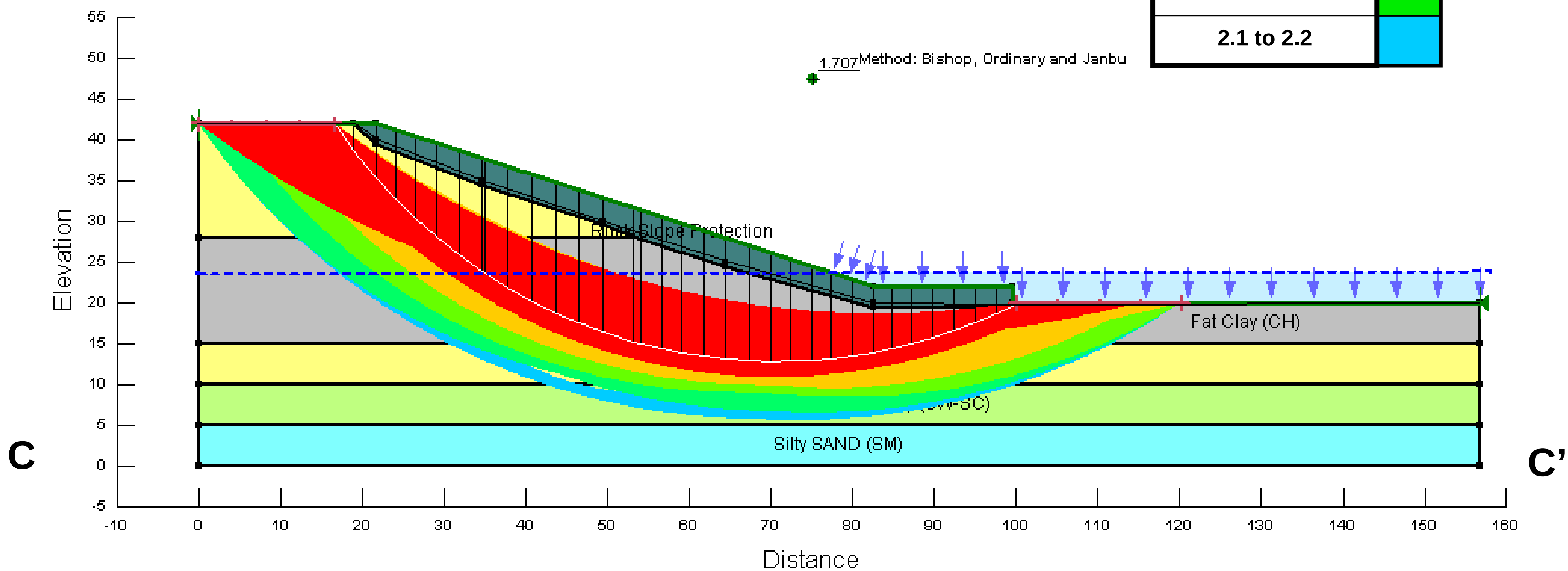
CALTRANS Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EA: 01-379701 Date: June 2010	**Baseline Slope Stability Model X-SECTION C-C'**
	03-SAC-80 PM 5.21 ADDENDUM TO FOUNDATION REPORT	Plate No. 6

Slope Stability Analysis
Natomas East Canal BOH Cross Section C-C' with RSP

Name: Silty SAND (SM) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Well Graded Sand with Clay (SW-SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 34 °
Name: Clayey Sand (SC) Unit Weight: 120 pcf Cohesion: 0 psf Phi: 32 °
Name: Fat Clay (CH) Unit Weight: 105 pcf Cohesion: 100 psf Phi: 19 °
Name: Rock Slope Protection Unit Weight: 136 pcf Cohesion: 0 psf Phi: 38 °

SAFETY MAP KEY

Range of Factor of Safety	
1.7 to 1.8	Red
1.8 to 1.9	Orange
1.9 to 2.0	Light green
2.0 to 2.1	Green
2.1 to 2.2	Blue



CALTRANS
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design - North

EA: 01-379701	**Baseline Slope Stability Model X-SECTION C-C'**
Date: June 2010	

03-SAC-80 PM 5.21 ADDENDUM TO FOUNDATION REPORT	Plate No. 7

DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT
?⁻ ⁻ ⁴ Park Towne Circle, Suite 2
amento, California 95825

Telephone (916) 574-2540
FAX (916) 574-2542

March 19, 2009

Department of Transportation
2800 Gateway Oaks Drive, Suite 200
Sacramento, California 95833

Attention: Cyrus Hui. Design Senior

Subject: Underground Classification Nos. C203-067-09T thru C217-067-09T
Interstate 80 HOV Improvements – Signs AS

Mr. Hui:

The information provided to this office relative to the above project has been reviewed. On the basis of this analysis, Underground Classifications of "Potentially Gassy with Special Conditions" have been assigned to the tunnels identified on your submittal. Please retain the original Classifications for your records and deliver true and correct copies of these Classifications to the tunnel contractor for posting at the job site.

When the contractor who will be performing the work is selected, please advise them to notify this office to schedule the mandated Prejob Conferences with the Division prior to commencing any activity associated with construction or rehabilitation of the tunnels.

Please be informed that whenever an employee enters any bore or shaft being constructed under 30 inches in diameter, the Mining and Tunneling Unit then has immediate jurisdiction over that job. Please contact the Mining and Tunneling Unit prior to entering such spaces.

If you have any questions on this subject, please contact this office at your earliest convenience.

Sincerely,

John R Leahy

John R. Leahy
Senior Engineer

cc: Douglas Patterson
File

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C203-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 250
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***.
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 22 feet deep drilled shaft project located on the north shoulder of westbound Route 80 approximately 1,290 feet east of the intersection of Route 80 and West El Camino Avenue Overcrossing, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C204-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 251
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
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3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 25 feet deep drilled shaft project located in the median of Route 80 approximately 2,790 feet east of the intersection of Route 80 and West El Camino Avenue Overcrossing, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R. Leahy
(SENIOR ENGINEER)
John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C205-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 632
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The twin 60-inch diameter by 29 feet deep drilled shafts project located on eastbound Route 80 approximately 1,830 feet east of the intersection of Route 80 and West El Camino Avenue Overcrossing, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C206-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 253
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The twin 60-inch diameter by 29 feet deep drilled shafts project located on eastbound Route 80 approximately 2,160 feet west of the separation of Route 80 and Route 5, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C207-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 633
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 23 feet deep drilled shaft project located on the north shoulder of westbound Route 80 approximately 1,900 feet east of the separation of Route 80 and Route 5, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C208-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 401
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The twin 60-inch diameter by 31 feet deep drilled shafts project located on westbound Route 80 approximately 400 feet east of the separation of Route 80 and Route 5, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R. Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C209-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 415
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The twin 60-inch diameter by 31 feet deep drilled shafts project located on westbound Route 80 approximately 550 feet west of the on ramp to Route 80 from Truxel Road, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C210-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 411
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 22 feet deep drilled shaft project located on the south shoulder of eastbound Route 80 approximately 250 feet west of the on ramp to Truxel Road, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C211-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 413
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 22 feet deep drilled shaft project located on the north shoulder of westbound Route 80 approximately 20 feet east of the off ramp to Truxel Road, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C212-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 643
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 23 feet deep drilled shaft project located on the east shoulder of northbound Northgate Boulevard approximately 20 feet south of the on ramp to eastbound Route 80, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C213-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 628
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 23 feet deep drilled shaft project located on the south shoulder of eastbound Route 80 approximately 2,100 feet east of the intersection of eastbound Route 80 and Northgate Boulevard Overcrossing, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C214-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 645
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 23 feet deep drilled shaft project located on the north shoulder of westbound Route 80 approximately 2,540 feet east of the off ramp to Northgate Boulevard, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy

(SENIOR ENGINEER)

John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C215-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 623
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 54-inch diameter by 21 feet deep drilled shaft project located on the north shoulder of eastbound Route 80 approximately 970 feet west of the intersection of Interstate 80 and the Winters Street under crossing,, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

March 19, 2009

Date

John R Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C216-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 220
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 22 feet deep drilled shaft project located on the south shoulder of eastbound Route 80 approximately 20 feet west of the Longview Drive off ramp, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C217-067-09T

DEPARTMENT OF TRANSPORTATION
(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateways Oaks Drive, Suite 200, Sacramento, California 95833
(MAILING ADDRESS)

at INTERSTATE 80 – HOV IMPROVEMENTS – SIGNS AS - 553
(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***
(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 23 feet deep drilled shaft project located on the south shoulder of eastbound Route 80 approximately 2,100 feet east of the intersection of Route 80 and the Longview Drive under crossing, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date March 19, 2009

John R Leahy
(SENIOR ENGINEER)
John R. Leahy

03 77089

STATE OF CALIFORNIA ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT
2211 Park Towne Circle, Suite 2
Sacramento, California 95825

Telephone (916) 574-2540
FAX (916) 574-2542

May 25, 2010

Department of Transportation
2800 Gateway Oaks Drive, Suite 200
Sacramento, CA 95833

Attention: Amy Fong via e-mail

Subject: Underground Classification No's.: C180-067-10T thru C186-067-10T

Interstate 80 Improvements - Sacramento

Ms. Fong:

The information provided to this office relative to the above project has been reviewed. On the basis of this analysis, Underground Classification of "Potentially Gassy with Special Conditions" has been assigned to the shafts identified on your submittal. Please retain the original Classification for your records and deliver a true and correct copy of the Classification to the shaft contractor(s) for posting at the job site.

When the contractor who will be performing the work is selected, please advise them to notify this office to schedule the mandated Prejob Conference with the Division prior to commencing any activity associated with drilling of the shafts.

Should you have another bore under construction that is not required to have an Underground Classification (i.e.: less than 30 inches in diameter), please contact the Mining and Tunneling Unit prior to any employee entry of such a space.

If you have any questions on this subject, please contact this office at your earliest convenience.

Sincerely,

John R. Leahy

John R. Leahy
Senior Engineer

cc: Doug Patterson
File

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C180-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – AS-251/252

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 54-inch diameter by 22 feet deep drilled shaft located in the median of Interstate 80, approximately 2,800 feet east of the intersection of Interstate 80 and West El Camino, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

(SENIOR ENGINEER)
John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C181-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – TEMP 1

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 25 feet deep drilled shaft located in the median of Interstate 80, approximately 1,000 feet east of the intersection of Interstate 80 and Winters Street, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

John R Leahy

(SENIOR ENGINEER)

John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C182-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – AS-610

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 25 feet deep drilled shaft located on westbound Interstate 80, approximately 1,100 feet west of the intersection of Interstate 80 and Longview Drive, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

(SENIOR ENGINEER)

John R. Leahy

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C183-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – AS-624

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 25 feet deep drilled shaft located on eastbound Interstate 80, approximately 800 feet east of the intersection of Interstate 80 and Longview Drive, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

John R. Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C184-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – CMS

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The 60-inch diameter by 22 feet deep drilled shaft located in the median of Interstate 80, approximately 600 feet east of the intersection of Interstate 80 and the Sacramento River, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

John R. Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C185-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – DEL PASO OH

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The nine 78-inch diameter by 30 to 114 feet deep drilled shaft located on eastbound Interstate 80, at the intersection of eastbound Interstate 80 and the Roseville Road, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

John R. Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089

State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

Underground Classification

C186-067-10T

DEPARTMENT OF TRANSPORTATION

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

of 2800 Gateway Oaks Drive, Suite 200, Sacramento, CA 95833

(MAILING ADDRESS)

at INTERSTATE 80 IMPROVEMENTS – SACRAMENTO – DEL PASO OH

(LOCATION)

has been classified as *** POTENTIALLY GASSY with Special Conditions***

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. A Certified Gas Tester shall perform pre-entry and continuous monitoring of the underground environment to measure Oxygen and detect explosive, flammable, and toxic gasses whenever an employee is working in the underground environment.
2. Mechanical ventilation shall provide for continuous exhaust of fumes and air at any time an employee is working in the underground environment. The primary ventilation fans must be located outside of the underground environment and shall be reversible by a single switch near the fan location.
3. The Division shall be notified immediately if any **Flammable Gas** or **Petroleum Vapor** exceeds 5% of the Lower Explosive Limit.
4. All utilities that may be in conflict with the project shall be identified and physically located (potholed) prior to the start of project operations.

The eight 78-inch diameter by 42 to 114 feet deep drilled shaft located on westbound Interstate 80, at the intersection of westbound Interstate 80 and the Roseville Road, Sacramento, Sacramento County.

This classification shall be conspicuously posted at the place of employment.

Date May 25, 2010

John R. Leahy

(SENIOR ENGINEER)

John R. Leahy

03 77089