

FOR CONTRACT NO.: 01-423704

INFORMATION HANDOUT

WATER QUALITY

**CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD
(COAST REGION)**

BOARD ORDER NO. 2003-0017

PERMITS

**UNITED STATES ARMY CORPS OF ENGINEERS
NON-REPORTING NATIONWIDE PERMIT 14**

AGREEMENTS

**CALIFORNIA DEPARTMENT OF FISH AND GAME STREAMBED ALTERATION
AGREEMENT**

NOTIFICATION NO.1600-2012-0019-R1

MATERIALS INFORMATION

FOUNDATION REPORT (LOCATIONS 1 AND 2)

FOUNDATION REPORT ADDENDUM (LOCATION 1)

ROUTE: 01-Hum-299, 20.2/20.5

North Coast Regional Water Quality Control Board

June 20, 2012

In the Matter of

Water Quality Certification

for the

**California Department of Transportation
Highway 299 – Green Point Sink Project
WDID No. 1B11055WNHU**

APPLICANT: California Department of Transportation
RECEIVING WATER: Intermittent, ephemeral streams and wetlands
HYDROLOGIC AREA: Redwood Creek Hydrologic Unit No.107.00
COUNTY: Humboldt
FILE NAME: CDOT - HWY 299, Green Point Sink Project
WDID No. 1B11055WNHU

BY THE EXECUTIVE OFFICER:

1. On January 23, 2012, the North Coast Regional Water Quality Control Board (Regional Water Board) received an application from the California Department of Transportation (Caltrans), requesting Federal Clean Water Act (CWA), section 401, Water Quality Certification for activities related to proposed Highway 299 Green Point Sink Project (Project). Additional information regarding project specifics was received on June 15, 2012. The proposed project will cause disturbances to waters of the United States (U.S.) and waters of the State associated with intermittent and ephemeral watercourses and wetland that are located within the Redwood Creek Hydrologic Unit No.107.00. The Regional Water Board provided public notice of the application pursuant to title 23, California Code of Regulations, section 3858 on April 17, 2012, and posted information describing the project on the Regional Water Board's website. No comments were received.
2. The proposed project is located on Highway 299 at post mile (PM) 20.2-20.5, in Humboldt County. The purpose of the proposed project is to permanently repair and reconstruct the drainage facilities, roadway, and culverts that were damaged during

the 2010/2011 winter storms. Temporary measures were taken following the initial storm damage; however, Caltrans proposes a project to restore the roadway and modify existing drainage features to reduce slope saturation which has led to failure of the highway. Caltrans is proposing to repair and install drainage features to minimize the infiltration of water into the roadway prism and construct retaining walls to support the highway alignment, which crosses an existing landslide. The projects includes installation and reconstruction drainage systems throughout the project limits, roadway excavation, reconstruction and widening, installing rock slope protection at culvert outfalls, construction of two retaining walls, and revegetation of disturbed areas.

3. Caltrans has determined that the proposed project will result in 0.022 acres (960 feet²) of permanent impacts to wetlands identified as waters of the US and waters of the State. The permanent impacts to unnamed tributaries to Redwood Creek identified as waters of the U.S. would total 0.032 acres (1,400 feet²), with an additional 0.047 acres (2,047 feet²) of permanent impact to surface waters identified as waters of the State. Temporary impacts to streams identified as waters of the U.S. associated with construction would total 0.023 acres (994 feet²). In addition, temporary impact to riparian areas identified as waters of the State will be 1.5 acres (65,122 feet²), with an additional 0.05 acres (1,002 feet²) of temporary impact to surface waters features.
4. The project will result in an increase of approximately 0.36 acres of impervious surface. Caltrans has determined that it is not feasible to include post-construction storm water treatment features within the project limits. Therefore, Caltrans will be required to develop a project which provides storm water treatment to approximately 0.4 acres of existing impervious surface within the Redwood Creek watershed. Storm water runoff and modifications to the local hydrograph can be controlled primarily through the use of Low Impact Development (LID) best management practices.
5. Caltrans proposes to mitigate for direct impacts to waters of the State through on-site revegetation and off-site mitigation projects in cooperation with the Bureau of Land Management (BLM). The on-site mitigation includes the restoration/creation of 180 linear feet of intermittent stream channel within the project limits and 1.5 acres of riparian revegetation and enhancement. In addition, Caltrans proposes to perform off-site mitigation within the Lacks Creek watershed (20 mi² tributary to Redwood Creek) managed by BLM which would decommission approximately 1.75 miles of abandoned road in the Lacks Creek watershed. The project would result in the restoration of 0.03 acres of freshwater seep wetlands and 0.33 acres (1,257 linear feet) of stream channel and riparian habitat and prevent and estimated 6,150 cubic yards of sediment from discharging to surface waters.

6. The proposed project will be conducted year round; however, work in surface waters will only be conducted in summer months during low flow conditions between May 15th and October 15th. The project will result in approximately 4 acres of disturbed soil area. Caltrans will utilize Best Management Practices (BMPs) to provide erosion control and pollution prevention throughout the project area during construction. All graded areas within the project affected by the construction activities will be appropriately stabilized and/or replanted with appropriate native vegetation.
7. Caltrans has applied for authorization from the U.S. Army Corps of Engineers to perform the project under their Nationwide Permits No. 3, 14, and 33 (maintenance, linear transportation project, and temporary construction access and dewatering) pursuant to Clean Water Act, section 404. On September 27, 2011, Caltrans, acting as lead agency, certified an Initial Study with Proposed Negative Declaration for the proposed project in order to comply with the California Environmental Quality Act (CEQA) (State Clearing House No. 2011072060). The Regional Water Board has considered the environmental documentation, including any proposed changes, and incorporates any avoidance, minimization, and mitigation measures into the project as a condition of approval to avoid significant affects to the environment.
8. The Redwood Creek watershed is listed on the Clean Water Act section 303(d) list as impaired for sediment and temperature. On December 30, 1998, the U.S. EPA established sediment total maximum daily loads (TMDLs) for the Redwood Creek watershed. Roads are a significant source of sediment in the watershed (directly, from surface erosion, and, indirectly, by triggering landslides. In addition, activities that impact stream bed, banks, and floodplains and reduce riparian vegetation are identified as sources contributing to increased stream temperatures. Such projects may involve removal of vegetation and/or channel alteration, and also have potential to increase sediment loads. A focus on measures to reduce sediment discharges to surface waters from roads in the watershed, and measures to avoid, minimize, and mitigate impacts on riparian zones is essential for achieving TMDL, Basin Plan, and CEQA compliance. Accordingly, this Order is consistent with, and implements portions of the Redwood Creek TMDL.
9. Pursuant to Regional Water Board Resolution R1-2004-0087, *Total Maximum Daily Load Implementation Policy Statement for Sediment-Impaired Receiving Waters within the North Coast Region* (Sediment TMDL Implementation Policy), the Executive Officer is directed to “rely on the use of all available authorities, including existing regulatory standards, and permitting and enforcement tools to more effectively and efficaciously pursue compliance with sediment-related standards by all dischargers of sediment waste.”
10. Pursuant to Regional Water Board Resolution R1-2012-0013, *Implementation of the Water Quality Objective for Temperature in the North Coast Region* (Temperature Implementation Policy), Regional Water Board staff is directed to address factors

that contribute to elevated water temperatures when issuing 401 certifications or WDRs (permits) for individual projects. Any permit should be consistent with the assumptions and requirements of temperature shade load allocations in areas subject to existing temperature TMDLs, including EPA- established temperature TMDLs, as appropriate. If applicable, any permit or order should implement similar shade controls in areas listed as impaired for temperature but lacking a TMDL and region-wide as appropriate and necessary to prevent future impairments and to comply with the intrastate temperature objective.

11. The federal antidegradation policy requires that state water quality standards include an antidegradation policy consistent with the federal policy. The State Water Board established California's antidegradation policy in State Water Board Resolution No. 68-16. Resolution No. 68-16 incorporates the federal antidegradation policy where the federal policy applies under federal law. Resolution No. 68-16 requires that existing quality of waters be maintained unless degradation is justified based on specific findings. The Regional Water Board's Basin Plan implements, and incorporates by reference, both the State and federal antidegradation policies. This Order is consistent with applicable federal and State antidegradation policies, as it does not authorize the discharge of increased concentrations of pollutants or increased volumes of treated wastewater, and does not otherwise authorize degradation of the waters affected by this project.
12. To ensure compliance with Water Quality Objectives within the Basin Plan, adequate wetland and riparian protection and stringent requirements to avoid, minimize, and mitigate the sediment and temperature impacts associated with the proposed project will be incorporated as enforceable conditions in this Water Quality Certification. In addition, Caltrans will be required to conduct surface water monitoring, sampling, and analysis in accordance with the conditions of the Water Quality Certification. Additionally, storm water runoff monitoring, sampling, and analysis will be conducted as required by the State Water Resources Control Board (SWRCB) National Pollutant Discharge Elimination System (NPDES) Permit for Storm Water Discharges from the State of California, Department of Transportation (Caltrans) Properties, Facilities and Activities Order No. 99 – 06 - DWQ. The surface water data collected will be utilized to assess the adequacy of BMPs during construction as well as site specific mitigation measures proposed to minimize impacts to the environment, including sediment and temperature impacts.
13. This discharge is also regulated under State Water Resources Control Board Order No. 2003-0017-DWQ, "General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification," which requires compliance with all conditions of this certification.

Receiving Waters: Wetlands and intermittent, ephemeral and perennial streams
Redwood Creek Hydrologic Unit No.107.00

Filled and/or
Excavated Areas: Permanent – streams (Waters of U.S.): 0.032 acres (1,400
feet²)
Permanent – wetlands (Waters of U.S.): 0.022 acres (960 feet²)
Permanent – surface waters (waters of the State): 0.047 acres
(2,047 feet²)

Temporary – streams (Waters of U.S.): 0.023 acres (994 feet²)
Temporary – surface waters (Waters of State): 0.05 acres
(1,002 feet²)
Temporary – Riparian Areas (Waters of State): 1.5 acres
(65,122 feet²)

Total Linear Impacts: Permanent - wetlands (Waters of the U.S.): 453 linear feet
Permanent - streams (Waters of the U.S.): 427 linear feet
Permanent - streams (Waters of State): 224 linear feet

Dredge Volume : None

Fill Volume : Permanent - 725 cubic yards
Temporary – 567 cubic yards

Mitigation proposed: On-site: Restoration of 1.5 acres of Riparian Areas (Waters of
State, restoration/creation of 180 linear feet of intermittent
stream channel (waters of U.S.)

Off-site: Restoration of 0.03 acres of freshwater seep wetlands
(waters of U.S.) and 0.33 acres (1,257 linear feet) of stream
channel and riparian habitat (waters of U.S.)

Latitude/Longitude: Green Point Sink: 40.2803 N/123.8589 W

Accordingly, based on its independent review of the record, the Regional Water Board certifies that the Caltrans – Highway 299 Green Point Sink Project (WDID No. 1B11055WNHU), as described in the application will comply with sections 301, 302, 303, 306 and 307 of the Clean Water Act, and with applicable provisions of state law, provided that the Caltrans complies with the following terms and conditions:

All conditions of this order apply to Caltrans (and all its employees) and all contractors (and their employees), sub-contractors (and their employees), and any other entity or agency that performs activities or work on the project (including the off-site mitigation lands) as related to this Water Quality Certification.

1. This certification action is subject to modification or revocation upon administrative or judicial review; including review and amendment pursuant to Water Code section 13330 and title 23, California Code of Regulations, section 3867.
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 title 23, California Code of Regulations, section 3855, subdivision (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 this certification is conditioned upon total payment of any fee required under title 23, California Code of Regulations, section 3833, and owed by the applicant.
4. All conditions required by this Order shall be included in the Plans and Specifications prepared by Caltrans for the Contractor. In addition, Caltrans shall require compliance with all conditions included in this Order in the bid contract for this project.
5. Caltrans shall provide a copy of this order and State Water Resources Control Board (SWRCB) Order No. 2003-0017-DWQ (web link referenced below) to the contractor and all subcontractors conducting the work, and require that copies remain in their possession at the work site. Caltrans shall be responsible for work conducted by its contractor or subcontractors.
6. The Regional Water Board shall be notified in writing each year at least five working days (working days are Monday – Friday) prior to the commencement of ground disturbing activities, water diversion activities or construction activities with details regarding the construction schedule, in order to allow Regional Water Board staff to be present on-site during installation and removal activities, and to answer any public inquiries that may arise regarding the project. Caltrans shall provide Regional Water Board staff access to the project site to document compliance with this order.
7. The Resident Engineer (or appropriately authorized agent) shall hold on-site water quality permit compliance meetings (similar to tailgate safety meetings) to discuss permit compliance, including instructions on how to avoid violations and procedures

for reporting violations. The meetings shall be held at least every other week, before forecasted storm events, and when a new contractor or subcontractor arrives to begin work at the site. The contractors, subcontractors and their employees, as well as any inspectors or monitors assigned to the project, shall be present at the meetings. Caltrans shall maintain dated sign-in sheets for attendees at these meetings, and shall make them available to the Regional Water Board on request.

8. All activities and best management practices (BMPs) shall be implemented according to the submitted application and the conditions in this certification. BMPs for erosion, sediment, turbidity and pollutant control shall be implemented and in place at commencement of, during, and after any ground clearing activities, construction activities, or any other project activities that could result in erosion, sediment, or other pollutant discharges to waters of the State. The BMPs shall be implemented in accordance with the Caltrans Construction Site Best Management Practice Manual (CCSBMPM) and all contractors and subcontractors shall comply with the CCSBMPM. In addition, BMPs for erosion and sediment control shall be utilized year round, regardless of season or time of year. Caltrans shall stage erosion and sediment control materials at the work site. All BMPs shall be installed properly and in accordance with the manufacturer's specifications. If the project Resident Engineer elects to install alternative BMPs for use on the project, Caltrans shall submit a proposal to Regional Water Board staff for review and concurrence.
9. Caltrans shall prioritize the use of wildlife-friendly biodegradable (not photo-degradable) erosion control products wherever feasible. Caltrans shall not use or allow the use of erosion control products that contain synthetic netting for permanent erosion control (i.e. erosion control materials to be left in place for two years or after the completion date of the project). If Caltrans finds that erosion control netting or products have entrapped or harmed wildlife, personnel shall remove the netting or product and replace it with wildlife-friendly biodegradable products. Caltrans shall not use or allow the use of erosion control products that contain synthetic materials within waters of the United States or waters of the State at any time. Caltrans shall request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.
10. Herbicides and pesticides shall not be used within the project. If Caltrans has a compelling case as to why herbicides and pesticides should be used, they may submit a request along with a BMP plan to the Executive Officer of the Regional Water Board for review, consideration, and concurrence.
11. Work in flowing or standing surface waters, unless otherwise proposed in the project description and approved by the Regional Water Board, is prohibited. If construction dewatering of groundwater is found to be necessary, Caltrans shall use a method of water disposal other than disposal to surface waters (such as land disposal) or Caltrans shall apply for coverage under the Low Threat Discharge

- Permit or an individual National Pollutant Discharge Elimination System (NPDES) Permit and receive notification of coverage to discharge to surface waters, prior to the discharge.
12. Caltrans is prohibited from discharging waste to waters of the State, unless explicitly authorized by this Order. For example, no debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete or concrete washings, welding slag, oil or petroleum products, or other organic or earthen material from any construction or associated activity of whatever nature, other than that authorized by this Order, shall be allowed to enter into waters of the State. In addition, none of the materials listed above shall be placed within 150 linear feet of waters of the State or where the materials may be washed by rainfall into waters of the State.
 13. Caltrans shall submit, subject to review and concurrence by the Regional Water Board staff, a dewatering and/or diversion plan that appropriately describe the dewatered or diverted areas and how those areas will be handled during construction. The diversion/dewatering plans shall be submitted no later than 30 days prior to conducting the proposed activity. Information submitted shall include the area or work to be diverted or dewatered and method of the proposed activity. All diversion or dewatering activities shall be designed to minimize the impact to waters of the State and maintain natural flows upstream and downstream. All dewatering or diversion structures shall be installed in a manner that does not cause sedimentation, siltation or erosion upstream or downstream. All dewatering or diversion structures shall be removed immediately upon completion of project activities. The in-channel work will only be conducted between June 15 and October 15. This Order does not authorize Caltrans to draft surface waters.
 14. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall be outside of waters of the U.S. and the State. Fueling, lubrication, maintenance, storage and staging of vehicles and equipment shall not result in a discharge or a threatened discharge to any waters of the State or the U.S. At no time shall Caltrans use any vehicle or equipment which leaks any substance that may impact water quality.
 15. Caltrans shall implement appropriate BMPs to prevent the discharge of equipment fluids to the stream channel. The minimum requirements will include: storing hazardous materials at least 150 linear feet outside of the stream banks; checking equipment for leaks and preventing the use of equipment with leaks; pressure washing or steam cleaning equipment to remove fluid residue on any of its surfaces prior to its entering any stream channel in a manner that does not result in a discharge to waters of the State.
 16. If, at any time, an unauthorized discharge to surface water (including wetlands, rivers or streams) occurs, or any water quality problem arises, the associated project activities shall cease immediately until adequate BMPs are implemented.

The Regional Water Board shall be notified promptly and in no case more than 24 hours after the unauthorized discharge or water quality problem arises.

17. Caltrans and their contractor are not authorized to discharge wastewater (e.g., water that has contacted uncured concrete or cement, or asphalt) to surface waters, ground waters, or land. Wastewater may only be disposed of to a sanitary waste water collection system/facility (with authorization from the facility's owner or operator) or a properly-licensed disposal or reuse facility. If Caltrans or their contractor proposes an alternate disposal method, Caltrans or their contractor shall request authorization from the Regional Water Board. Plans to reuse or recycle wastewater require written approval from Regional Water Board staff.
18. Caltrans shall provide analysis and verification that placing non-hazardous waste or inert materials (which may include discarded product or recycled materials) will not result in degradation of water quality, human health, or the environment. All project-generated waste shall be handled, transported, and disposed in strict compliance with all applicable State and Federal laws and regulations. When operations are complete, any excess material or debris shall be removed from the work area and disposed of properly and in accordance with the Special Provisions for the project and/or Standard Specification 7-1.13, Disposal of Material Outside the Highway Right of Way. Within 30 days of disposing of materials off-site Caltrans shall submit to the Regional Water Board the satisfactory evidence provided to the Caltrans Engineer by the Contractor referenced in Standard Specification 7-1.13. In accordance with State and Federal laws and regulations, Caltrans is liable and responsible for the proper disposal of waste generated by their project.
19. All imported fill material shall be clean and free of pollutants. All fill material shall be imported from a source that has the appropriate environmental clearances and permits. The reuse of low-level contaminated solids as fill on-site shall be performed in accordance with all State and Federal policies and established guidelines and must be submitted to the Regional Water Board for review and concurrence.
20. Only clean washed spawning gravel (0.25" – 6") with a cleanliness value of at least 85, using the Cleanness Value Test Method for California Test No. 227 will be placed in the streams. Gravel bag fabric shall be nonwoven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:
 - Mass per unit area, grams per square meter, min ASTM Designation: D 5261 – 270
 - Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632* 0.89
 - Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D4355, xenon arc lamp method 70 or appropriate test method for specific polymer

- Gravel bags shall be between 600 mm and 800 mm in length, and between 400 mm and 500 mm in width.
 - Yarn used in construction of the gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color. Gravel shall be between 0.5" – 4" in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg and 22 kg in mass.
 - Caltrans shall request approval from the Regional Water Board if an exception from this requirement is needed for a specific location.
21. In order to demonstrate compliance with receiving water limitations and water quality objectives surface water monitoring shall be conducted. When conducting surface water monitoring Caltrans shall establish discharge, upstream (background) and downstream monitoring locations to demonstrate compliance with applicable water quality objectives. The downstream location shall be no more than 100 feet from the discharge location.
- A. Surface water monitoring shall be conducted whenever a project activity is conducted within waters of the State (e.g. including but not limited to the installation, use or removal of stream diversions, pile installations, and cofferdams). Measurements and observations shall be collected from each sampling location four times daily.
 - B. Surface water monitoring shall be conducted immediately when any project activity has mobilized sediment or other pollutants resulting in a discharge and/or has the potential to alter background conditions within waters of the State (including but not limited to storm water runoff, concrete discharges, leaks, and spills.). The continuing frequency is contingent upon results of field measurements and applicable water quality objectives.

Surface water monitoring field measurements shall be taken for pH and turbidity. In addition, visual observations of each location shall be documented daily for each established monitoring location and monitoring event and include the estimate of flow, appearance of the discharge including color, floating or suspended matter or debris, appearance of the receiving water at the point of discharge (occurrence of erosion and scouring, turbidity, solids deposition, unusual aquatic growth, etc), and observations about the receiving water, such as the presence of aquatic life. If a project activity has reached a steady state and is stable then Caltrans may request a temporary reprieve from this condition from the Regional Water Board until an activity or discharge triggers the monitoring again.

22. Whenever, as a result of project activities (in-stream work or a discharge to receiving waters), downstream measurements exceed any water quality objective 100 feet downstream of the source(s) all necessary steps shall be taken to install,

repair, and/or modify BMPs to control the source(s). The frequency of surface water monitoring shall increase to hourly and shall continue until measurements demonstrate compliance with water quality objectives for each parameter listed below and measured levels are no longer increasing as a result of project activities. In addition, the overall distance from the source(s) to the downstream extent of the exceedence of water quality objectives shall be measured.

Monitoring results shall be reported to appropriate Regional Water Board staff person by telephone within 24 hours of taking any measurements that exceed the limits detailed below (only report turbidity if it is higher than 20 NTU).

pH	<6.5 or >8.5 (any changes >0.5 units)
turbidity	20% above natural background

Monitoring results and upstream and downstream pictures within the working and/or disturbed area and discharge location shall be taken and submitted to the appropriate Regional Water Board staff within 24 hours of the incident. All other monitoring data documenting compliance with water quality objectives shall be reported on a monthly basis and is due to the Regional Water Board by the 15th of the following month.

23. Post Storm Event Reports:

- Once the project has begun ground-disturbing activities, and subsequent to a qualifying rain event that exceeds 0.5-inches of precipitation, Caltrans shall inspect the project within 24 hours and take photos of all discharge locations, and disturbed areas, including all excess materials disposal areas, in order to demonstrate that erosion control and revegetation measures are present and have been installed appropriately and are functioning effectively. A brief report containing these photos, corrective actions (if necessary), and any surface water monitoring results collected pursuant to this Order or the Construction General Permit (SWRCB Order 2009-009 DWQ) shall be submitted to the Regional Water Board within 10 days after the end of the qualifying rain event. Inspections are required daily during extended rain events. Once the project site is stable, in a steady state (channel- ground- or vegetation-disturbing activities have ceased), and has demonstrated sufficient and effective erosion and sediment control, Caltrans may request a reprieve from this condition from the Regional Water Board. At least one post-construction inspection is required to demonstrate sufficient and effective erosion and sediment control and compliance with the Basin Plan.
- Rain events are periods of precipitation that that are separated by more than 48-hours of dry weather. Rainfall amounts may be taken from on-site rain gauges, from the nearest California Data Exchange Center station

(<http://cdec.water.ca.gov>), or by a custom method or station approved by Regional Water Board staff.

24. Caltrans shall perform on-site revegetation actions in accordance with the application and Caltrans-prepared *Green Point Sink Emergency & Restoration Project Revegetation Plan*, dated January 2012. Revegetation planting shall occur in the first full planting season (November to April) subsequent to the year construction is complete and erosion control is established. Revegetation monitoring reports are due on December 31, annually for up to five years or until success is achieved.
25. Caltrans shall perform off-site mitigation as proposed in the Caltrans-prepared *Green Point Sink Emergency and Restoration Projects Off-site Mitigation and Monitoring Plan within Lacks Creek Watershed*, dated June 2012. This Order authorizes the construction of the mitigation project which shall result in the restoration of 0.03 acres of freshwater seep wetlands and 0.33 acres (1,257 linear feet) of stream channel and riparian habitat and prevent and estimated 6,150 cubic yards of sediment from discharging to surface waters. The mitigation project shall be completed by October 15th, 2013, with the first annual monitoring report due to the Regional Water Board on December 31, 2013.
26. Caltrans shall develop and implement a project to off-set the increase storm water run-off resulting from the increase in impervious surface from the highway project. The off-set project shall incorporate Low Impact Development (LID) methods to capture and treat the volume of storm water for 0.4 acres of existing impervious surface within the Redwood Creek HA 107.00. The plan shall be submitted to the Executive Officer of the Regional Water Board for review, consideration, and concurrence no later than December 31, 2012. The projects shall be completed by October 15th, 2013.
27. 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 applicable state or federal law. For the purposes of section 401(d) of the 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 assure compliance with the water quality standards and other pertinent requirements incorporated into this Order. In response to a suspected violation of any condition of this certification, the State Water Board may require the holder of any federal permit or license subject to this Order to furnish, under penalty of perjury, any technical or monitoring reports the State Water Board deems appropriate, provided that the burden, including costs, of the reports shall bear a reasonable relationship to the need for the reports and the benefits to be obtained from the reports. In response to any violation of the conditions of this Order, the Regional Water Board may add to or modify the conditions of this Order as appropriate to ensure compliance.

28. The Regional Water Board may add to or modify the conditions of this Order, as appropriate, to implement any new or revised water quality standards and implementation plans adopted or approved pursuant to the Porter-Cologne Water Quality Control Act or section 303 of the Clean Water Act.
29. This Order is not transferable. In the event of any change in control of ownership of land presently owned or controlled by the Applicant, the Applicant shall notify the successor-in-interest of the existence of this Order by letter and shall forward a copy of the letter to the Regional Water Board. The successor-in-interest must send to the Regional Water Board Executive Officer a written request for transfer of this Order to discharge dredged or fill material under this Order. The request must contain the following:
 - a. requesting entity's full legal name
 - b. the state of incorporation, if a corporation
 - c. address and phone number of contact person
 - d. description of any changes to the project or confirmation that the successor-in-interest intends to implement the project as described in this Order.
30. Except as may be modified by any preceding conditions, all certification actions are contingent on: a) the discharge being limited, and all proposed revegetation, avoidance, minimization, and mitigation measures being completed, in strict compliance with Caltrans' project description and CEQA documentation, as approved herein, b) Caltrans shall construct the project in accordance with the project described in the application and the findings above, and c) compliance with all applicable water quality requirements and water quality control plans including the requirements of the Water Quality Control Plan for the North Coast Region (Basin Plan), and amendments thereto. Any change in the design or implementation of the project that would have a significant or material effect on the findings, conclusions, or conditions of this Order must be submitted to the Executive Officer of the Regional Water Board for prior review, consideration, and written concurrence. If the Regional Water Board is not notified of a significant alteration to the project, it will be considered a violation of this Order, and Caltrans may be subject to Regional Water Board enforcement actions.
31. The authorization of this certification for any dredge and fill activities expires on June 20, 2017. Conditions and monitoring requirements outlined in this Order are not subject to the expiration date outlined above, and remain in full effect and are enforceable.

32. Please contact our staff Environmental Specialist / Caltrans Liaison Jeremiah Puget of at (707) 576-2835 or jpuget@waterboards.ca.gov if you have any questions.



Matthias St. John
Executive Officer

120620_JJP_ef_CDOT_Hwy299_GreenPointSink_401Cert

Web link: State Water Resources Control Board Order No. 2003-0017 -DWQ, General Waste Discharge Requirements for Dredge and Fill Discharges That Have Received State Water Quality Certification can be found at:
[http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_q
uality/2003/wqo/wqo2003-0017.pdf](http://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2003/wqo/wqo2003-0017.pdf)

Original to: Ms. Denise Walker-Brown, Caltrans, District 1, P.O. Box 3700, Eureka, CA 95502-3700

Copies to: Ms. Kathleen Sartorius, Caltrans, District 1, P.O. Box 3700, Eureka, CA 95502-3700

Electronic
Copies to: U.S. Army Corps of Engineers, Regulatory Functions - San Francisco District



DEPARTMENT OF THE ARMY
SAN FRANCISCO DISTRICT, U.S. ARMY CORPS OF ENGINEERS
1455 MARKET STREET, 16th Floor
SAN FRANCISCO, CALIFORNIA 94103-1398

REPLY TO
ATTENTION OF

JUN 27 2012

Regulatory Division

SUBJECT: File No. 2012-00044N

Mr. Gary Berrigan
Department of Transportation
District 1-North Region Environmental
P.O. Box 3700
Eureka, California 95502-3700

Dear Mr. Berrigan:

This letter is in reference to your submittal dated May 2, 2012, concerning Department of the Army (Corps) permit authorization to repair two failing segments of SR 299 from postmile 20.2 through 20.5. The two sites are failing due to the highway alignment crossing two historic landslides. Poor surface and subsurface drainage conditions coupled with lateral movement and subsidence of the subgrade below the roadway are contributing to the slope instability. During the rainy season, the slope saturation triggers movement of the underlying landslides. Continuous maintenance work to keep the highway open indicates the need for permanent repair of the site.

The project would repair the two segments of highway by reconstructing the roadway and drainage system in conjunction with constructing tie-back walls that would address the stability problem of the subgrade below the roadbed. The proposed repairs include an upslope widening of the highway, installation and realignment of culverts, and construction of two soldier pile tie-back walls below the roadway. The tie-back walls would be as deep as the failure plane and as long as the width of the failure prism. The project would reduce annual maintenance costs for the site and prevent catastrophic failure of the segment of the highway during future rain events. The project is located on SR 299 about 11-miles east of Blue Lake and 0.2-miles west of Chezem Road at postmile 20.2-20.5, Humboldt County, California.

Based on a review of the information you submitted, your project qualifies for authorization under Department of the Army Nationwide Permit (NWP) 14 (*Linear Transportation Systems*) (77 Fed. Reg. 10, February 21, 2012), pursuant to Section 404 of the Clean Water Act (33 U.S.C. § 1344) and Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. § 403). All work shall be completed in accordance with the plans and drawings entitled: "Project Plans for Construction on State Highway (sheet 1 of 13)," "Typical Cross Section (sheets 2-4 of 13)," "Layout (sheets 5-6 of 13)," "Profile (sheets 7-8 of 13)," and "Construction Details (sheets 9-13 of 13)," dated July 2, 2010.

The project must be in compliance with the Terms and Conditions of the NWP's cited in Enclosure 1 and any Special Conditions specified in this letter for the NWP authorization to remain valid. Non-compliance with any Term or Condition could result in the revocation of the NWP authorization for your project, thereby requiring you to obtain an Individual Permit from the Corps of Engineers (Corps). Upon completion of the project and all associated mitigation and monitoring requirements, you shall sign and return the statement cited in Enclosure 2, certifying all work complies with the Terms and Conditions of the NWP's. Project authorization under the NWP's does not obviate any requirement to obtain other Federal, State, or local approvals necessitated by law.

This verification will remain valid for two years from the date of this letter. Activities which have commenced (i.e., are under construction) or are under contract to commence in reliance upon an NWP will remain authorized provided the activity is completed within 12 months of the date of an NWP's expiration, modification, or revocation, unless discretionary authority has been exercised on a case-by-case basis to modify, suspend, or revoke the authorization in accordance with 33 CFR 330.4(e) and 33 CFR 330.5 (c) or (d). The Chief of Engineers will periodically review NWP's and their conditions and will decide to either modify, reissue, or revoke the permits. If an NWP is not modified or reissued within five years of its effective date, it automatically expires and becomes null and void. It is incumbent upon you to remain informed of any changes to the NWP's. Changes to the NWP's would be announced by Public Notice posted on our website (<http://www.spn.usace.army.mil/regulatory/index.html>).

Project authorization will not be effective until you have obtained Section 401 water quality certification from the Regional Water Quality Control Board (RWQCB), North Coast Region. If the RWQCB fails to act on a valid request for certification within two (2) months after receipt of a complete application, the Corps will presume a waiver of water quality certification has been obtained. You shall submit a copy of the certification to the Corps prior to the commencement of work. You shall comply with any condition of certification required by the RWQCB, and you shall consider any such conditions to be an integral part of the NWP authorization for the project.

To ensure compliance with this NWP authorization and to further minimize adverse impacts to water quality and other aquatic resources, including federally listed threatened and endangered species and designated critical and essential fish habitat, the project is subject to the following Special Conditions:

1. The permittee shall mitigate for permanent impacts to 0.054-acre of wetland and non-wetland waters of the U.S., through restoration (reestablishment) of 0.026 acre of seep (palustrine emergent wetland) waters of the U.S. and 0.15 acre of non-wetland waters of the U.S. as described in the draft mitigation plan: "Green Point Sink Emergency and

Restoration Projects Off-site Mitigation & Monitoring Plan within Lacks Creek Watershed" (dated June 6, 2012, and prepared by Denise Walker-Brown, Associate Environmental Planner (Natural Science).

2. The permittee shall submit a final mitigation plan and receive written Corps approval of the final plan prior to commencement of Green Point Sink project construction. The permittee shall fully implement this final mitigation plan concurrently with impacts to waters of the U.S. The responsible party for mitigation implementation, performance, and long-term management is CalTrans. The permittee retains ultimate legal responsibility for meeting the requirements of the final mitigation plan. Detailed mitigation objectives, performance standards, and monitoring requirements shall be described in the above final mitigation plan. Specifically, the draft plan shall be amended to include the following information in the final submitted plan (as set forth in Special Conditions 3 through 9 and agreed to by Caltrans on June 21, 2012).
3. The permittee shall submit site-specific drawings for the wetland and non-wetland waters of the U.S. reestablishment areas in accordance with the Corps' South Pacific Division map and drawing standards (Special Public Notice dated March 5, 2012). Drawings will include proposed wetland contours and plant community composition.
4. The mitigation monitoring shall be performed for a minimum of five (5) years, as opposed to the proposed 3-year period written into the draft plan.
5. The permittee shall ensure the following performance standard is met: greater than or equal to 50% absolute cover (for combined strata) of native, wetland species (OBL/FACW) is present by year 5.
6. The permittee shall ensure the following performance standard is met: greater than or equal to 75% relative cover (for combined strata) of native species is present by year 5.
7. The permittee shall ensure the following performance standard is met: less than or equal to 10% absolute cover of invasive plant species by year 5. Invasive plant species are those categorized as "high" or "moderate" on the California Invasive Plant Inventory.
8. The permittee shall ensure the following performance standard is met: greater than or equal to 75% of the average number (species richness) of native species surveyed in baseline surveys by year 5.

9. The permittee shall conduct and submit the results of baseline surveys to determine the native species list/plant composition for reference sites along Lacks Creek, including appropriate photo-documentation. These survey results shall be included in the final mitigation plan.
10. The permittee shall restore all temporarily impacted areas (0.023 acre of non-wetland waters of the U.S.) through the restoration of all temporary impact areas to pre-construction contours. All disturbed areas shall be revegetated with pre-existing and/or native wetland vegetation as described in the "Green Point Sink Emergency and Restoration Projects Revegetation Plan," dated January 2012, and prepared by Caltrans.
11. Best management practices shall be fully implemented. No debris, sand, silt, trash, concrete or washings thereof, oil or other petroleum products or washings thereof, or other foreign materials shall be allowed to enter or be placed where it may be washed by rainfall or runoff into waters of the U.S. Upon project completion, any and all excess construction materials, debris, and/or other excess project materials shall be removed to an appropriate upland disposal site.
12. All minimization measures provided by FWS in their concurrence letter dated September 27, 2011, shall be implemented.

You may refer any questions on this matter to Carol Heidsiek of our Regulatory staff by telephone at 707-443-0855. All correspondence should be addressed to the Regulatory Division, North Branch, Eureka Field Office, 601 Startare Drive, Box 14, Eureka, California 95501, referencing the file number at the head of this letter. If you would like to provide comments on our permit review process, please complete the Customer Survey Form available online at our website: <http://per2.nwp.usace.army.mil/survey.html>.

Sincerely,



 Jane M. Hicks
Chief, Regulatory Division

Enclosures

CALIFORNIA DEPARTMENT OF FISH AND GAME
REGION 1 - NORTHERN
601 LOCUST STREET
REDDING, CA, 96001



RECEIVED

MAY 08 2012

D. F. G. – EUREKA

STREAMBED ALTERATION AGREEMENT
NOTIFICATION No. 1600-2012-0019-R1
UNNAMED TRIBUTARY TO REDWOOD CREEK

CALTRANS AND MR. RICHARD MULLEN
GREEN POINT SINK RESTORATION PROJECT
(ONE ENCROACHMENT)

This Streambed Alteration Agreement (Agreement) is entered into between the California Department of Fish and Game (DFG) and Caltrans (Permittee) as represented by Mr. Richard Mullen.

RECITALS

WHEREAS, pursuant to Fish and Game Code (FGC) section 1602, Permittee notified DFG on January 23, 2012, that Permittee intends to complete the project described herein.

WHEREAS, pursuant to FGC section 1603, DFG has determined that the project could substantially adversely affect existing fish or wildlife resources and has included measures in the Agreement necessary to protect those resources.

WHEREAS, Permittee has reviewed the Agreement and accepts its terms and conditions, including the measures to protect fish and wildlife resources.

NOW THEREFORE, Permittee agrees to complete the project in accordance with the Agreement.

PROJECT LOCATION

The project is located at an Unnamed Tributary to Redwood Creek, in the County of Humboldt, State of California; Latitude 40° 54' 59.76"N, Longitude 123° 29' 44.61"W; Section 10, Township 6N, Range 3E, U.S. Geological Survey (USGS) map Lord Ellis Summit, Humboldt Base and Meridian.

PROJECT DESCRIPTION

The project is limited to the installation of a new culvert at Highway 299, Post Mile 20.43. The culvert shall consist of one 24-inch diameter, 53-foot-long culvert connected to a 30-inch diameter, 80-foot-long culvert. A rock energy dissipater (RED) constructed of approximately 18 cubic yards of rock will be placed below the culvert outlet.

PROJECT IMPACTS

Existing fish or wildlife resources the project could substantially adversely affect include: **northern red legged frog (*Rana aurora*)**, other non-game and game fishes, amphibians, reptiles, aquatic invertebrates, mammals, birds, and other aquatic and riparian species.

The adverse effects the project could have on the fish or wildlife resources identified above include:

Impacts to bed, channel, or bank and effects on habitat structure:

1. permanent loss of natural bed or bank;
2. permanent change in contour of bed, channel or bank;
3. temporary loss of bank stability during construction;
4. permanent change in composition of channel materials (substrate particle size);
5. debris transport impedance (from culvert);

Impacts to water quality:

1. temporary increased turbidity;

Impacts to bed, channel, or bank and direct effects on fish, wildlife, and their habitat:

1. temporary loss or decline of riparian and/or emergent marsh habitat;
2. direct take of aquatic species;
3. temporary disruption to nesting birds and other wildlife;
4. temporary disturbance from project activity;

Impacts to natural flow and effects on habitat structure and process:

1. temporary diversion of flowing water from, or around, activity site;
2. dewatering;
3. rewatering;

MEASURES TO PROTECT FISH AND WILDLIFE RESOURCES

1. Administrative Measures

Permittee shall meet each administrative requirement described below.

- 1.1 Documentation at Project Site. Permittee shall make the Agreement, any extensions and amendments to the Agreement, and all related notification materials and California Environmental Quality Act (CEQA) documents, readily available at the project site at all times and shall be presented to DFG personnel, or personnel from another state, federal, or local agency upon request.
- 1.2 Providing Agreement to Persons at Project Site. Permittee shall provide copies of the Agreement and any extensions and amendments to the Agreement to all persons who will be working on the project at the project site on behalf of Permittee, including but not limited to contractors, subcontractors, inspectors, and monitors.

- 1.3 Notification of Conflicting Provisions. Permittee shall notify DFG if Permittee determines or learns that a provision in the Agreement might conflict with a provision imposed on the project by another local, state, or federal agency. In that event, DFG shall contact Permittee to resolve any conflict.
- 1.4 Project Site Entry. Permittee agrees that DFG personnel may enter the project site at any time to verify compliance with the Agreement.
- 1.5 DFG Notification of Work Initiation and Completion. The Permittee shall contact DFG within the 7-day period preceding the beginning of work permitted by this Agreement. Information to be disclosed shall include Agreement number, and the anticipated start date. The Permittee shall contact DFG within thirty days of completion of the work permitted by this Agreement. Information to be disclosed shall include Agreement number.
- 1.6 Contractor Responsibility. The Permittee shall ensure that any and all contractors involved in this project have read and understand this Agreement, and accept the conditions found therein.

2. Avoidance and Minimization Measures

To avoid or minimize adverse impacts to fish and wildlife resources identified above, Permittee shall implement each measure listed below.

- 2.1 Except where otherwise stipulated in this Agreement, all work shall be in accordance with the work plan submitted with Notification No. 1600-2012-0019-R1, as of January 23, 2012.
- 2.2 All instream work shall be confined to the period June 15 through October 31 of each year.
- 2.3 Excess fill shall be placed in stable upland areas where it cannot enter or erode into a stream. DFG shall field inspect and pre-approve of any proposed fill disposal site prior to its use by the contractor.
- 2.4 Trees greater than 16-inch dbh removed from the work area shall be transferred to DFG for instream habitat enhancement projects. Trees shall be cut into approximately 30-foot lengths.
- 2.5 The new permanent culvert at PM 20.43 shall extend lengthwise completely beyond the toe of fill. The culvert and its outfall structure shall be aligned with the stream channel, and as wide as or wider than the channel width. The proposed energy dissipater shall be constructed of rock appropriately sized to withstand scour and displacement from any and all potential flows exiting the culvert outlet.
- 2.6 If there is any streamflow when instream work will be done, the Permittee shall construct coffer dams upstream and downstream of the excavation site and divert all flow around the site. Cofferdams may be constructed with clean river run gravel or sand bags, and

may be sealed with sheet plastic. Upon project completion, sand bags and any sheet plastic shall be removed from the stream. When bypassing stream flow around work area, stream flow below the construction site shall be maintained similar to the unimpeded flow at all times.

- 2.7 Equipment shall not operate in a live (flowing) stream or wetted channel except as may be necessary to construct and remove in-stream structures to catch and contain water (i.e. cofferdams) to divert stream flow and isolate the work site, or as otherwise specifically provided for in this Agreement.
- 2.8 No fill material shall be placed within a stream except as specified in this Agreement. No native fill shall be placed in a live stream. Any fill material used shall be placed and/or removed in such a manner that it shall cause no sediment discharge or siltation in the stream.
- 2.9 All heavy equipment that will be entering the live stream shall be cleaned of materials deleterious to aquatic life including oil, grease, hydraulic fluid, soil and other debris. Cleaning of equipment shall take place outside of the riparian area and prior to entering the water.
- 2.10 Adequate and effective erosion and siltation control measures shall be used to prevent sediment or turbid or silt-laden water from entering streams. Where needed, the Permittee shall use native vegetation or other treatments including jute netting, straw wattles, and geotextiles to protect and stabilize soils. Geotextiles, fiber rolls, and other erosion control treatments shall not contain plastic mesh netting.
- 2.11 All bare mineral soil exposed in conjunction with construction, deconstruction, maintenance or repair activities, shall be treated for erosion prior to the onset of precipitation capable of generating run-off or the end of the yearly work period, whichever comes first. Restoration shall include the seeding and mulching of all bare mineral soil exposed in conjunction with encroachment work. Erosion control shall consist of at least 2 to 4 inches straw mulch and 100 lbs/acre equivalent barley seed. No annual, or Italian, ryegrass (*Lolium multiflorum*) shall be used.
- 2.12 Disturbance or removal of vegetation shall not exceed the minimum necessary to complete operations.
- 2.13 The Permittee shall provide site maintenance including, but not limited to, re-applying erosion control to minimize surface erosion and ensuring drainage structures, streambeds and banks remain sufficiently armored and/or stable.
- 2.14 Refueling of equipment and vehicles and storing, adding or draining lubricants, coolants or hydraulic fluids shall not take place within riparian areas or within stream beds, banks or channels. All such fluids and containers shall be disposed of properly. Heavy equipment including water drafting trucks parked within riparian areas or streambeds, banks or channels shall use drip pans or other devices (i.e., absorbent blankets, sheet barriers or other materials) as needed to prevent soil and water contamination.

- 2.15 All activities performed in the field which involve the use of petroleum or oil based substances shall employ absorbent material designated for spill containment and clean up activity on site for use in case of accidental spill. Clean-up of all spills shall begin immediately. The Permittee shall immediately notify the State Office of Emergency Services at 1-800-852-7550. DFG shall be notified by the Permittee and consulted regarding clean-up procedures.
- 2.16 No debris, soil, silt, sand, bark, slash, sawdust, rubbish, cement or concrete washings, oil or petroleum products, or other organic or earthen material from any logging, construction, or associated activity of whatever nature shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into Waters of the State. When operations are completed, any excess materials or debris shall be removed from the work area.

3. Reporting Measures

Permittee shall meet each reporting requirement described below.

- 3.1 Permittee shall provide a final construction report via email to DFG no later than 30 days after the project is fully completed. The construction report at a minimum shall contain a brief summary of the work accomplished, and pre- and post-project photos of each site.

CONTACT INFORMATION

Written communication that Permittee or DFG submits to the other shall be delivered to the address below unless Permittee or DFG specifies otherwise:

To Permittee:

Mr. Richard Mullen
California Department of Transportation
1656 Union Street, P.O. Box 3700
Eureka, CA 95502-3700
Fax: (707) 441-5873
Email: Richard_Mullen@dot.ca.gov

To DFG:

Department of Fish and Game
Northern Region
619 2nd Street
Eureka, CA 95501

Attn: Lake and Streambed Alteration Program – Scott Bauer
Notification #1600-2012-0019-R1
Fax: (707) 441-2021
Email: sbauer@dfg.ca.gov

LIABILITY

Permittee shall be solely liable for any violations of the Agreement, whether committed by Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents or contractors and subcontractors, to complete the project or any activity related to it that the Agreement authorizes.

This Agreement does not constitute DFG's endorsement of, or require Permittee to proceed with the project. The decision to proceed with the project is Permittee's alone.

SUSPENSION AND REVOCATION

DFG may suspend or revoke in its entirety the Agreement if it determines that Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, is not in compliance with the Agreement.

Before DFG suspends or revokes the Agreement, it shall provide Permittee written notice by certified or registered mail that it intends to suspend or revoke. The notice shall state the reason(s) for the proposed suspension or revocation, provide Permittee an opportunity to correct any deficiency before DFG suspends or revokes the Agreement, and include instructions to Permittee, if necessary, including but not limited to a directive to immediately cease the specific activity or activities that caused DFG to issue the notice.

ENFORCEMENT

Nothing in the Agreement precludes DFG from pursuing an enforcement action against Permittee instead of, or in addition to, suspending or revoking the Agreement.

Nothing in the Agreement limits or otherwise affects DFG's enforcement authority or that of its enforcement personnel.

OTHER LEGAL OBLIGATIONS

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from obtaining any other permits or authorizations that might be required under other federal, state, or local laws or regulations before beginning the project or an activity related to it.

This Agreement does not relieve Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, from complying with other applicable statutes in the FGC including, but not limited to, FGC sections 2050 et seq. (threatened and endangered species), 3503 (bird nests and eggs), 3503.5 (birds of prey), 5650 (water pollution), 5652 (refuse disposal into water), 5901 (fish passage), 5937 (sufficient water for fish), and 5948 (obstruction of stream).

Nothing in the Agreement authorizes Permittee or any person acting on behalf of Permittee, including its officers, employees, representatives, agents, or contractors and subcontractors, to trespass.

AMENDMENT

DFG may amend the Agreement at any time during its term if DFG determines the amendment is necessary to protect an existing fish or wildlife resource.

Permittee may amend the Agreement at any time during its term, provided the amendment is mutually agreed to in writing by DFG and Permittee. To request an amendment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the corresponding amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

TRANSFER AND ASSIGNMENT

This Agreement may not be transferred or assigned to another entity, and any purported transfer or assignment of the Agreement to another entity shall not be valid or effective, unless the transfer or assignment is requested by Permittee in writing, as specified below, and thereafter DFG approves the transfer or assignment in writing.

The transfer or assignment of the Agreement to another entity shall constitute a minor amendment, and therefore to request a transfer or assignment, Permittee shall submit to DFG a completed DFG "Request to Amend Lake or Streambed Alteration" form and include with the completed form payment of the minor amendment fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5).

EXTENSIONS

In accordance with FGC section 1605(b), Permittee may request one extension of the Agreement, provided the request is made prior to the expiration of the Agreement's term. To request an extension, Permittee shall submit to DFG a completed DFG "Request to Extend Lake or Streambed Alteration" form and include with the completed form payment of the extension fee identified in DFG's current fee schedule (see Cal. Code Regs., tit. 14, § 699.5). DFG shall process the extension request in accordance with FGC 1605(b) through (e).

If Permittee fails to submit a request to extend the Agreement prior to its expiration, Permittee must submit a new notification and notification fee before beginning or continuing the project the Agreement covers (Fish & G. Code, § 1605, subd. (f)).

EFFECTIVE DATE

The Agreement becomes effective on the date of DFG's signature, which shall be: 1) after Permittee's signature; 2) after DFG complies with all applicable requirements under the California Environmental Quality Act (CEQA); and 3) after payment of the applicable FGC section 711.4 filing fee listed at http://www.dfg.ca.gov/habcon/ceqa/ceqa_changes.html.

TERM

This Agreement becomes effective on the date of DFG's signature and terminates **2 years** from the effective date, unless it is terminated or extended before then. All provisions in the

Agreement shall remain in force throughout its term. Permittee shall remain responsible for implementing any provisions specified herein to protect fish and wildlife resources after the Agreement expires or is terminated, as FGC section 1605(a)(2) requires.

AUTHORITY

If the person signing the Agreement (signatory) is doing so as a representative of Permittee, the signatory hereby acknowledges that he or she is doing so on Permittee's behalf and represents and warrants that he or she has the authority to legally bind Permittee to the provisions herein.

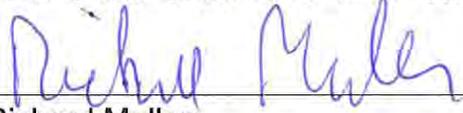
AUTHORIZATION

This Agreement authorizes only the project described herein. If Permittee begins or completes a project different from the project the Agreement authorizes, Permittee may be subject to civil or criminal prosecution for failing to notify DFG in accordance with FGC section 1602.

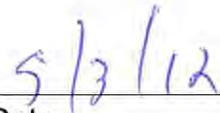
CONCURRENCE

The undersigned accepts and agrees to comply with all provisions contained herein.

FOR CALIFORNIA DEPT. OF TRANSPORTATION



Richard Mullen
Project Manager



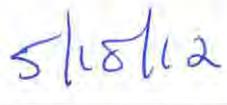
Date

FOR DEPARTMENT OF FISH AND GAME



Curt Babcock
Environmental Program Manager

T. LABANZA



Date

Prepared by: Scott Bauer
Staff Environmental Scientist

Memorandum

*Flex your power!
Be energy efficient!*

To: JOE DOWNING
Division of Structure Design
Office of Bridge Design North
Branch 3

Date: July 25, 2011

File: 01-HUM-299-PM 20.2
Green Point Sink Location 1
EFIS ID: 0100000172
Bridge No: 04E0028

Attn: Lewis Shen

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – OGDN

Subject: Foundation Report for Green Point Sink Retaining Wall No.1

1. INTRODUCTION

This Foundation Report summarizes the results of the geotechnical investigation and provides geotechnical recommendations for the proposed soldier pile tieback wall on Route 299 at post mile (PM) 20.2 (Location 1) in Humboldt County, CA (Vicinity Map, Figure 1). The wall is required to stabilize the roadway within the limits of an active earth flow that originates approximately 500 feet upslope of the highway.

2. PROJECT DESCRIPTION

The above referenced location was identified as a “perennial maintenance problem” in 2000. The roadway has been subsiding for about two decades due to landslide movement. The need for a permanent repair was warranted after considerable rain and landslide movement in 05/06 caused significant damage. An underdrain system was installed upslope and surface drainage work was done this earlier this year to help reduce the rate of active movement. The proposed tieback wall is approximately 408 feet in length and has a maximum height of 46 feet. The wall layout line is shown on the Site Plan and Landslide Map (Figure 2).

3. SCOPE OF WORK

The recommendations contained in this report are based on a review of geotechnical/geologic literature, a subsurface investigation, field observations, laboratory testing of soil samples, and geotechnical calculations. Subsurface conditions were evaluated only at the boring locations and may deviate elsewhere within the Project Limits. The elevations reported in this memorandum are with respect to Mean Sea Level (MSL).

4. PERTINENT REPORTS AND INVESTIGATIONS

Caltrans Bridge Design Specifications, August 2004

Fall, J.N. et. al. 2006, "Landslides in the Highway 299 Corridor between Blue Lake and Willow Creek, Humboldt County, California, California Geological Survey, Special Report 195.

Freeze, R.A. and Cherry, J. A. , 1979, "Groundwater", Prentice-Hall, Inc.

Sabatini, P. J. et. al. 1999, "Geotechnical Engineering Circular No. 4 - Ground Anchors and Anchored Systems" FHWA Report No. FHWA-IF-99-015.

List of California Vegetation Alliances, Department of Fish and Game Biogeographic Data Branch, Vegetation Classification and Mapping Program, December 28, 2009

Stark, T, Choi, H and McCone, S., 2005, "Drained Shear Strength Parameters for Analysis of Landslides", Journal of Geotechnical and Geoenvironmental Engineering, ASCE.

Turner, A.K., Schuster, R.L. (ed.) 1996, "Landslides Investigation and Mitigation", Special Report 247, Transportation Research Board, National Research Council.

Caltrans Reports

Preliminary Geotechnical Report, Greenpoint Sink dated 10-28-2008

Project Study Report dated 9/2009

Caltrans Corrosion Guidelines Version 1.0, 9/2003

Caltrans Bridge Design Specifications Section 5, 8/2004

Caltrans Soil and Rock Logging, Classification, and Presentation Manual, 2010 Edition.

5. FIELD INVESTIGATION AND TESTING PROGRAM

Surface mapping was conducted in order to map landslide related features and identify the limits of the active landslide (Figure 2).

Eight mud-rotary borings were drilled between November 2009 and March 2010. The locations of the borings are shown on Figure 2. The boreholes were advanced using a truck mounted Acker MPCA and a CME 750 drill rig using a 94-mm HXB casing equipped with a diamond impregnated core bit. Soil and

rock samples were logged in accordance to the Caltrans Soil and Rock Logging, Classification, and Presentation Manual 2010 Edition.

SI casings were installed in all the borings and backfill with coarse sand with bentonite seal. The casings were perforated in the bottom to permit monitoring of water levels within the casing. Inclinometer readings were obtained between December 2009 and July of 2010. A summary of the borings and the depth of movement are provided in Table 1. The SI data are included in Appendix A.

**TABLE 1
 BORING AND INCLINOMETER DATA SUMMARY**

BORING I.D.	STATION AND OFFSET	DEPTH OF BORING (ft, bgs)	SURFACE ELEVATION (ft, MSL)	DEPTH TO BEDROCK (ft, bgs)	DEPTH TO SHEAR ZONE (ft, bgs)
R-09-001	313+14.298 RT 5.007	200	1606.89	45	30
R-09-002	314+18.4 LT 15.437	101	1601.87	30	23
R-09-003	312+15.607 LT 15.834	100.5	1613.50	44	33
R-09-004	314+47.404 LT 128.974	85	1561.55	28	20
R-09-005	313+06.775 RT 120.11	100	1618.37	44	27
R-09-006	312+07.937 RT 89.372	101.5	1622.90	55	No shear observed
R-09-007	313+58.349 RT 111.558	76.3	1613.66	19	19.7
R-10-008	314+14.564 RT 437.491	69.8	1707.16	29	No shear observed

6. LABORATORY TESTING

Laboratory testing of selected soil samples were performed at Caltrans’ Geotechnical and Materials Laboratory in Sacramento and in the District 1 Materials Laboratory in Eureka, California. The testing was performed to classify soils using the ASTM Unified Soil Classification System (USCS) and determine the engineering properties of the soil. Appendix B provides the laboratory data sheets and summary table of the results.

7. SITE GEOLOGY AND SUBSURFACE CONDITIONS

7.1 Site Description

Highway 299 at this location traverses what has been mapped as a Quaternary landslide (Project Geologic Map, Figure 3). The roadway was constructed around 1960 on a through fill. Sections of older alignments of Highway 299 exist upslope of the current alignment. The vegetation on the cut slopes and the natural slopes above and below the highway can be classified as a *Psuedotsuga menziesii* Alliance (Douglas fir forest).

7.2 Site Geology

Bedrock within the project limits is Redwood Creek Schist of the Eastern Belt Franciscan Complex (Geologic Map, Figure 3). In several of the borings an unmapped mélangé unit was encountered above the schist.

The roadway is within the limits of an active earth flow between approximately Station 311+44 and Station 315+15 along the design roadway alignment HUM 1. The headscarp of the earth flow is located approximately 510 feet upslope of the wall layout line (Figure 2). The landslide is approximately 372 feet wide at the wall layout line and extends for hundreds of feet below the roadway. The depth to the failure surface of the landslide is approximately 50 feet at the wall layout line. A cross section of the landslide is shown in Figure 4.

7.3 Subsurface Conditions

The project site is underlain by asphalt and cold mix ranging in thickness between 3 and 15 feet. The asphalt is underlain by fill composed predominantly of silty sand with gravel (SM) and silty gravel with sand (GM) between 4 and 10 feet thick. Underlying the fill is decomposed mélangé composed of sandy lean clay (CL) between 6 and 10 feet thick. Beneath the mélangé is schist decomposed to a silty sand and a silty sand with gravel (SM). Less intensely weathered schist exists beneath the decomposed schist. A cross section of the subsurface conditions is shown on Figure 4.

Logs of Test Borings (LOTBs) will be provided at a future date to be included in the plans.

7.4 Groundwater Conditions

Groundwater levels were recorded periodically in all the borings between December 16, 2009 and March 24, 2011. A summary of the measured groundwater levels is provided in Appendix C.

8. CORROSION EVALUATION

Corrosion testing was performed on soil samples at Retaining Wall No. 2 which also apply to this wall. The results are shown in Table 2.

TABLE 2
SOIL CORROSION TEST SUMMARY

BOREHOLE ID	DEPTH (ft, bgs)	pH	MINIMUM RESISTIVITY (ohm-cm)
R-10-027	30-41.5	6.08	3,500
R-10-027	40-41.5	6.1	1,500

Based on Caltrans Corrosion Guidelines (Version 1.0, 2003) and the laboratory test results, the site may be considered non-corrosive.

9. GEOTECHNICAL AND FOUNDATION RECOMMENDATIONS

9.1 Wall Location and Height

The recommended wall layout line is shown on the Site Plan (Figure 2) and located in Cross Section A-A' (Figure 4). The proposed wall is approximately 408 feet in length. The recommended design height is 46 feet.

9.2 Slope Stability Analysis

The data from the inclinometers indicate that the depth of movement is approximately at the decomposed melange and decomposed schist interface. A slope stability model was developed from the boring and slope inclinometer data using the slope stability program SLOPE/W 2007 and cross section A-A' (Figures 2 and 6).

Residual strengths were estimated based on a correlation of liquid limit, clay size fraction and effective normal stress at the failure zone (Stark and Eid, 1994). A friction angle of 18 degrees was estimated based on a liquid limit of 48% and clay fraction of 35% of samples tested in boring R-09-003. This friction angle indicates relatively weak shear strength along the landslide failure surface, which is consistent with the gentle slope at this site. A factor of safety of 1.0 was obtained for the existing failure using the assumed groundwater surface shown on Figure 6.

The ground anchor force (lateral force) required to resist the landslide force was also evaluated using SLOPE/W 2007 per Bridge Design Specification (BDS) 2004 Section 5.5.5.7. This was done for slope

failures extending up slope from the wall. A concentrated horizontal force (P_{TOTAL}) was applied at the wall face at the mid-point of the wall height. P_{TOTAL} was then increased in the stability analysis until a factor of safety of 1.3 was achieved. Per Caltrans Bridge Design Specifications, a surcharge pressure of 270 pounds per square feet (psf) was applied to the road surface behind the wall. The results of the stability analysis indicate that a total horizontal force of 70,000 pounds per foot is required to stabilize the slope to a factor of safety of 1.3 (P_{TOTAL} Stability Analysis, Figure 7).

10. RECOMMENDED WALL DESIGN PARAMETERS

Lateral forces determined from earth pressure theory using the soil and rock parameters provided in Table 3 control the design loading, and are recommended for the wall design per BDS Section 5.5.5.7.

TABLE 3
Design Parameters

LAYER	APPROXIMATE THICKNESS (ft) ¹	TOTAL UNIT WEIGHT (pcf)	ANGLE OF INTERNAL FRICTION (degrees)	COHESION (c, psf)
(1) Fill	26	140	34	0
(2) Decomposed Melange	28	120	18	0
(3) Decomposed Schist	28	120	30	500
(4) Schist	>100	145	34	1,000

Notes: 1 – At wall layout line

The recommended design groundwater surface elevation is 26 feet below top of the wall.

Steel HP piling placed in structural concrete with concrete walers and timber lagging is planned. For the maximum wall height of 46 feet, a minimum pile length of 75 feet is recommended to assure embedment into competent material. At the ends of the wall a minimum pile length of 40 feet is recommended for the same reason. A profile along the wall layout line is provided in Figure 5, showing the estimated landslide contact (failure surface), the recommended lagging depths, and finished grade.

Five rows of tieback anchors and concrete walers are planned. The recommended tieback design parameters are provided in Table 4.

**TABLE 4
 TIEBACK DESIGN PARAMETERS**

Tieback Design Parameters	
Horizontal Tieback Spacing	8 feet
Tieback Inclination	20°
Tieback Unbonded Length (feet)	
Row 1	120
Row 2	100
Row 3	80
Row 4	60
Row 5	40

11. EARTHWORK AND WALL BACKFILL RECOMMENDATIONS

The recommended finished grade elevation is between the third and fourth level of tiebacks and is shown on Figure 5. Along the face of the buried portion of the wall we recommend a two foot wide chimney of Class I Type B permeable material be constructed 2 feet below the finished grade elevation to the base of lagging. Filter fabric should be placed between the permeable material and backfill. A 12 inch perforated plastic pipe should be placed 6 inches above the base of the permeable material and connected to a 12 inch solid plastic pipe and outlet below the wall.

12. CONSTRUCTION CONSIDERATIONS

12.1 Excavation and Drilling Difficulties

Caving conditions will likely be encountered during drilling for the piles and tiebacks due to the intensely fractured nature of the rock. Temporary casing, drilling under slurry, or placement of slurry cement backfill or concrete and redrilling may be required to control caving and should be performed in conformance with the provisions in Section 49-4.03 “Drilled Holes,” of the Standard Specifications.

Groundwater will likely be encountered in the pile and tieback holes. Pile and tieback installations may require dewatering or the placement of concrete and grout under water. If water is present and the holes are not dewatered, displacement of the water by means of a closed system using a concrete pump or tremie tube to place concrete and grout at the bottom of the holes will be required in conformance with the provisions in Section 51-1.10 “Concrete Deposited Under Water,” of the Standard Specifications.

Drill fluid circulation was lost during drilling of several of the exploratory borings and is interpreted to indicate the presence of cracks and voids in the subsurface materials. The potential for the loss of concrete and grout into voids should be expected. Controlling measures such as the use of a “grout sock,” could greatly reduce the potential for grout loss.

12.2 Hazardous Materials

The Quaternary landslide deposits and bedrock within the Project Limits do not contain Naturally Occurring Asbestos (NOA).

13. 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 bed opening. The following is an excerpt for SSP-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information Handout will be provided in Acrobat (pdf) format to addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:
Log of Test Borings for Location 2

Data and information included in the Information Handout provided to the bidders and contractors are:

- A. Foundation Report for Retaining Wall – Green Point Sink Location 1 dated July 25, 2011

Data and Information available for observation at the Transportation Laboratory:

- A. Borehole Core Samples

Mr. Lewis Shen
July 25, 2011
Page 9

01-HUM-299-PM 20.4
01-0000000172
Green Point Sink Location 1

If you have any questions or require additional information please contact Jim Morris at (530) 265-9867 or Charlie Narwold at (707) 445-6036.



JAMES MORRIS
Senior Materials & Research Engineer
Office of Geotechnical Design – North



CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design – North

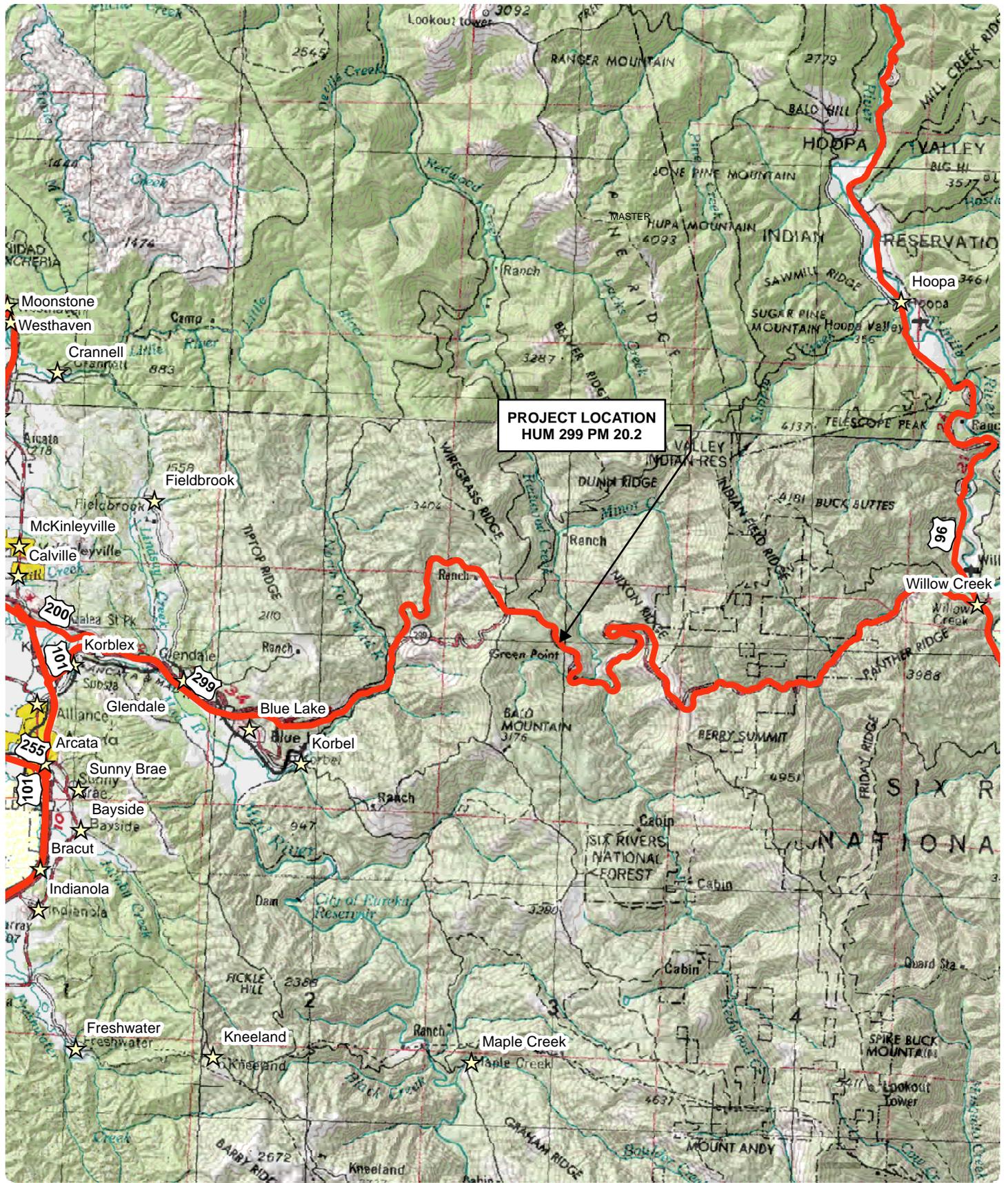
List of Figures:

- Figure 1 - Vicinity Map
- Figure 2 - Site Plan and Landslide Map
- Figure 3- Geologic Map
- Figure 4 - Cross Section A-A'
- Figure 5 - Profile Along Wall Layout Line
- Figure 6- Existing Condition Stability Analysis
- Figure 7- P_{TOTAL} Stability Analysis

Attachments:

- Appendix A: Slope Inclinator Data
- Appendix B: Laboratory Summary and Data Sheets
- Appendix C: Groundwater Data

C: RBibbens (E-copy)
GS File Room (email gs_file_room@dot.ca.gov)
Structure Construction RE Pending File (email RE_pending_file@dot.ca.gov)
Project Manager



0 2.5 5 10 Miles



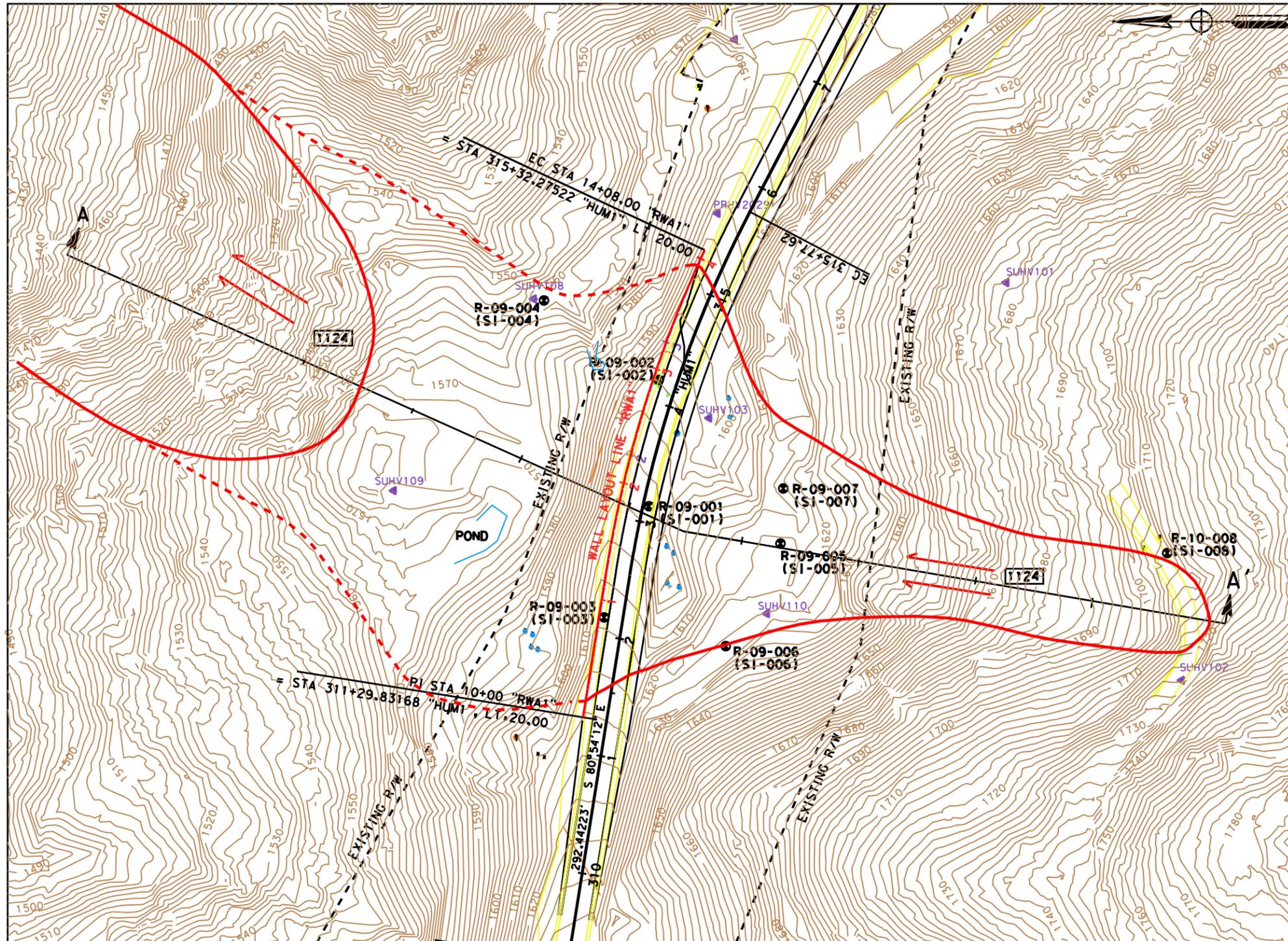
Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North- Branch B

EFIS:0100000172
Date: July 2011

VICINITY MAP

01-HUM-299-PM 20.2
GREEN POINT SINK RETAINING WALL NO. 1

FIGURE 1



LEGEND

- APPROXIMATE BORING AND SI LOCATION
- CROSS-SECTION LOCATION
- HORIZONTAL DRAINS
- RIGHT OF WAY LINE
- LANDSLIDE, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED OR INFERRED IS UNCERTAIN. ARROWS INDICATE DIRECTION OF MOVEMENT.
- LANDSLIDE IDENTIFICATION NUMBER (REFER TO LANDSLIDE IDENTIFICATION CHART BELOW)

LANDSLIDE IDENTIFICATION CHART

STATE OF ACTIVITY

- 1 = Active or Recently Active
(areas of unstable ground with relatively recent/"fresh" geomorphic features such as ground cracks, hummocky topography, exposed soils, abrupt gradient breaks and/or disrupted vegetation, typically recent to 50 years.)
- 2 = Dormant
(areas of quasi-stable ground, with eroded or subdued geomorphic features, no exposed soils, somewhat re-vegetated but typically >50 to several hundreds of years old)
- 3 = Ancient
(areas of relatively stable ground, typically characterized by large, broad and deep landslides with highly eroded and subdued geomorphic features, re-vegetated with similar type and density, typically several hundreds to several thousands of years old)

CERTAINTY OF IDENTIFICATION

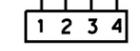
- 1=Definite
- 2=Probable
- 3=Questionable

DOMINANT TYPE OF MOVEMENT

- 1= Slump-Flow Complex
- 2= Earth Flow
- 3= Debris Slide
- 4= Debris Flow
- 5= Slump
- 6= Translational

THICKNESS OF DEPOSIT

- 1=Less than 5 feet
- 2=5 to 15 feet
- 3=15 to 50 feet
- 4=Greater than 50 feet



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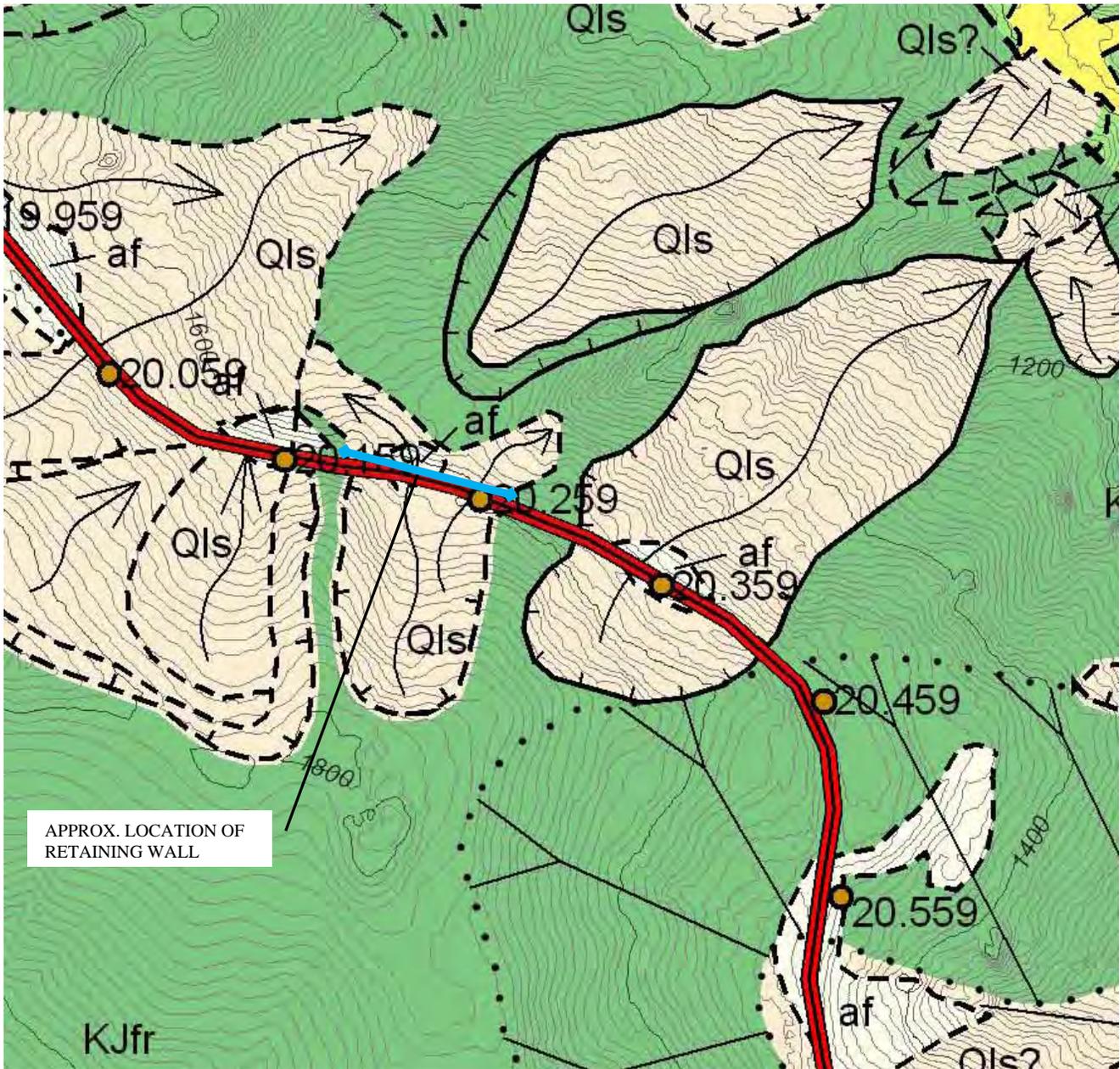
EFIS: 010000172

DATE: JULY 2011

SITE PLAN AND LANDSLIDE MAP

01-HUM-299-PM 20.2
 GREEN POINT SINK RETAINING WALL NO. 1

FIGURE 2



APPROX. LOCATION OF
RETAINING WALL

Reference: Falls, James. N. et.al. "Geologic Map of the Highway 299 Corridor, Humboldt County, California" 2005

MAP UNIT DESCRIPTIONS

- af Artificial Fill
- Qrt Quaternary River Terrace Deposits
- Qls Quaternary Landslide
- KJfr Redwood Creek Schist

LINE SYMBOLS



ROCK SLIDE: Slope movement with bedrock as its primary source material. This class of failure includes rotational and translational landslides; relatively cohesive slide masses with failure planes that are deep-seated in comparison to those debris slides of similar areal extent. The slide plane is curved in a rotational slide. Movement along a planer joint or bedding surface may be referred to as translational. Complex versions with combinations of rotational heads and translational movement or earthflows downslope are common. Landslide boundary indicates confidence; solid line- definite, dashed line - probable, dotted line - questionable. ↑ indicates a scarp, arrows show direction of movement. Qls denotes deposit when present.



EARTHFLOW: Slow to rapid movement of mostly fine-grained soil with some rocky debris in a semi-viscous, highly plastic state. After initial failure, the mass may flow or creep seasonally in response to changes in groundwater level. These types of slope failures often include complexes of nested rotational slides and deeply incised gullies. Landslide boundary indicates confidence; solid line- definite, dashed line - probable, dotted line - questionable. ↑ indicates scarp, arrows show direction of movement. Qls denotes deposit when present.

LANDSLIDE SYMBOLS



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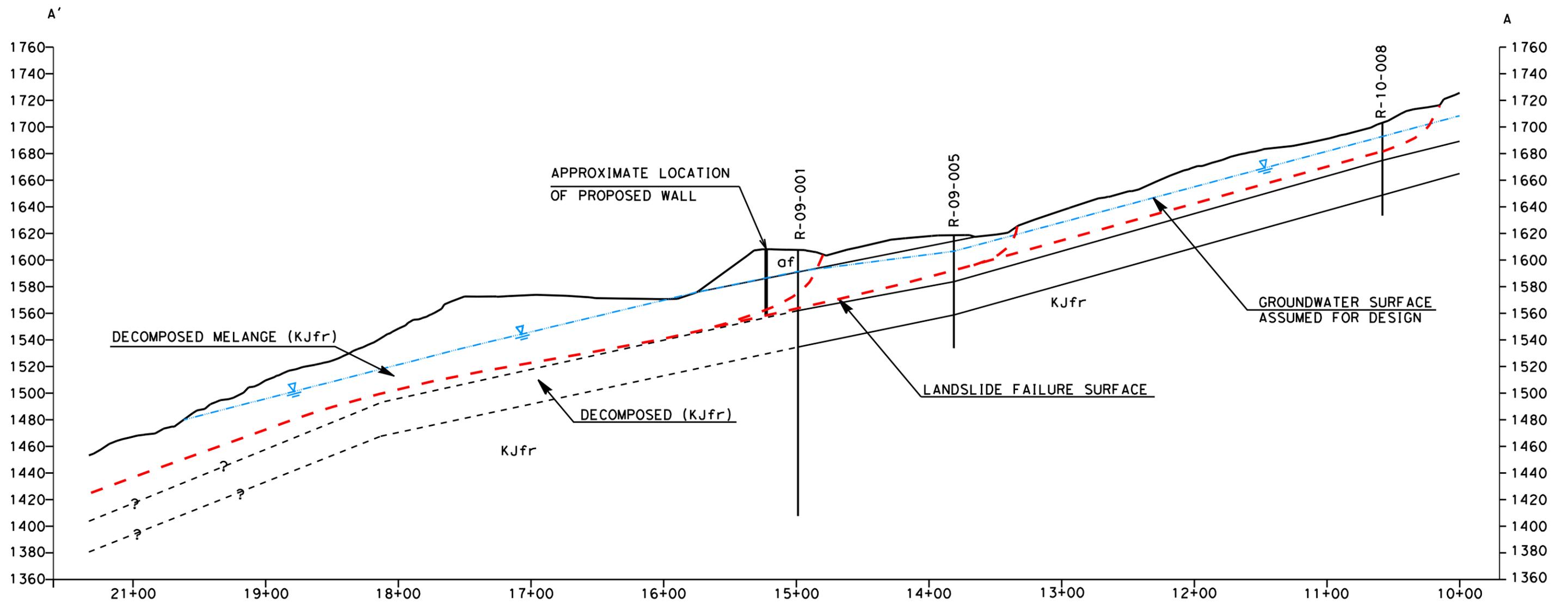
EFIS: 010000172

Date: July 2011

**PROJECT GEOLOGIC
MAP**

**01-HUM-299 PM 20.2
GREEN POINT SINK
RETAINING WALL NO. 1**

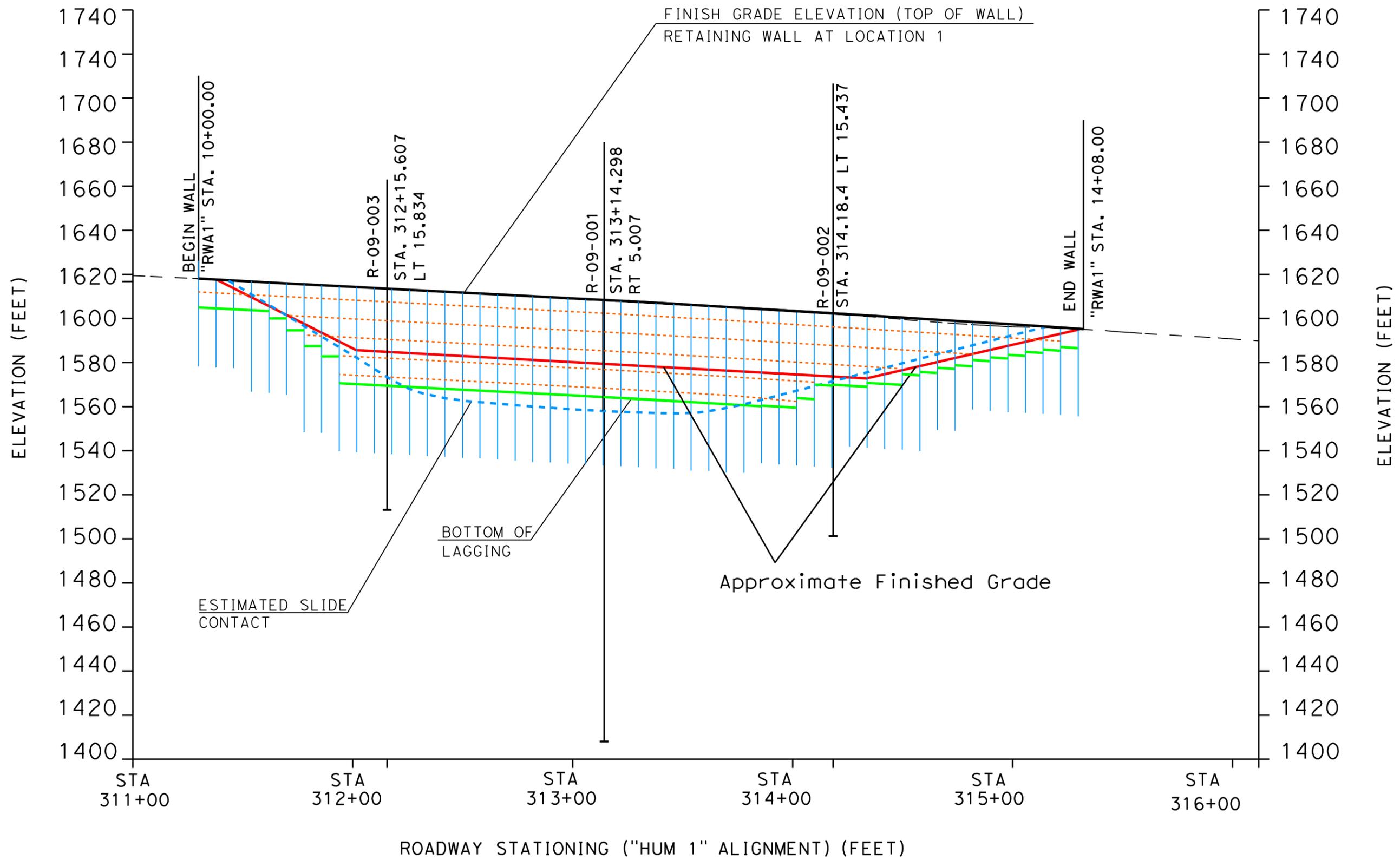
**Figure
3**



EXPLANATION

-  GEOLOGIC CONTACT, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED AND QUERIED WHERE EXISTENCE IS UNCERTAIN
-  LANDSLIDE CONTACT, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED AND QUERIED WHERE EXISTENCE IS UNCERTAIN
- af ARTIFICIAL FILL
- KJfr REDWOOD CREEK SCHIST

 Department of Transportation Division of Engineering Services Geotechnical Services Office of Geotechnical Design - North	EFIS: 0100000172	CROSS SECTION A-A'	
	DATE: JULY 2011		
01-HUM-299 PM-20.2 GREEN POINT SINK RETAINING WALL NO. 1		FIGURE 4	



Department of Transportation
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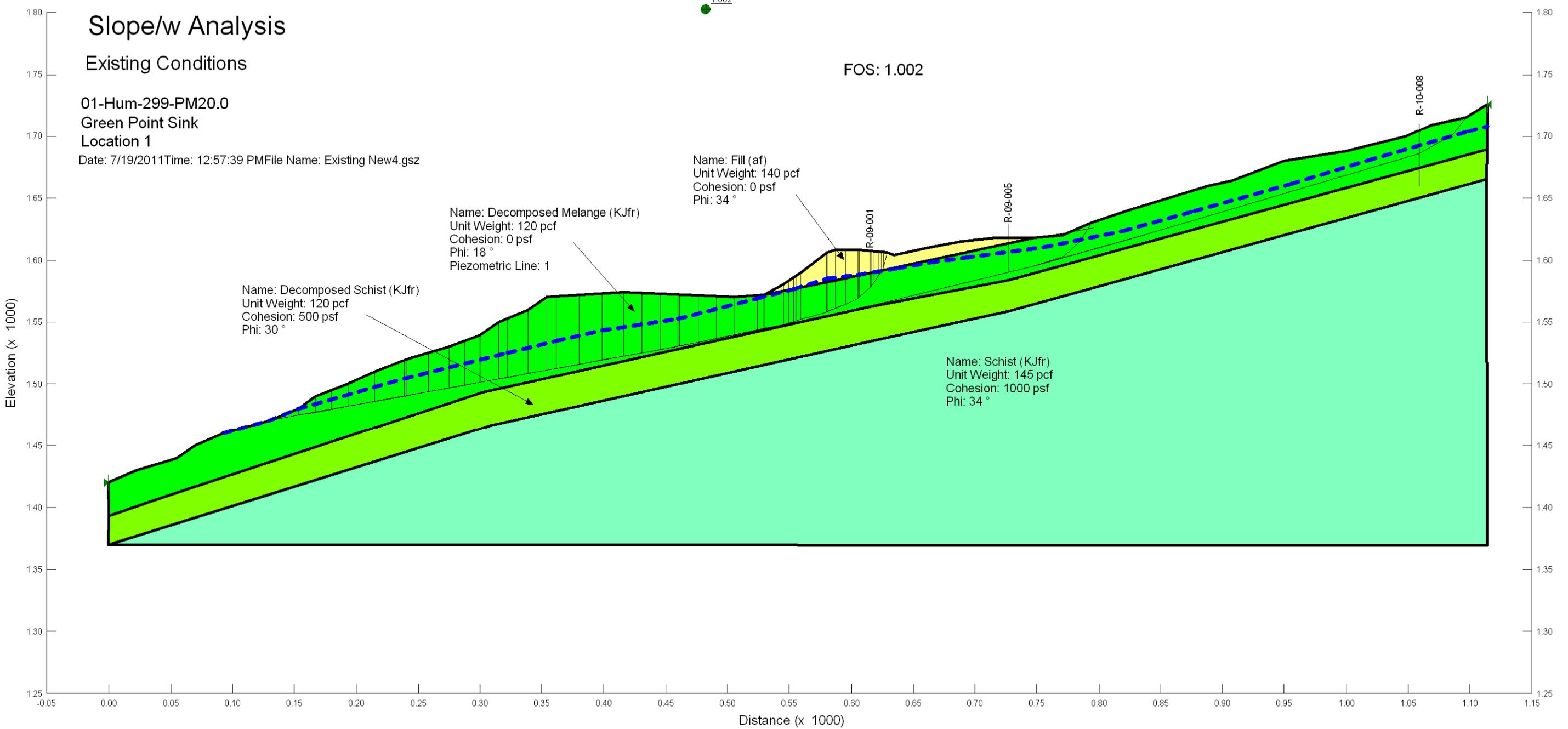
EA: 01-00000172

DATE: JULY 2011

PROFILE ALONG WALL
 LAYOUT LINE

LOCATION 1 FOUNDATION REPORT

FIGURE
 5



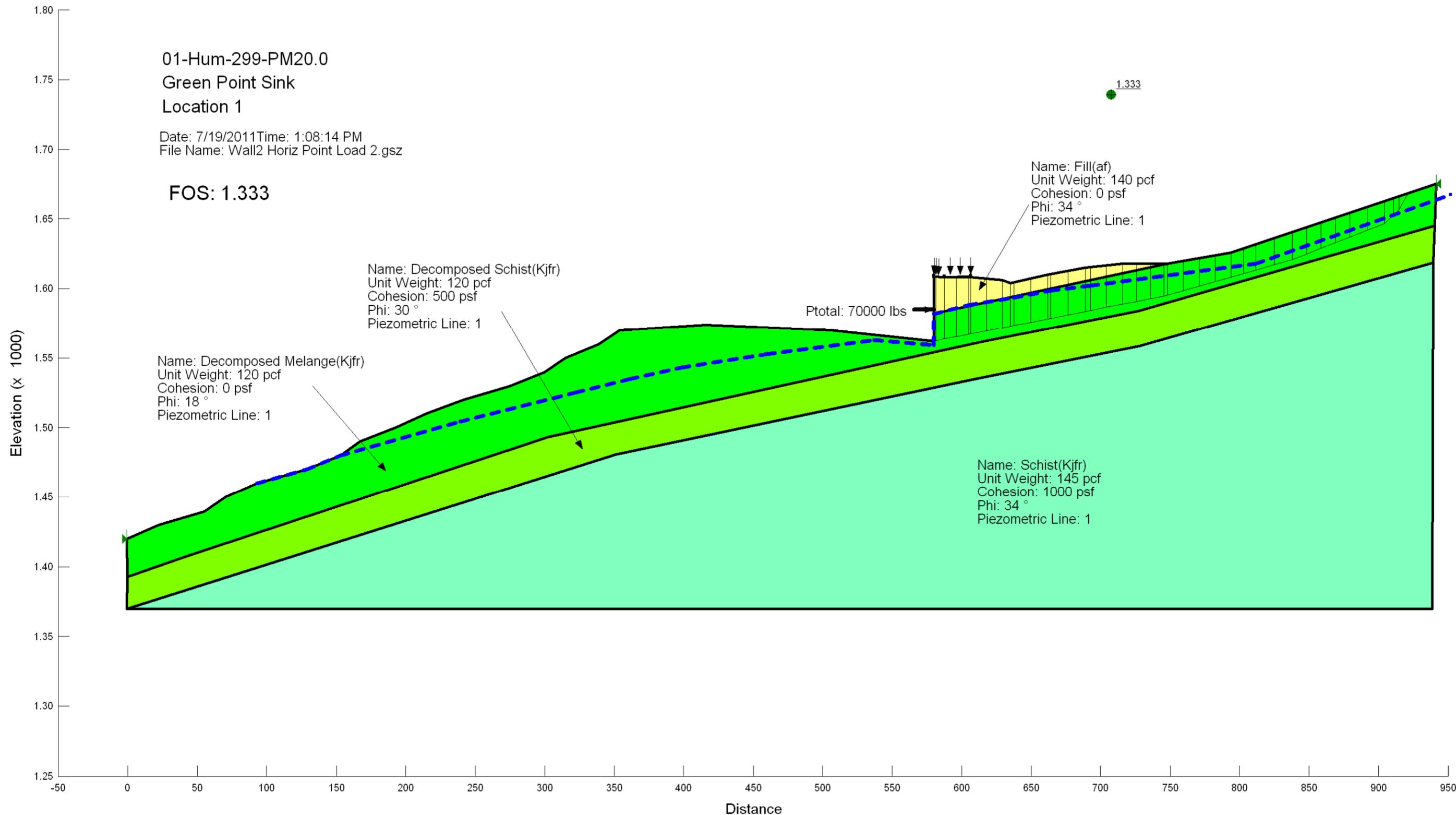
Department of Transportation
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

EFIS: 0100000172
 Date: JULY 2011

EXISTING CONDITION STABILITY ANALYSIS

**01-HUM-299 PM 20.2
 GREEN POINT SINK RETAINING WALL NO. 1**

Figure 6



Department of Transportation
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Geotechnical Services
Office of Geotechnical Design - North

EFIS: 0100000172

Date: JULY 2011

PTOTAL STABILITY ANALYSIS

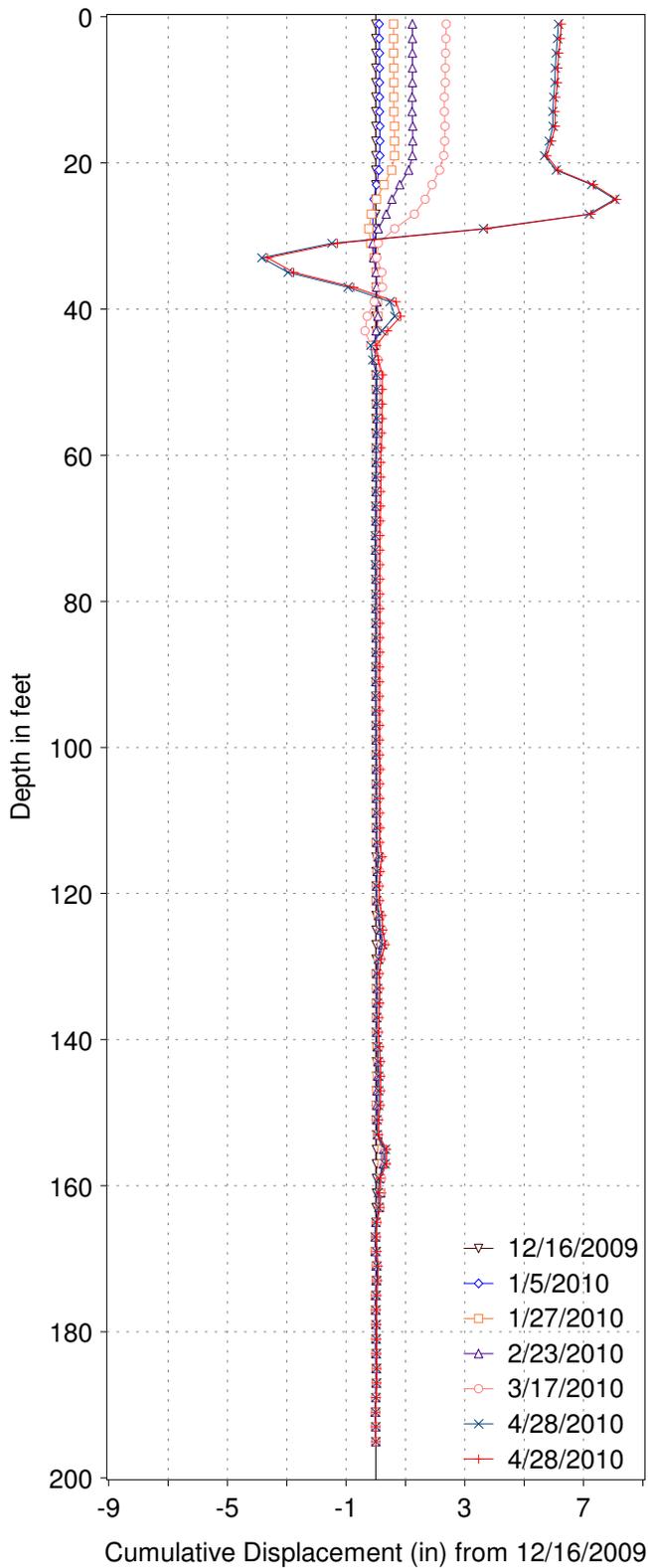
**01-HUM-299 PM 20.2
GREEN POINT SINK RETAINING WALL NO. 1**

Figure 7

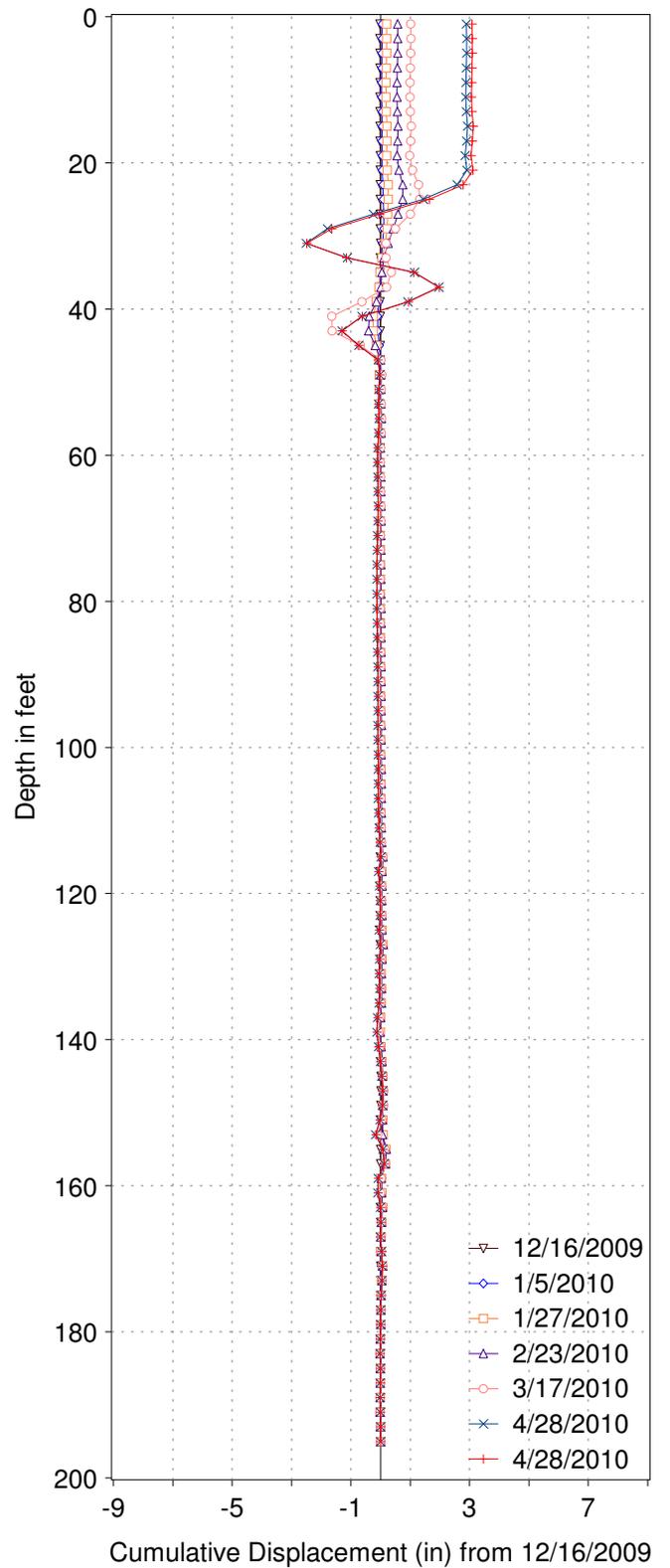
APPENDIX A

SLOPE INCLINOMETER DATA

GPS SI-001, A-Axis



GPS SI-001, B-Axis

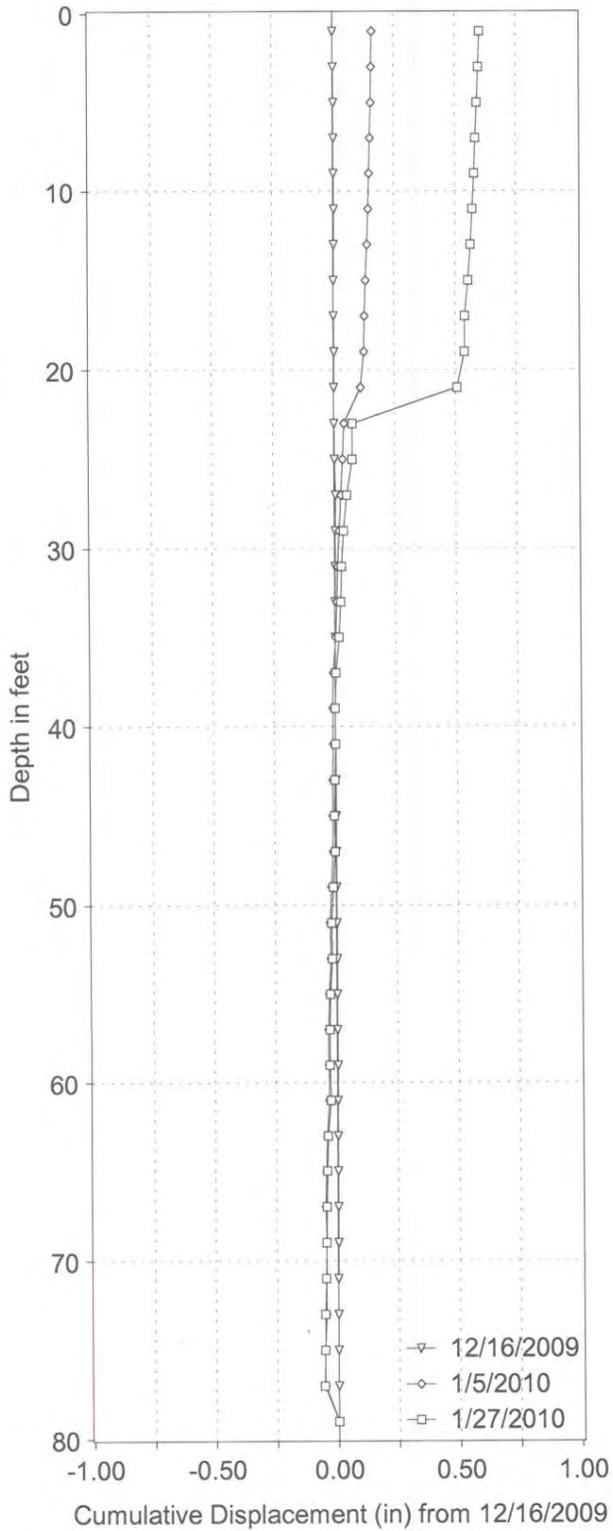


INCLINOMETER RESULTS

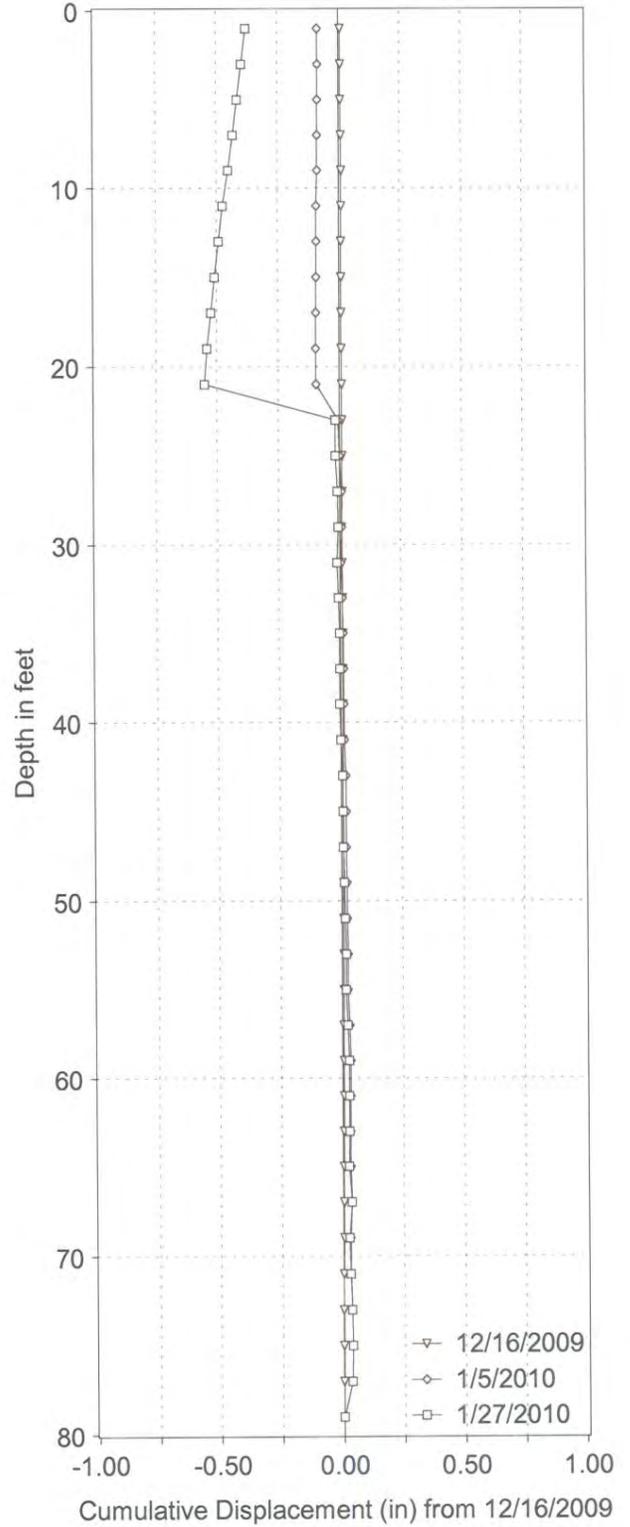
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 197.25 feet
 Ao Direction: 10 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-002, A-Axis



GPS SI-002, B-Axis



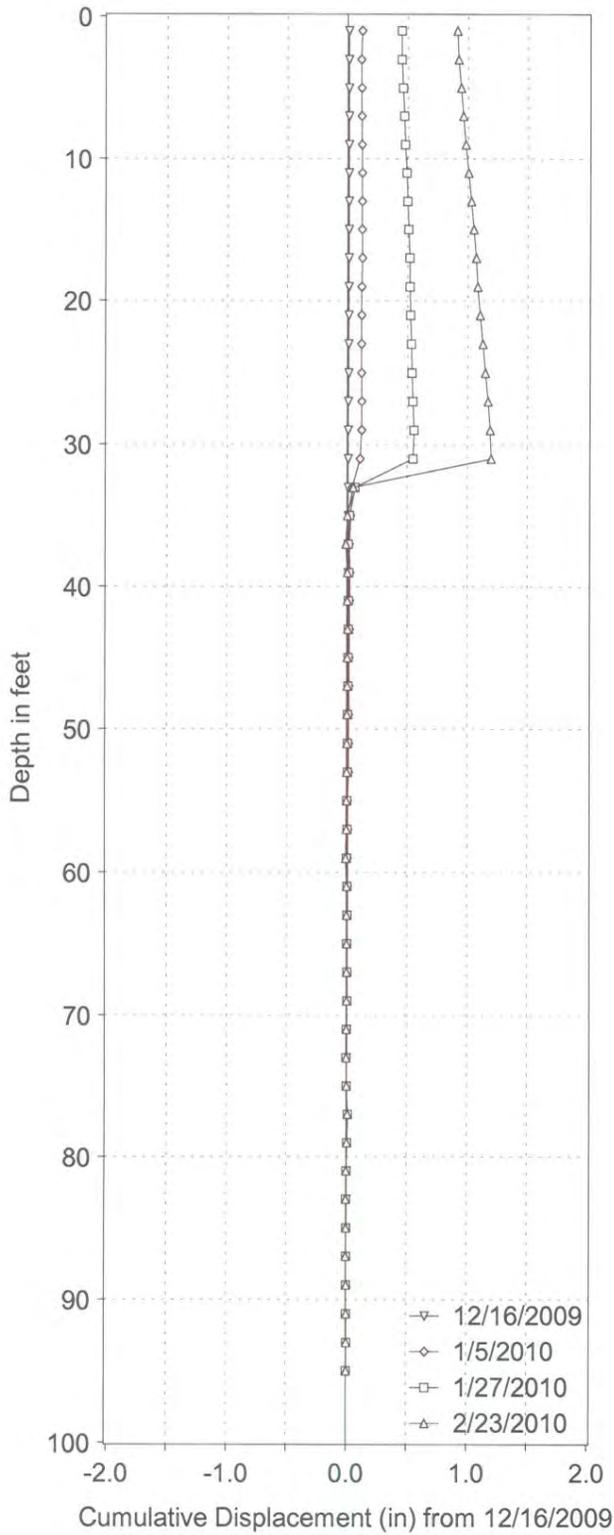
INCLINOMETER RESULTS



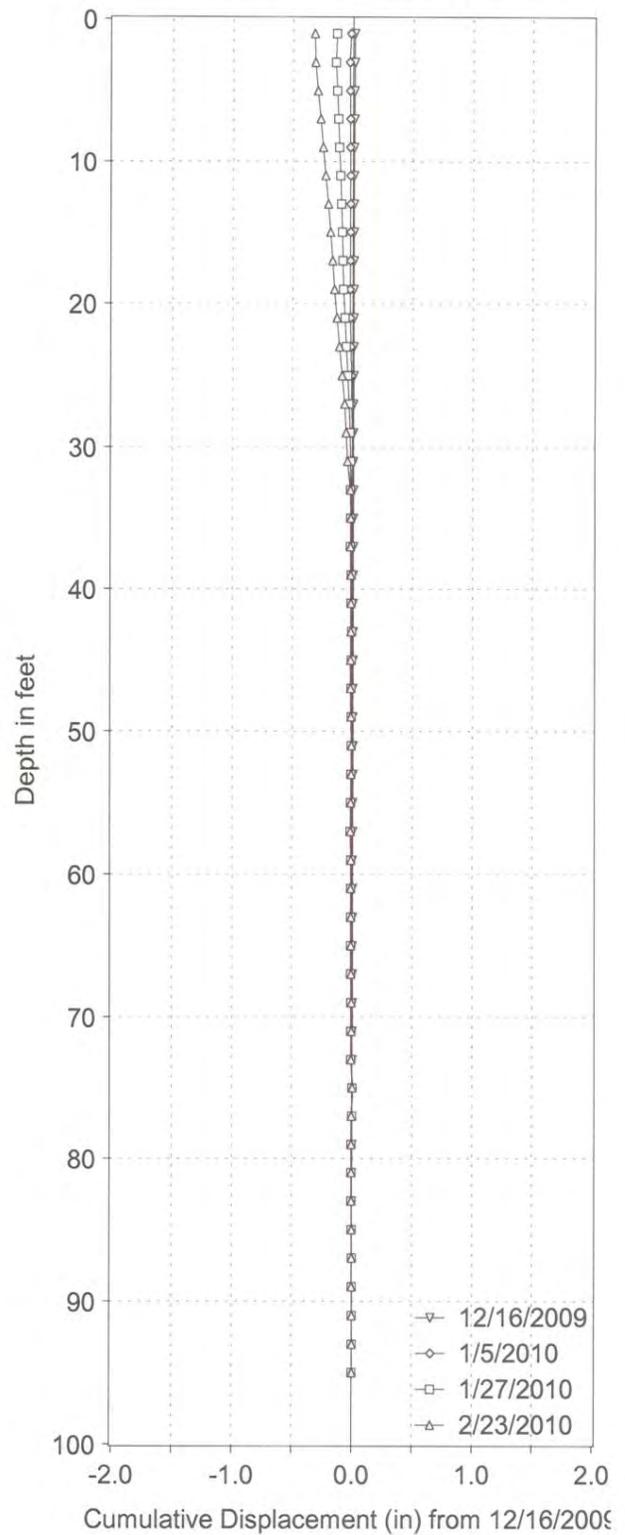
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 87.25 feet
 Ao Direction: 20 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-003, A-Axis



GPS SI-003, B-Axis

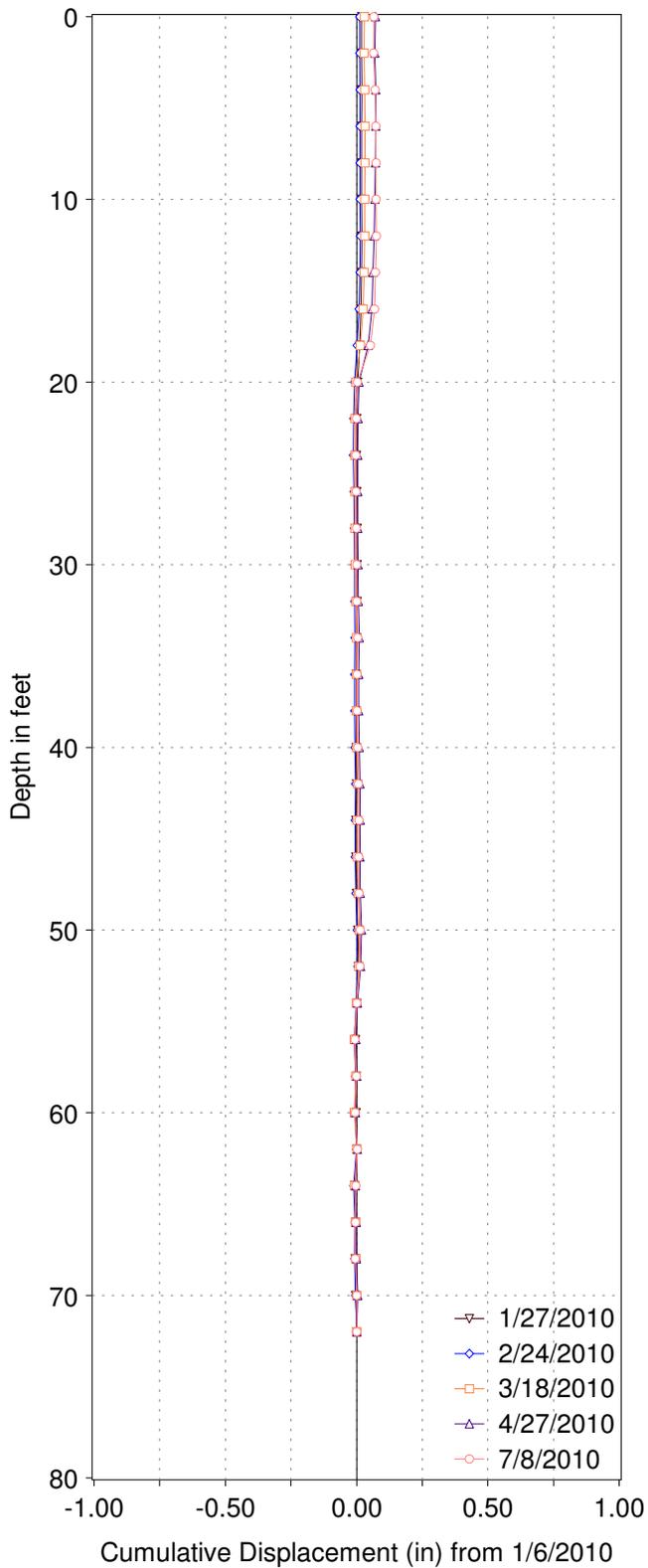


INCLINOMETER RESULTS

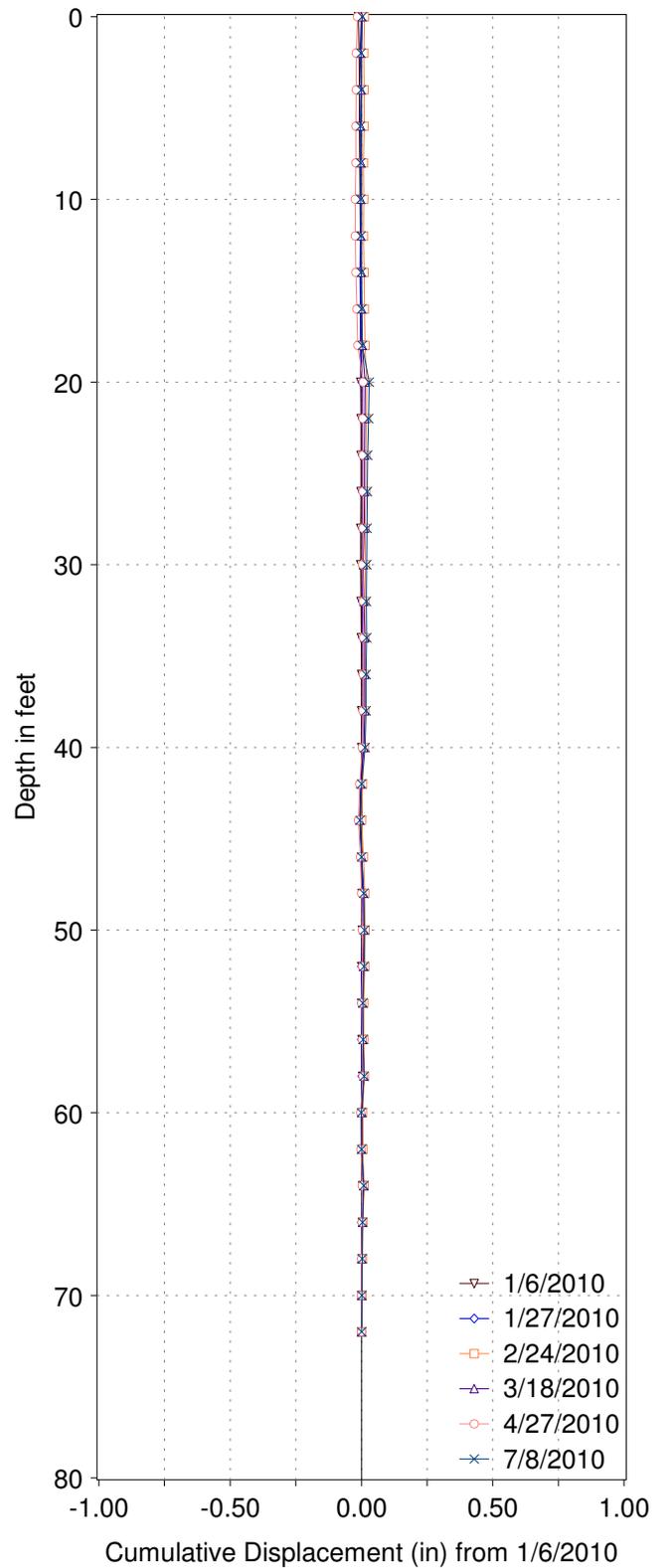
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 98.5 feet
 Ao Direction: 30 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-004, A-Axis



GPS SI-004, B-Axis

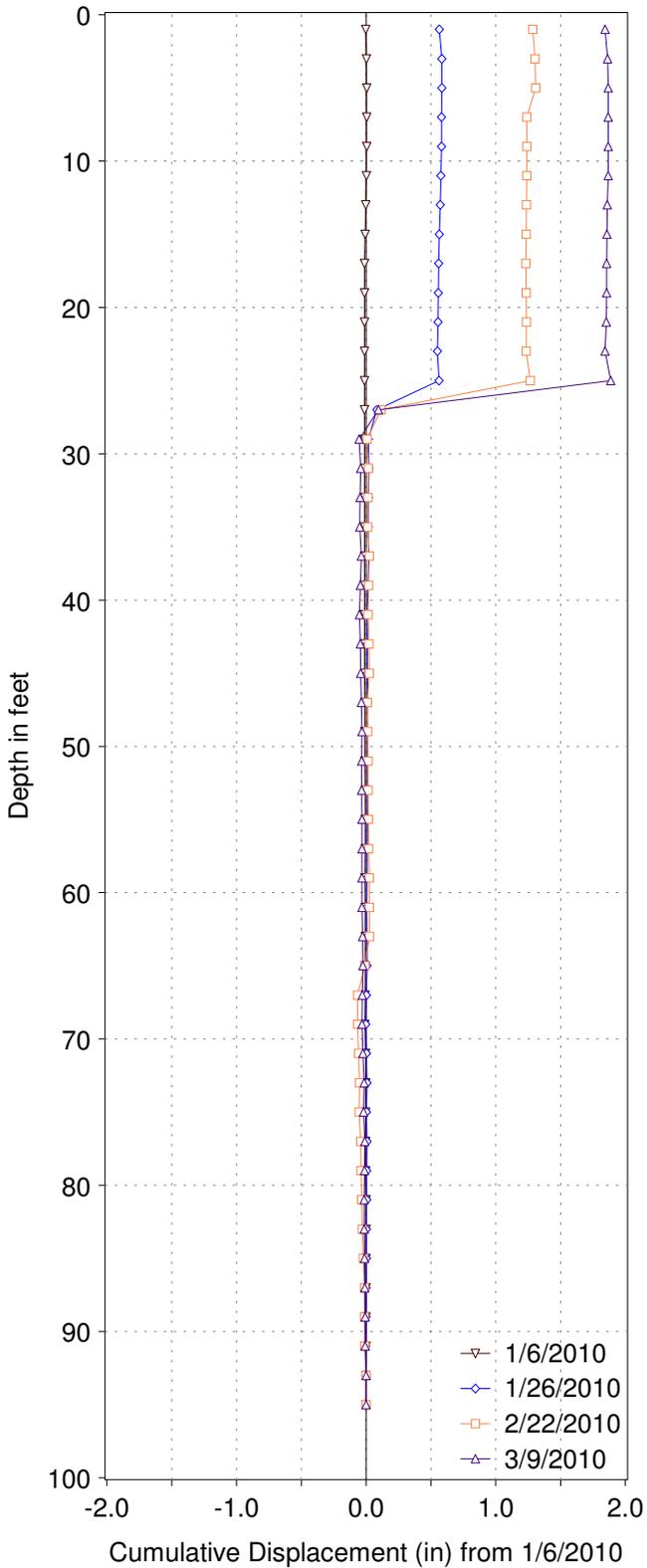


INCLINOMETER RESULTS

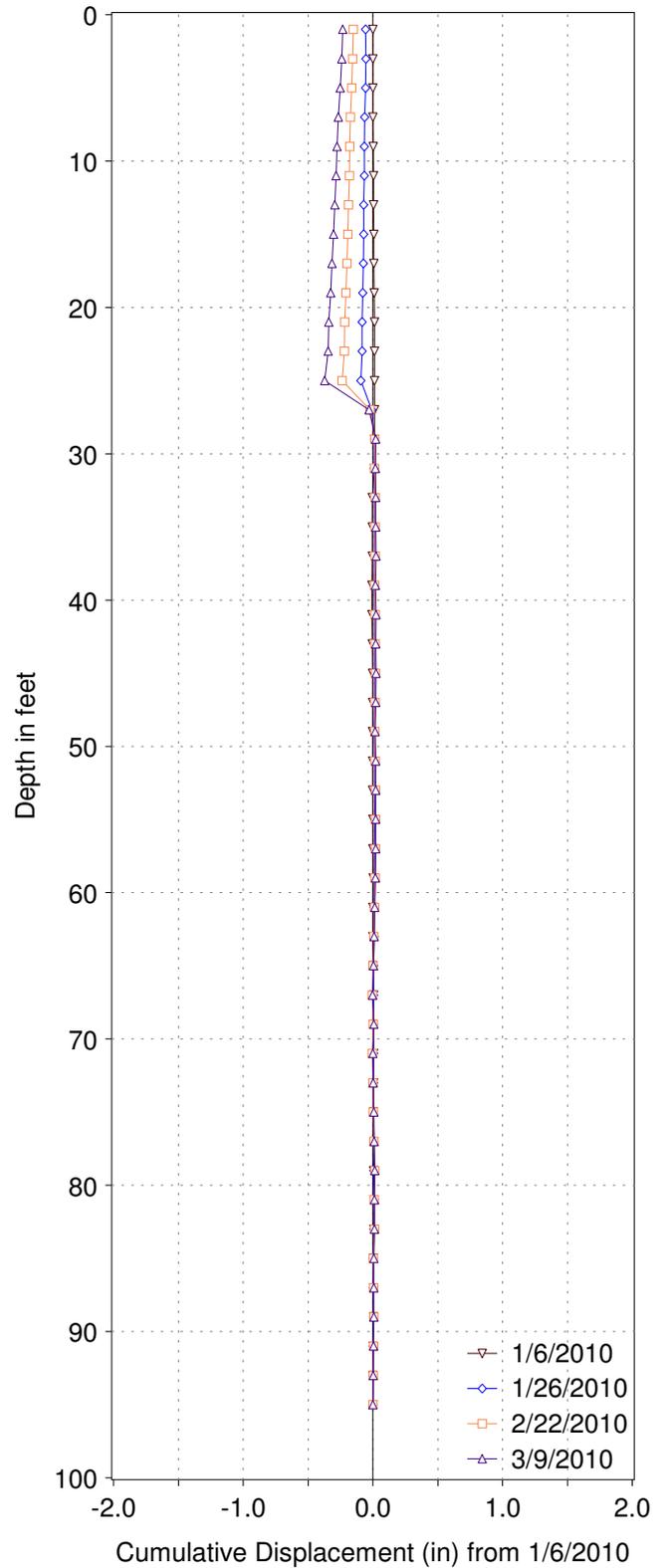
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 76.7 feet
 Ao Direction: 90 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-005, A-Axis



GPS SI-005, B-Axis

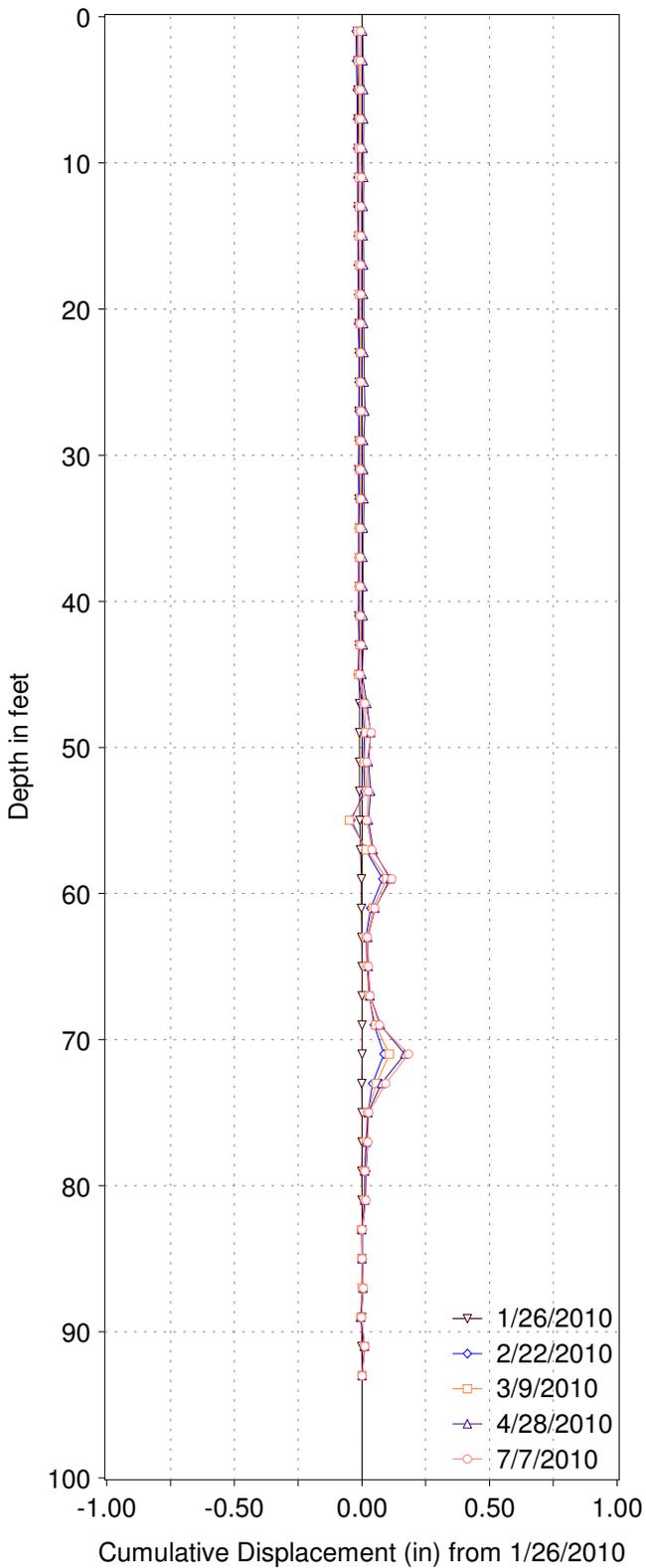


INCLINOMETER RESULTS

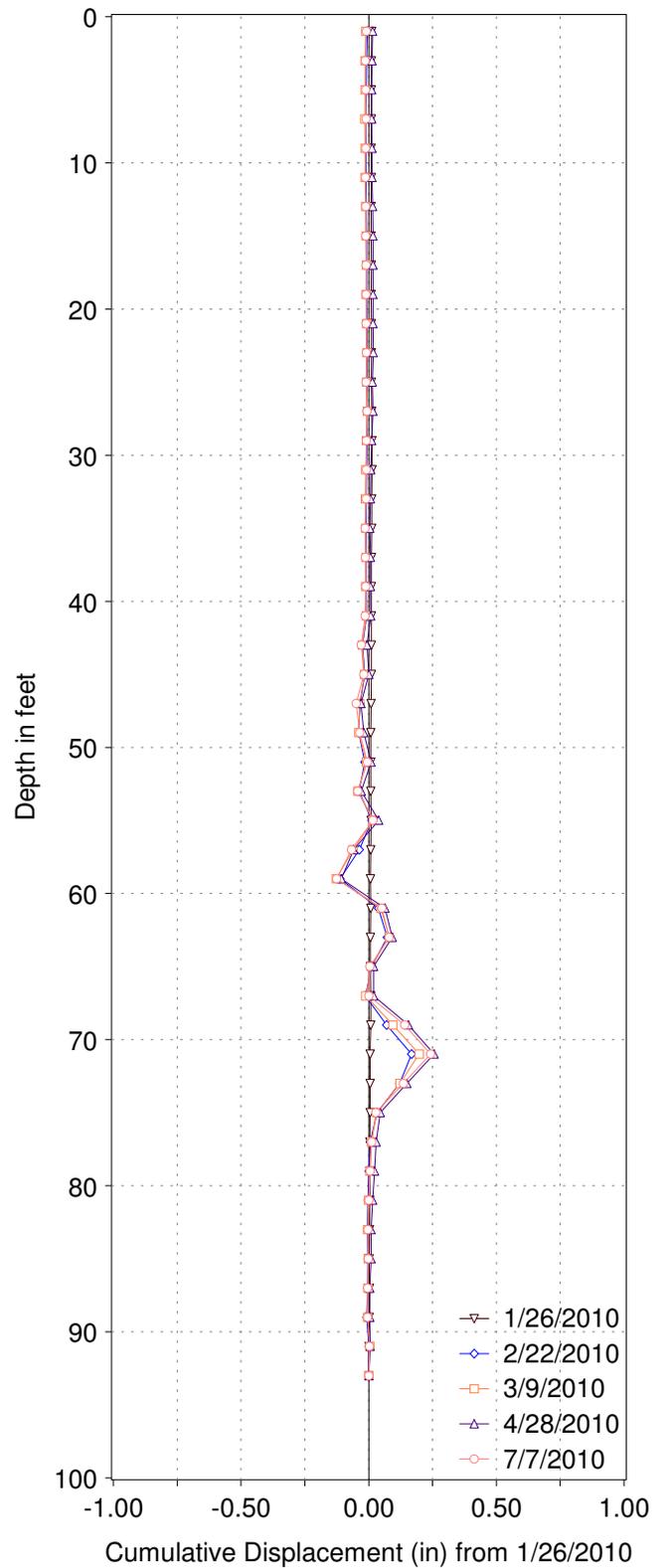
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinometer Casing: 98.9 feet
 Ao Direction: 20 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-006, A-Axis



GPS SI-006, B-Axis

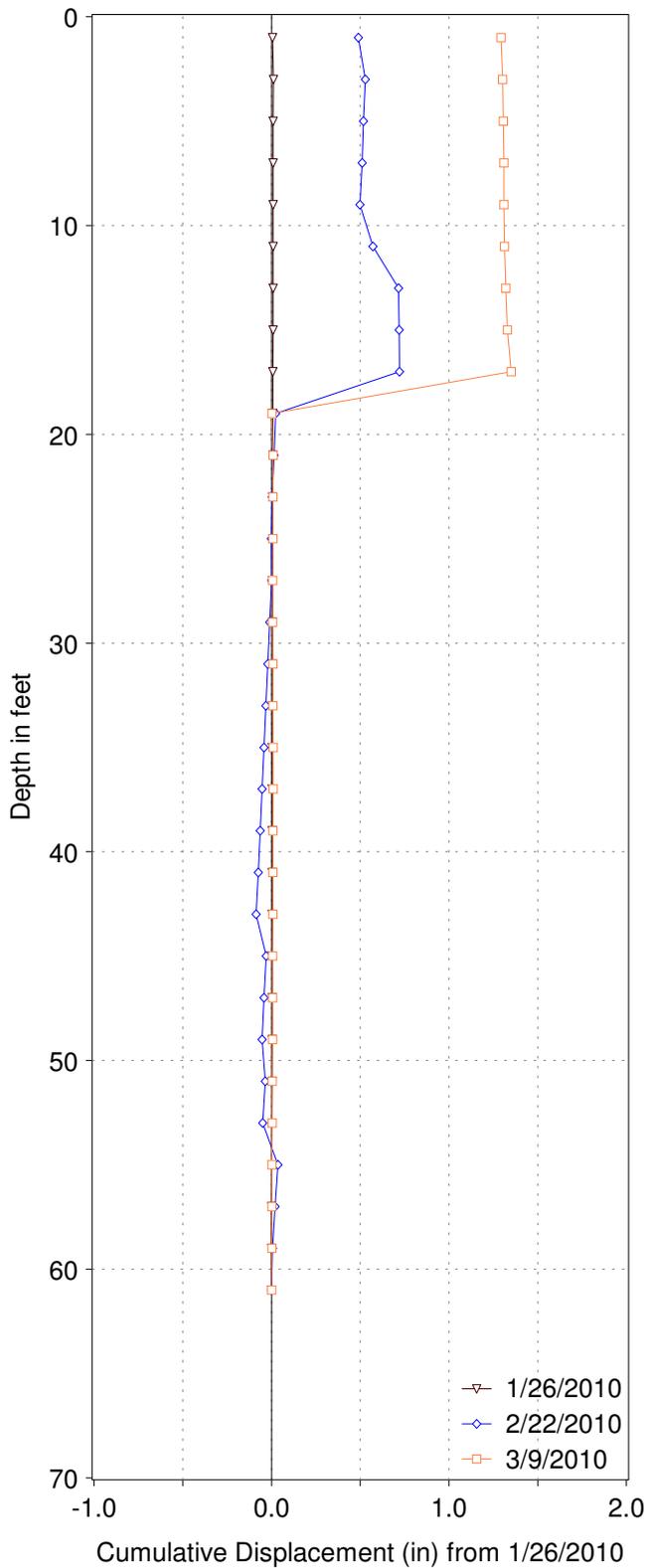


INCLINOMETER RESULTS

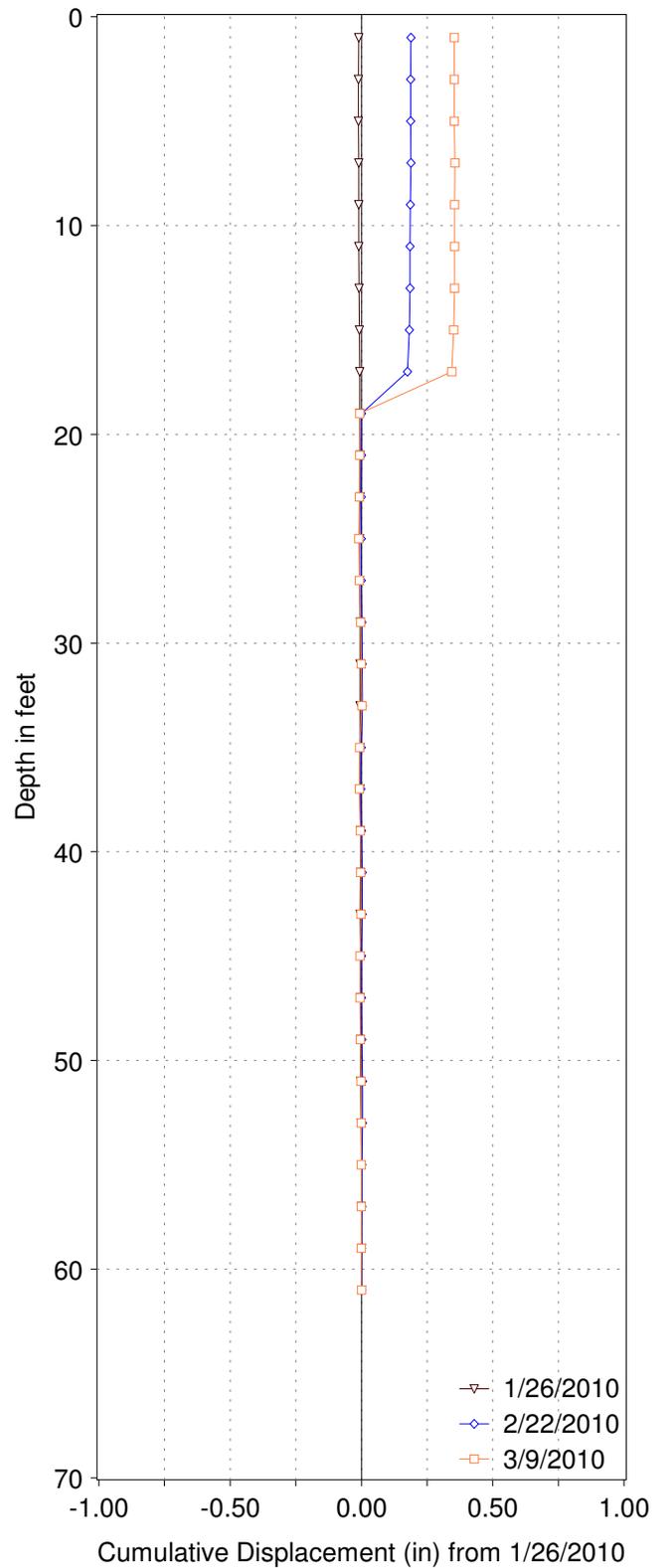
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 95.5 feet
 Ao Direction: 40 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-007, A-Axis



GPS SI-007, B-Axis

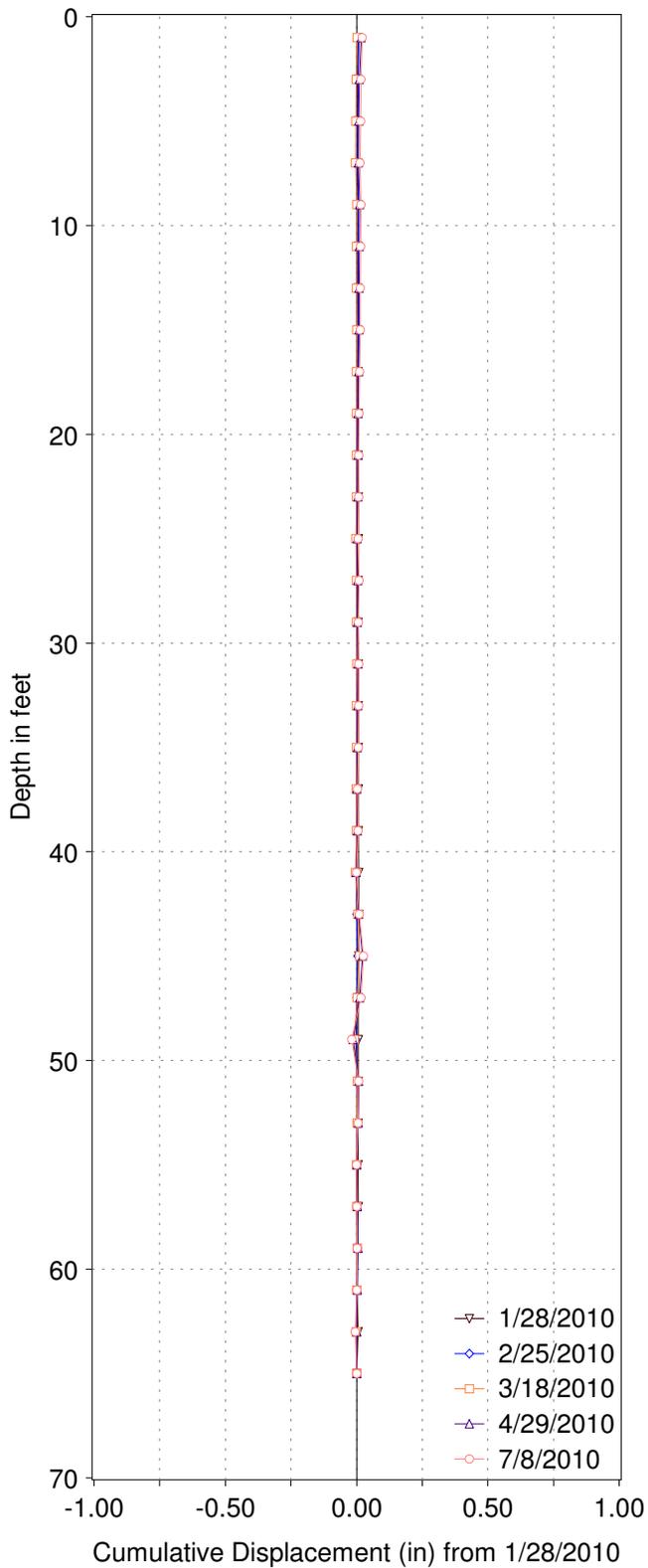


INCLINOMETER RESULTS

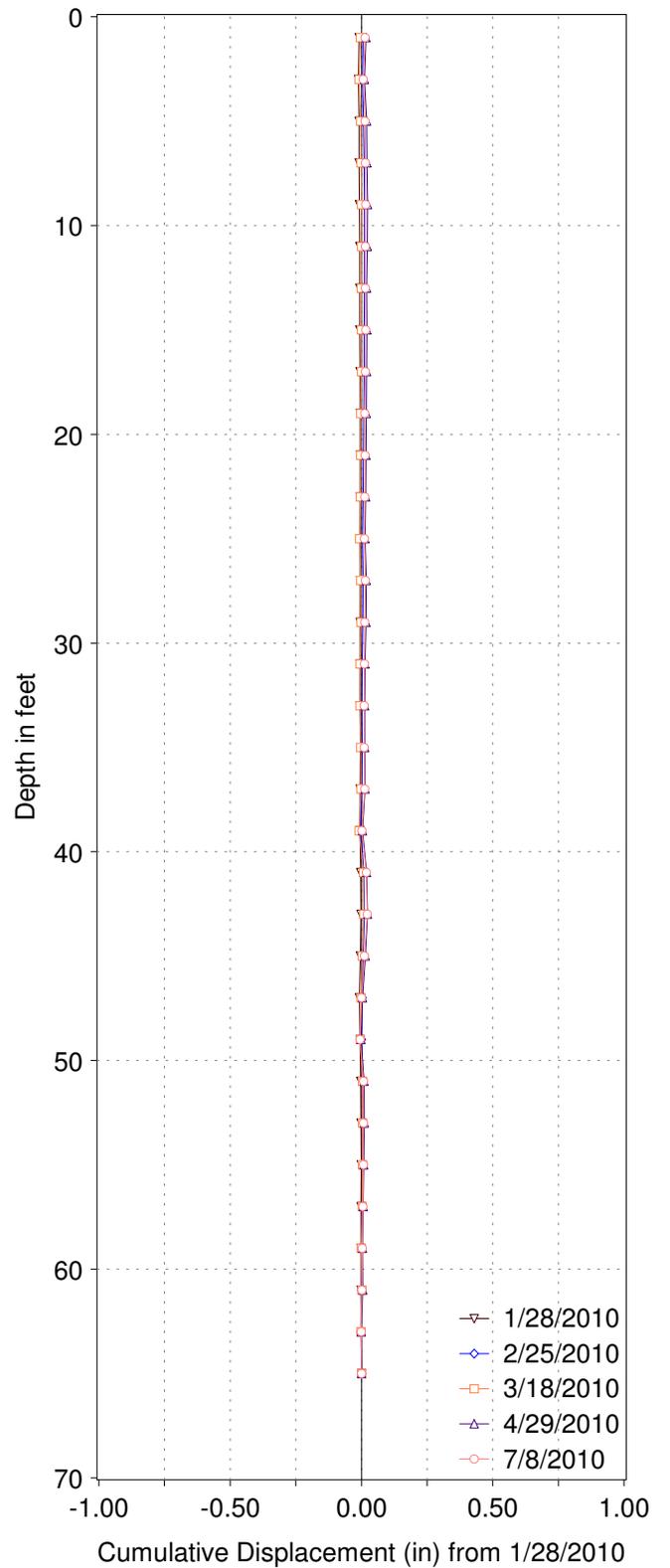
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 63.8 feet
 Ao Direction: 360 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-008, A-Axis



GPS SI-008, B-Axis



INCLINOMETER RESULTS

01-HUM-299 P.M. 20.2
Rt 299 Green Point Sink
E.A. No. 01-423700

Depth of Inclinator Casing: 68.6 feet
Ao Direction: 325 (Magnetic North)
Location: HWY 299 P.M 20.2

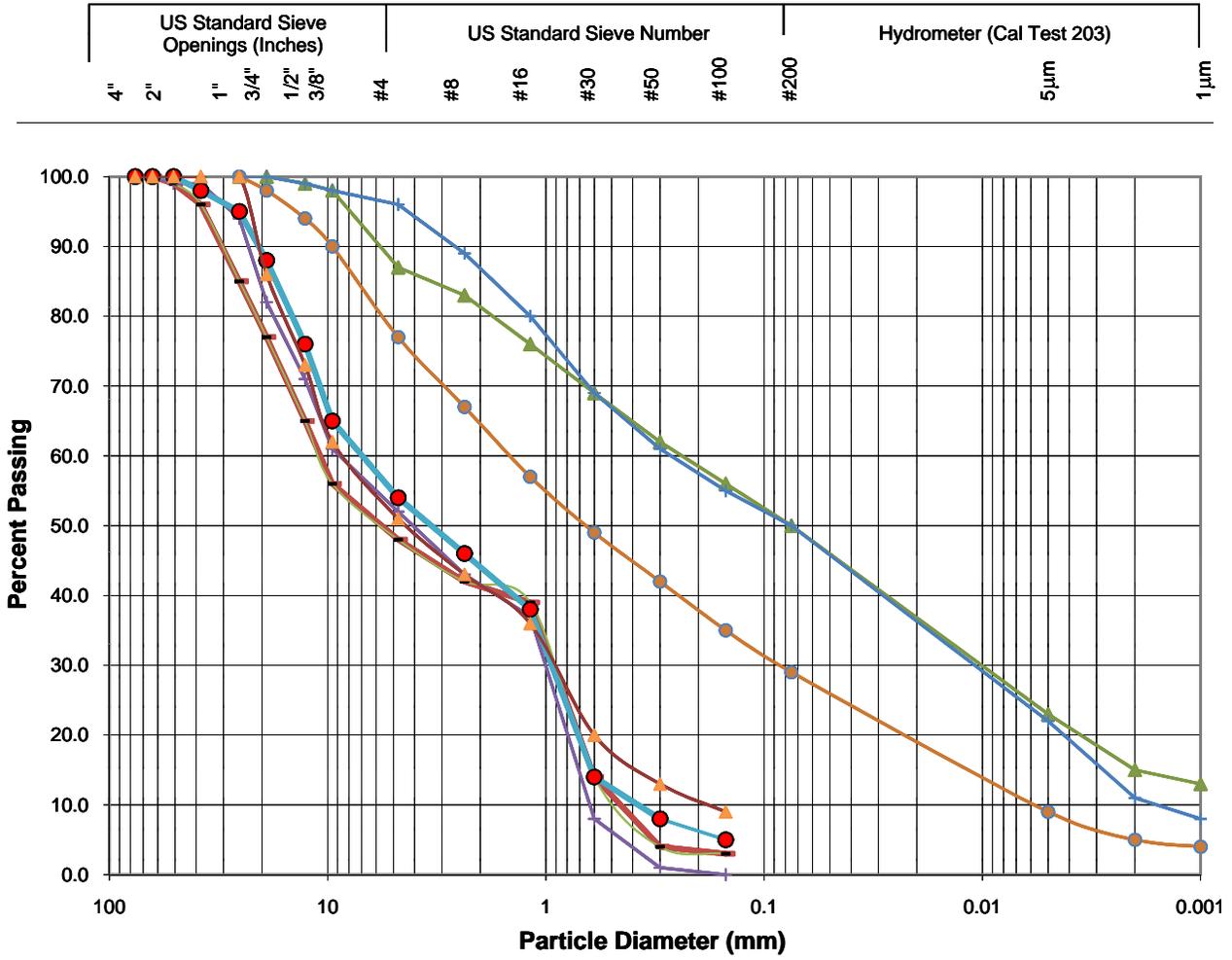
APPENDIX B

LAB TEST SUMMARY AND DATA SHEETS

SUMMARY OF LABORATORY TEST RESULTS

Boring ID	Depth (ft, bgs)	USCS	Description	Unit Weight (pcf)	Moisture Content (%)	Friction Angle ¹ (deg)	Cohesion ¹ (psf)	ASTM Atterberg Limits			Notes
								LL	PL	PI	
R-09-001	15-16.5	CL	Sandy Lean Clay					28	18	10	
	30-31.5	SC	Clayey Sand with Gravel					21	13	8	
	45-46.5	ML	Sandy Silt					23	NP	-	
	55-56.5	SP	Poorly Graded Sand with Gravel		16			25	NP	-	
	70-71.5	SP	Poorly Graded Sand		21			26	NP	-	
	90-91.5	SP	Poorly Graded Sand		17			24	NP	-	
	100-101.5	SP	Poorly Graded Sand		19			24	NP	-	
	25	GC	Clayey Gravel with Sand		12.4	36.9	554	23	9	14	Sample ID: R-09-001 11
	33.5	SC	Clayey Sand with Gravel	136.6	12.3			20	8	12	Sample ID: R-09-001 13
	34.5				6.1	23.2	3120				Sample ID: R-09-001 15
41.3	GC	Clayey Gravel with Sand	136.6	5.4			21	6	15	Sample ID: R-09-001 17	
41.7				3.5	24.2	5760				Sample ID: R-09-001 18	
R-09-003	33	CL	Sandy Lean Clay with Gravel		29.4			48	27	21	Sample ID: R-09-003 15
	33.5				26.9	30	647				Sample ID: R-09-003 16
R-09-005	23-24	SC	Clayey Sand with Gravel					29	14	15	
	25-26.5	SC	Clayey Sand with Gravel								
	30-31.5	GC	Clayey Gravel with Sand								
	33	CH	Sandy Fat Clay					51	17	34	
1 - From Direct Shear tests											

Gradation Analysis Test Results



GRAVELS		SANDS			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

Sample ID:

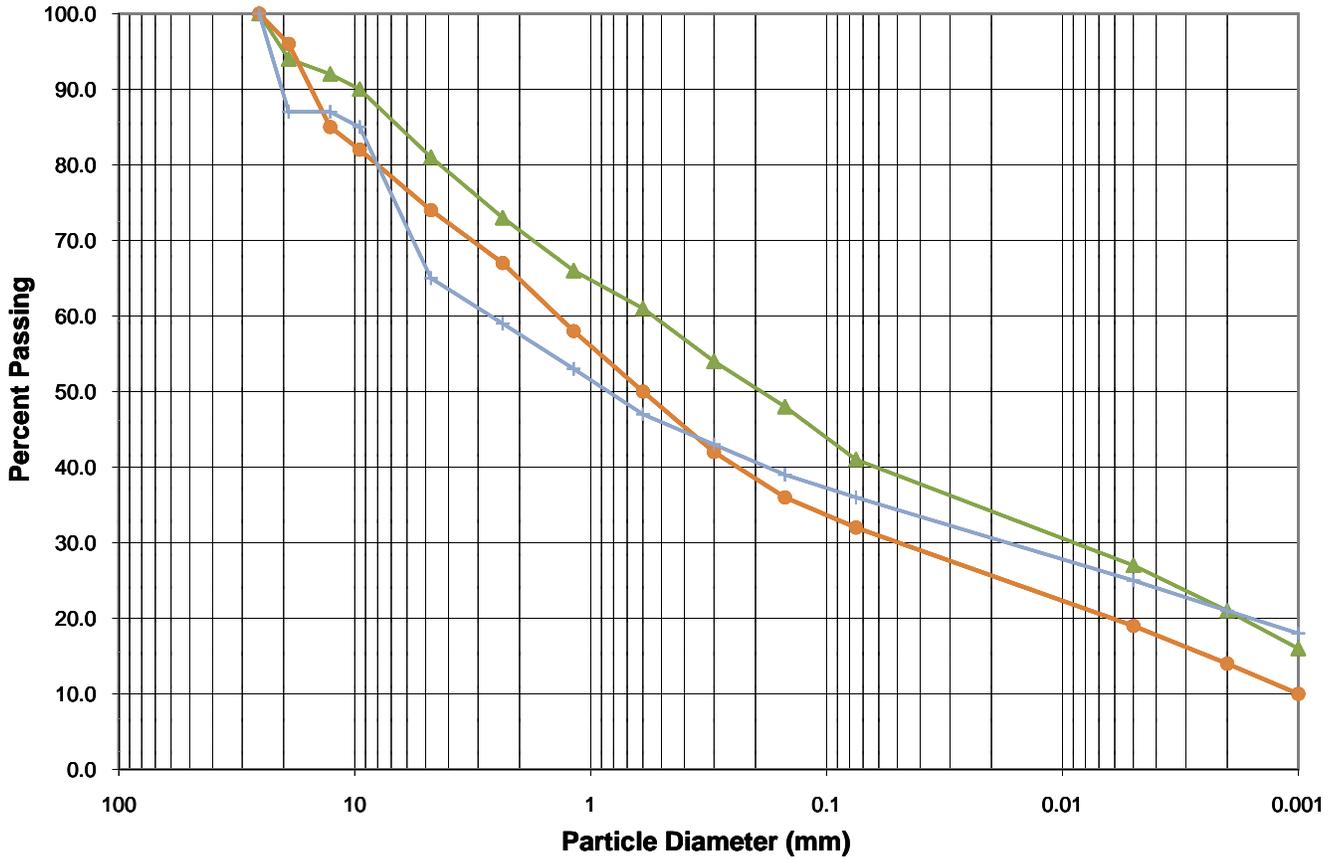
▲ R-09-001 15'-16.5'	● R-09-001 30'-31.5'	+ R-09-001 45'-46.5'
■ R-09-001 55'-56.5'	◆ R-09-001 70'-71.5'	● R-09-001 90'-91.5'
▲ R-09-001 100'-101.5'		

CALTRANS
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Engineering North -
 Branch B

Project: Greenpoint Sink Wall #1
EA: 01-423700
D.-Co.-Rt.-: 01-HUM-299-PM 20.2
Test Date: 12/24/09-8/2/2010

Gradation Analysis Test Results

US Standard Sieve Openings (Inches)			US Standard Sieve Number					Hydrometer (Cal Test 203)						
4"	2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	5µm	1µm



GRAVELS		SANDS			SILT	CLAY

Sample ID: ▲ R-09-005 23'-24' ● R-09-005 25'-26.5' + R-09-005 30'-31.5'

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 Office of Geotechnical Engineering North -
 Branch B

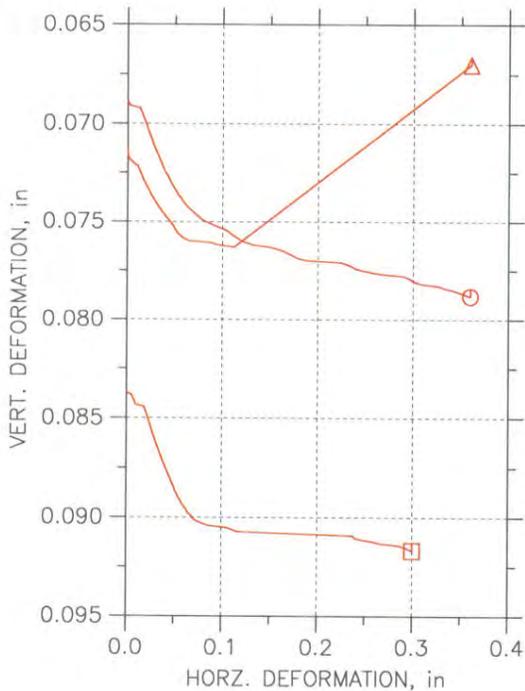
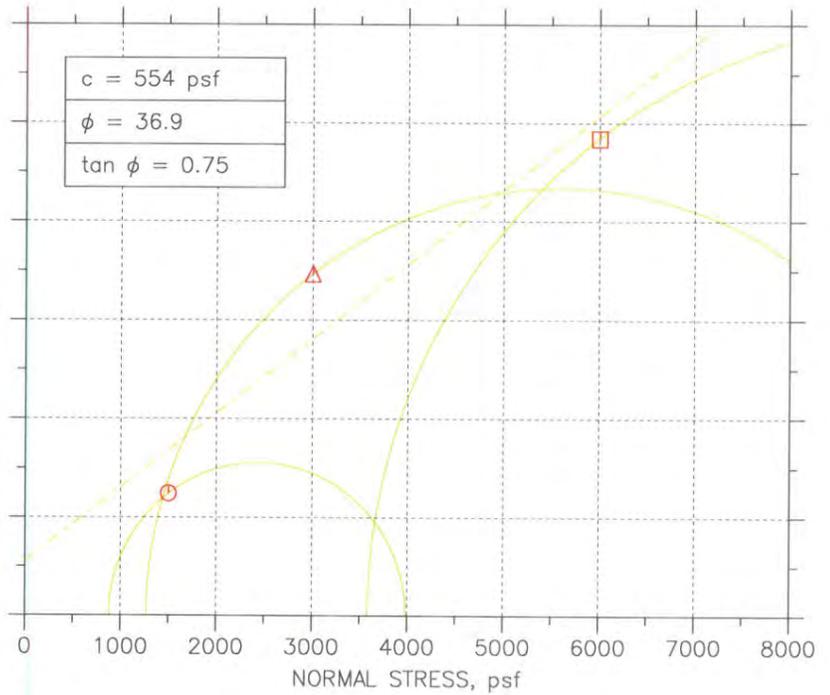
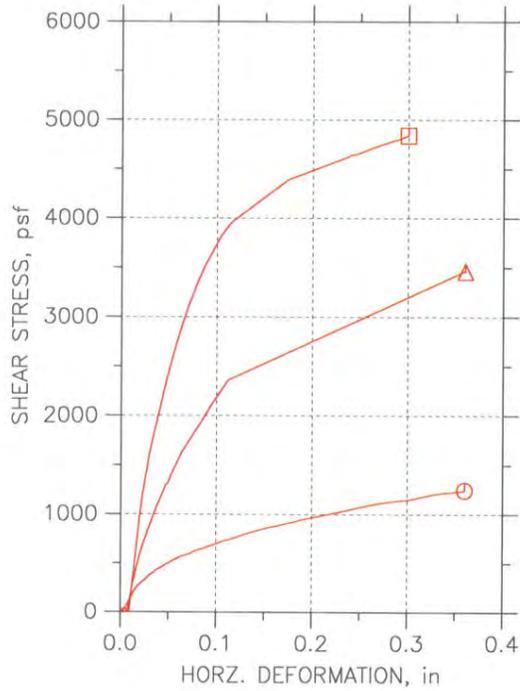
Project: Greenpoint Sink Wall #1

EA: 01-423700

D.-Co.-Rt.-: 01-HUM-299-PM 20.2

Test Date: 8/2/2010

DIRECT SHEAR TEST REPORT

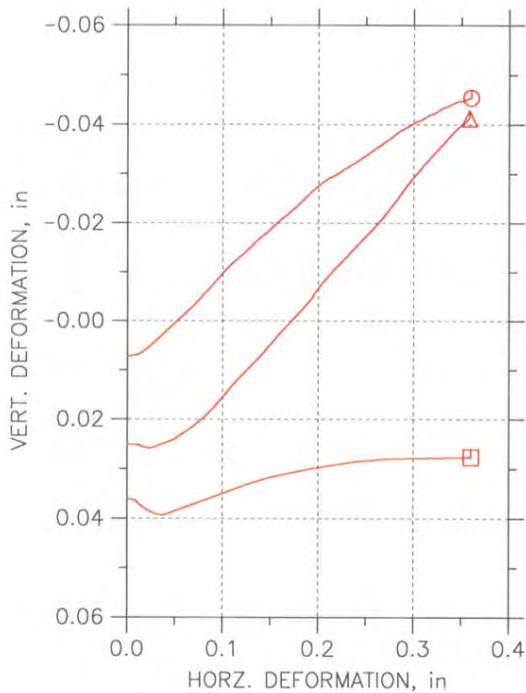
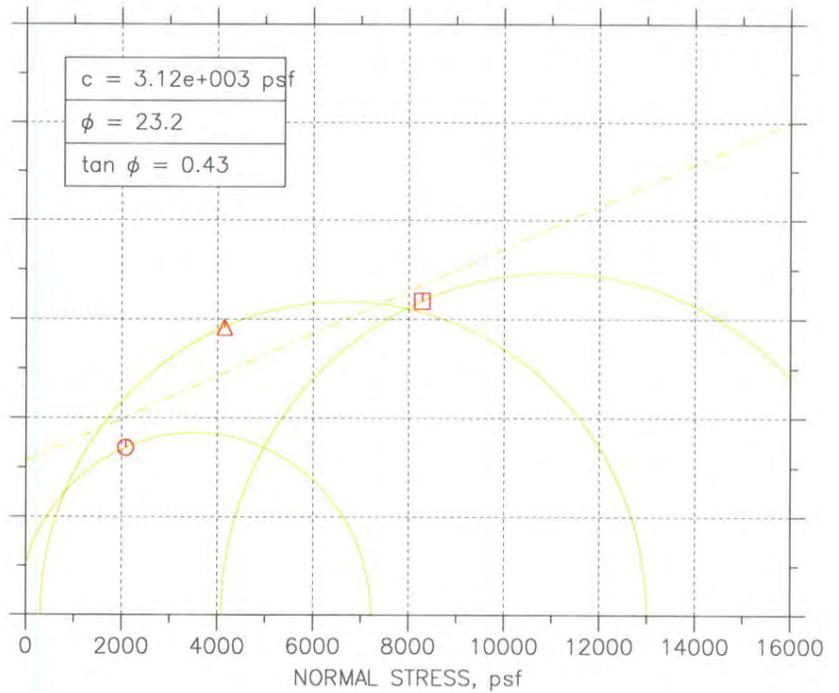
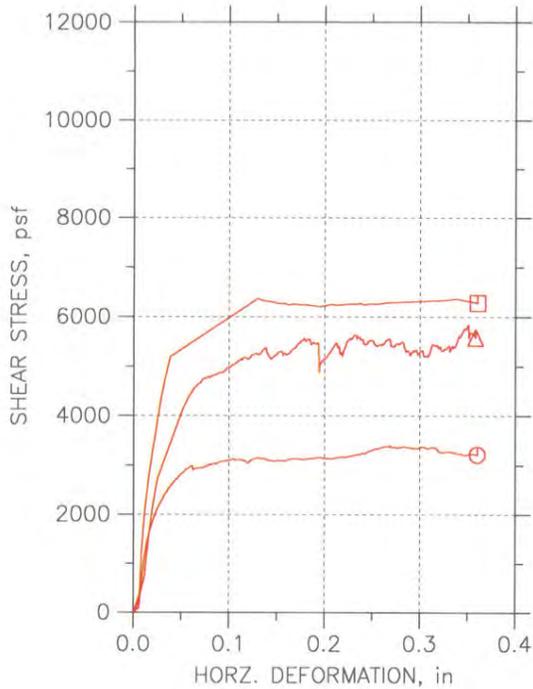


Symbol	⊙	△	□
Test No.	DS10054A	DS10054B	DS10054C
Sample No.	11	11	11
Shape	Circular	Circular	Circular
Initial	Dimension, in	2.375	2.375
	Area, in ²	4.4301	4.4301
	Height, in	1	1
	Water Content, %	14.96	13.20
	Dry Density, pcf	121.25	126.41
	Saturation, %	103.56	106.87
	Void Ratio	0.39015	0.33341
Consol. Height, in	0.93122	0.92938	
Consol. Void Ratio	0.29454	0.23924	
Final	Water Content, %	10.35	8.98
	Dry Density, pcf	131.62	135.49
	Saturation, %	99.64	99.35
	Void Ratio	0.28058	0.24404
Normal Stress, psf	1498.8	3000.1	
Max. Shear Stress, psf	1241.1	3463.1	
Ult. Shear Stress, psf	1241.1	3458.9	
Time to Failure, min	36.085	36.654	
Disp. Rate, in/min	0.01	0.01	
Implied Specific Gravity	2.70	2.70	
Liquid Limit	---	---	
Plastic Limit	---	---	
Plasticity Index	---	---	

Project: Greenpoint Sink	Disp. Rate, in/min	0.01	0.01	0.01
Location: 01-HUM-299-20.2	Implied Specific Gravity	2.70	2.70	2.70
Project No.: 01-423700	Liquid Limit	---	---	---
Boring No.: R1-09-001	Plastic Limit	---	---	---
Sample Type: 2.4" BRASS	Plasticity Index	---	---	---
Description: Moist, Stiff/Dense, Brownish Silvery Very Dark Grey, Firm Clay and Gravel up to 1". Extensively patched.				
Remarks: ASTM D 3080.				

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4/30/10

DIRECT SHEAR TEST REPORT

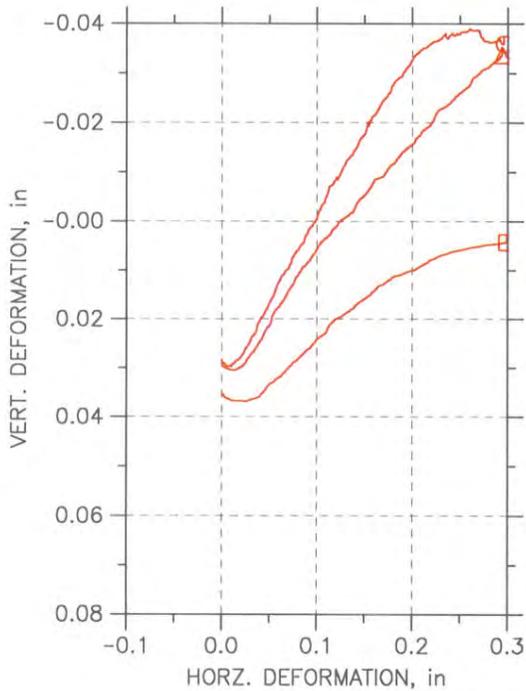
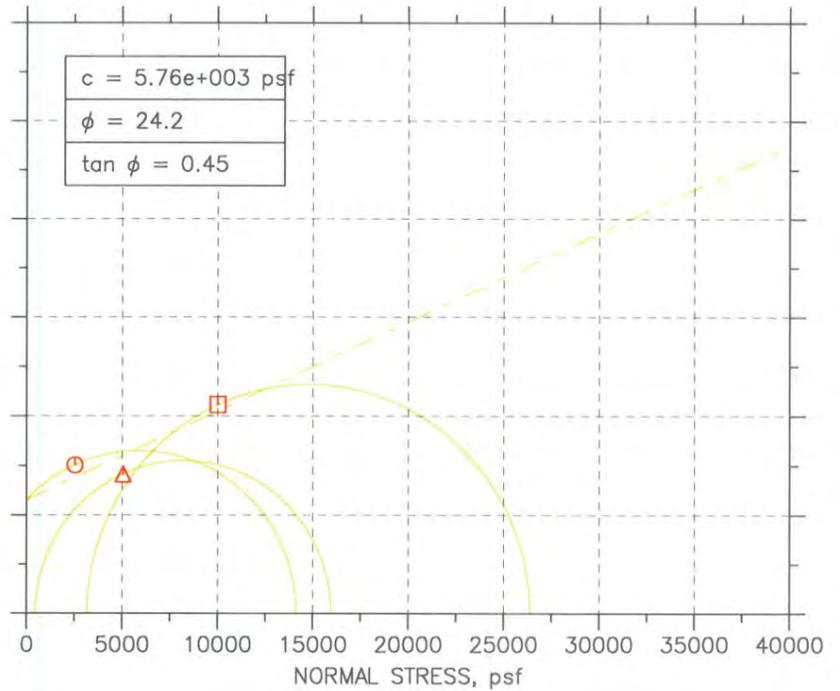
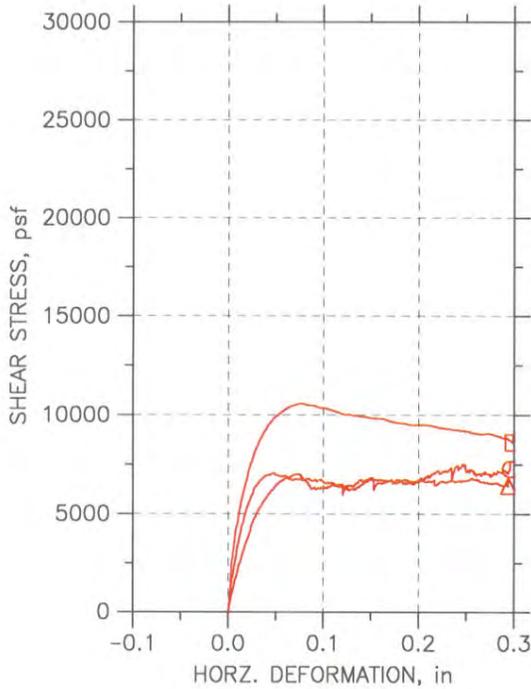


Symbol	⊙	△	□	
Test No.	DS10055A	DS10055B	DS10055C	
Sample No.	15	15	15	
Shape	Circular	Circular	Circular	
Initial	Dimension, in	2.375	2.375	2.375
	Area, in ²	4.4301	4.4301	4.4301
	Height, in	1	1	1
	Water Content, %	5.91	4.00	7.09
	Dry Density, pcf	138.19	139.57	140.77
	Saturation, %	72.64	52.06	96.93
	Void Ratio	0.21974	0.20771	0.19738
Consol. Height, in	0.99322	0.97534	0.96427	
Consol. Void Ratio	0.21147	0.17793	0.1546	
Final	Water Content, %	10.14	9.49	6.05
	Dry Density, pcf	132.19	134.04	144.78
	Saturation, %	99.56	99.51	99.42
	Void Ratio	0.27506	0.25746	0.16425
Normal Stress, psf	2074.7	4143.2	8279.5	
Max. Shear Stress, psf	3390.5	5830.8	6364	
Ult. Shear Stress, psf	3208.2	5579.5	6279	
Time to Failure, min	27.556	35.947	13.674	
Disp. Rate, in/min	0.01	0.01	0.01	
Implied Specific Gravity	2.70	2.70	2.70	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	
Plasticity Index	---	---	---	

Project: Greenpoint Sink	Disp. Rate, in/min	0.01	0.01	0.01
Location: 01-HUM-299-20.2	Implied Specific Gravity	2.70	2.70	2.70
Project No.: 01-423700	Liquid Limit	---	---	---
Boring No.: R1-09-001	Plastic Limit	---	---	---
Sample Type: 2.4" BRASS	Plasticity Index	---	---	---
Description: Moist, Very Stiff, Dark Grey, Silt and Gravel up to 0.5". With white quartz in specimen A. Extensively patched				
Remarks: ASTM D 3080.				

6/30/10

DIRECT SHEAR TEST REPORT

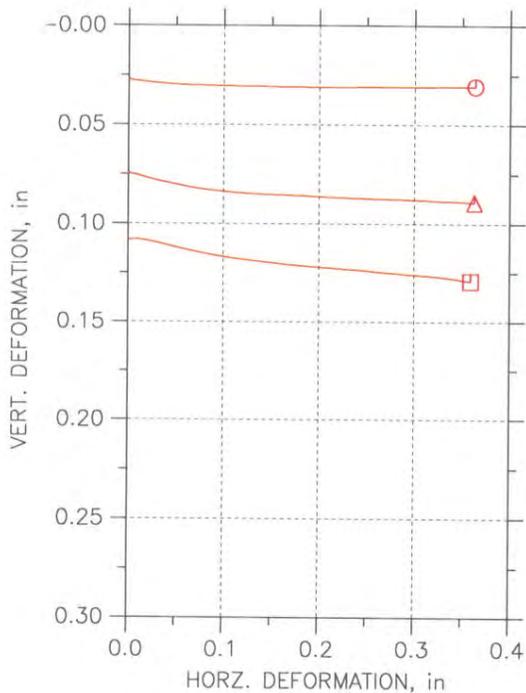
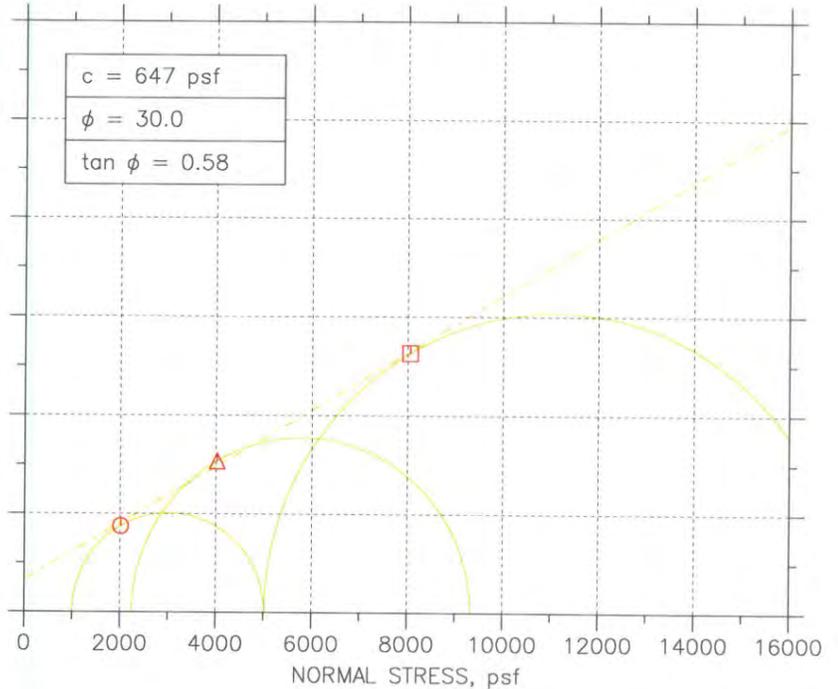
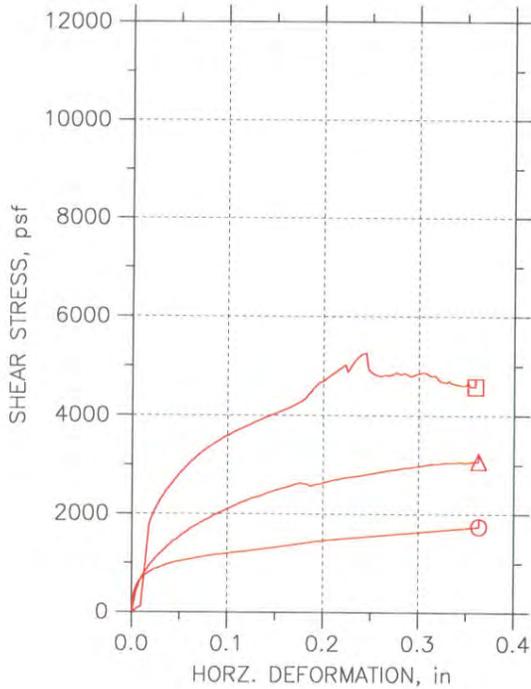


Symbol	⊙	△	□	
Test No.	DS10056A	DS10056B	DS10056C	
Sample No.	18	18	18	
Shape	Circular	Circular	Circular	
Initial	Dimension, in	1.944	1.944	1.944
	Area, in ²	2.9681	2.9681	2.9681
	Height, in	1	1	1
	Water Content, %	5.40	4.80	7.78
	Dry Density, pcf	140.29	139	140.16
	Saturation, %	66.34	56.17	95.19
	Void Ratio	0.22376	0.23506	0.22488
Consol. Height, in	0.97327	0.97215	0.96623	
Consol. Void Ratio	0.19104	0.20066	0.18352	
Final	Water Content, %	9.70	9.97	7.97
	Dry Density, pcf	135.43	134.48	140.76
	Saturation, %	99.64	99.16	99.77
	Void Ratio	0.26767	0.27656	0.21961
Normal Stress, psf	2509.6	5025.8	10010	
Max. Shear Stress, psf	7516.1	7065.3	10575	
Ult. Shear Stress, psf	7260	6406.7	8608.5	
Time to Failure, min	25.896	5.9178	8.9385	
Disp. Rate, in/min	0.01	0.01	0.01	
Implied Specific Gravity	2.75	2.75	2.75	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	
Plasticity Index	---	---	---	

Project: Greenpoint Sink	
Location: 01-HUM-299-20.2	
Project No.: 01-423700	
Boring No.: R1-09-001	
Sample Type: 2" Brass	
Description: Moist, Very Stiff, Silvery Very Dark Grey with some White, Silty Clay and Gravel. Extensively patched.	
Remarks: ASTM D 3080.	

[Handwritten Signature]
6/30/10

DIRECT SHEAR TEST REPORT



Symbol	⊙	△	□	
Test No.	DS10057A	DS10057B	DS10057C	
Sample No.	16	16	16	
Shape	Circular	Circular	Circular	
Initial	Dimension, in	2.375	2.375	2.375
	Area, in ²	4.4301	4.4301	4.4301
	Height, in	1.03	1.02	1.02
	Water Content, %	24.38	25.66	25.85
	Dry Density, pcf	101.35	99.229	99.144
	Saturation, %	99.29	99.16	99.69
Void Ratio	0.66303	0.69866	0.7001	
Consol. Height, in	1.0044	0.94788	0.91631	
Consol. Void Ratio	0.62165	0.57855	0.52728	
Final	Water Content, %	22.57	20.31	17.86
	Dry Density, pcf	104.48	108.75	113.54
	Saturation, %	99.37	99.69	99.50
	Void Ratio	0.61327	0.54995	0.48456
Normal Stress, psf	2004.7	4018.7	8050.6	
Max. Shear Stress, psf	1736.5	3065.5	5256.8	
Ult. Shear Stress, psf	1736.5	3065.5	4582	
Time to Failure, min	122.27	122.71	84.576	
Disp. Rate, in/min	0.003	0.003	0.003	
Implied Specific Gravity	2.70	2.70	2.70	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	
Plasticity Index	---	---	---	

Project: Greenpoint Sink	Disp. Rate, in/min	0.003
Location: 01-HUM-299-20.2	Implied Specific Gravity	2.70
Project No.: 01-423700	Liquid Limit	---
Boring No.: R1-09-003	Plastic Limit	---
Sample Type: 2.4" BRASS	Plasticity Index	---
Description: Moist, Soft, Brown Clay with Gravel. Patched.		
Remarks: ASTM D 3080.		

[Signature]
7/6/10

APPENDIX C

GROUNDWATER DATA

WATER LEVEL MEASUREMENTS GREENPOINT SINK LOCATION 1

Date Measured	SI-001 R-09-001 (ft, bgs)	SI-002 R-09-002 (ft, bgs)	SI-003 R-09-003 (ft, bgs)	SI-004 R-09-004 (ft, bgs)	SI-005 R-09-005 (ft, bgs)	SI-006 R-09-006 (ft, bgs)	SI-007 R-09-007 (ft, bgs)	SI-008 R-10-008 (ft, bgs)
12/16/2009	84.4	37.1	34.3					
1/5/2010	87.1	38.2	38.9					
1/23/2010				13	19.2			
1/26/2010				11.9	18.7			
1/27/2010	86.9	36.8	36.2			33.3	16.4	
1/28/2010								28.2
2/22/2010					22.7	35.3	14	
2/23/2010	86.2		38.01					
2/24/2010				12.9				
2/25/2010					22.0			28.9
3/09/2010					22.7	34.4	13.3	
3/10/2010								29
3/17/2010	90.3		37.6				12.9	
3/18/2010				13.2				29.2
4/27/2010								
4/28/2010	46.3				22.7	34.3	7.5	
4/29/2010								29.1
5/11/2010								
5/12/2010							8.4	
3/24/2011				10.1	5.6	36.1	6.0	

Memorandum

*Flex your power!
Be energy efficient!*

To: JOE DOWNING
Division of Structure Design
Office of Bridge Design North
Branch 3

Date: July 5, 2011

File: 01-HUM-299-PM 20.4
Green Point Sink Location 2
EFIS ID: 0100000172
Bridge No: 04E0029

Attn: Lewis Shen

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – OGDN Branch B

Subject: Foundation Report for Retaining Wall - Green Point Sink Location 2

1. INTRODUCTION

This Foundation Report summarizes the results of the geotechnical investigation and provides geotechnical recommendations for the proposed soldier pile tieback wall on Route 299 at post mile (PM) 20.4 (Location 2) in Humboldt County, CA (Vicinity Map, Figure 1). The wall is required to stabilize the roadway within the limits of an active earth slide.

2. PROJECT DESCRIPTION

The above referenced location was identified as a “perennial maintenance problem” in 2000. The roadway has been subsiding for about two decades due to landslide movement. Two slope inclinometers (SI’s) S-1 and S-2 were installed in 1991. The need for a permanent repair was warranted after considerable rain and landslide movement in 05/06 caused significant damage. The proposed tieback wall is approximately 544 feet in length and has a maximum height of 50 feet. The wall layout line is shown on the Site Plan and Landslide Map (Figure 2).

3. SCOPE OF WORK

The recommendations contained in this report are based on a review of geotechnical/geologic literature, a subsurface investigation, field observations, laboratory testing of soil samples, and geotechnical calculations. Subsurface conditions were evaluated only at the boring locations and may deviate elsewhere within the Project Limits. The elevations reported in this memorandum are with respect to Mean Sea Level (MSL).

4. PERTINENT REPORTS AND INVESTIGATIONS

Caltrans Bridge Design Specifications, August 2004

Fall, J.N. et. al. 2006, "Landslides in the Highway 299 Corridor between Blue Lake and Willow Creek, Humboldt County, California, California Geological Survey, Special Report 195.

Freeze, R.A. and Cherry, J. A. , 1979, "Groundwater", Prentice-Hall, Inc.

Sabatini, P. J. et. al. 1999, "Geotechnical Engineering Circular No. 4 - Ground Anchors and Anchored Systems" FHWA Report No. FHWA-IF-99-015.

List of California Vegetation Alliances, Department of Fish and Game Biogeographic Data Branch, Vegetation Classification and Mapping Program, December 28, 2009

Stark, T, Choi, H and McCone, S., 2005, "Drained Shear Strength Parameters for Analysis of Landslides", Journal of Geotechnical and Geoenvironmental Engineering, ASCE.

Turner, A.K., Schuster, R.L. (ed.) 1996, "Landslides Investigation and Mitigation", Special Report 247, Transportation Research Board, National Research Council.

Caltrans Reports

Preliminary Geotechnical Report, Greenpoint Sink dated 10-28-2008

Project Study Report dated 9/2009

Caltrans Corrosion Guidelines Version 1.0, 9/2003

Caltrans Design Plans dated 8/25/2010

Caltrans Bridge Design Specifications Section 5, 8/2004

Caltrans Soil and Rock Logging, Classification, and Presentation Manual, 2010 Edition.

5. FIELD INVESTIGATION AND TESTING PROGRAM

Surface mapping was conducted in order to map landslide related features and identify the approximate limits of the active landslide (Figure 2).

Eight mud-rotary borings were drilled between December 2009 and March 2010. The locations of the borings are shown on Figure 2. The boreholes were advanced using a truck mounted Acker MPCA and a CME 750 drill rig using a 94-mm HXB casing equipped with a diamond impregnated core bit. Soil and rock samples were logged in accordance to the Caltrans Soil and Rock Logging, Classification, and Presentation Manual 2010 Edition.

SI casings were installed in all the borings and backfill with coarse sand with bentonite seal. The casings were perforated in the bottom to permit monitoring of water levels within the casing. Inclinator readings were obtained between December 2009 and July of 2010. A summary of the borings and the depth of movement are provided in Table 1. The SI data are included in Appendix A.

**TABLE 1
 BORING AND INCLINOMETER DATA SUMMARY**

BORING I.D.	STATION AND OFFSET	DEPTH OF BORING (ft, bgs)	SURFACE ELEVATION (ft, MSL)	DEPTH TO BEDROCK (ft, bgs)	DEPTH TO SHEAR ZONE (ft, bgs)
R-09-020	320+58.10 RT 17.79'	200	1560	51.5	38
R-09-021	322+23.14 RT 9.08'	95	1552	40	24
R-10-023	319+43.61 RT 255.89'	75	1634	32	No shear observed
R-10-024	320+51.49 RT 141.05'	100	1582	35	No shear observed
R-10-025	322+5.54 RT 116.824'	100	1584	45	No shear observed
R-10-026	319+46.15 RT 120.64'	100	1589	28	No shear observed
R-10-027	319+58.46 LT 11.07'	80	1561	55	53
R-09-050	319+46.15 RT 3.94'	100	1568	65	27

BORING I.D.	STATION AND OFFSET	DEPTH OF BORING (ft, bgs)	SURFACE ELEVATION (ft, MSL)	DEPTH TO BEDROCK (ft, bgs)	DEPTH TO SHEAR ZONE (ft, bgs)
SI-1	320+62.99 LT 44.42'	197.25	1545	--	44
SI-2	320+55.10 RT 40.80'	87.25	1554	--	22

6. LABORATORY TESTING

Laboratory testing of selected soil samples obtained from borings R-10-024 and R-10-027 were performed at Caltrans' Geotechnical and Materials Laboratory in Sacramento and in the District 1 Materials Laboratory in Eureka, California. Appendix B provides the laboratory data sheets and summary table of the results. The testing was performed to classify soils using the ASTM Unified Soil Classification System (USCS) and determine the engineering properties of the soil.

The following tests were performed:

Particle-Size Analysis of Soils (California Test Method No. 203 and ASTM D422)

Liquid Limit, Plastic Limit, Plasticity Index of Soils (California Test Method No. 204 and ASTM D4318),

Direct Shear Test of Soils under Consolidated Drained Conditions (ASTM D3080), and

Corrosivity test (pH and Resistivity) (CA Test Method No. 643).

In-place density was determined from brass tube push samples.

7. SITE GEOLOGY AND SUBSURFACE CONDITIONS

7.1.1. Site Description

Highway 299 at this location traverses what has been mapped as a Quaternary landslide (Geologic Map, Figure 3). The roadway was constructed around 1960 on a through fill that is founded on a stabilization trench. Figure 4, (As-built Plan Sheet) shows a profile of the original ground surface (beneath the through fill) and the approximate location of the stabilization toe trench.

A steep (1.4H:1V), un-vegetated slope covered in cold patch borders the westbound lane. The slope is approximately 33 feet in height. At the base of the slope there is an approximately 15 to 30 foot wide bench covered in coarse gravel and cobbles. The bench is interpreted to be a buttress or is related to the original stabilization trench and through fill. Cross-Section A-A' (Figure 5) goes through the center of the active landslide and shows the geometry of the slope and subsurface information.

A cut slope exists on the south side of the roadway outside of the through fill limits. The cuts are approximately 18 feet in height with slope ratio that ranges between 3H:1V to 4H:1V. A shallow V-ditch along the eastbound lane at the base of the cut slope, channels surface water and groundwater (from a series of horizontal drains) to the east to a 36-inch corrugated metal pipe inlet at PM 20.58. The horizontal drains, shown on Figure 2, flow year round. Sections of older alignments of Highway 299 exist upslope of the current alignment. Shallow debris slides are visible along the cut slopes of the old highway alignment. The vegetation on the cut slopes and the natural slopes above and below the highway can be classified as a *Psuedotsuga menziesii* Alliance (Douglas fir forest).

7.1.2. Site Geology

A geologic map of the site is provided in Figure 3. Bedrock within the project limits is mapped as Redwood Creek schist (KJFr) Eastern Belt Franciscan Complex (Falls et. al; 2006). The bedrock at the site is a very dark grey, fine-grained and crenulated quartz mica schist within the Franciscan Complex of the Coast Ranges Province. The schist possesses a distinctive, strongly developed platy (metamorphic) texture with a relatively high quartz/mica content. Large dormant landslide complexes and earthflows are common along the main channel of Redwood Creek and its western tributaries underlain by this unit. These features typically are seen as broad, bowl-shaped depressions in the hillsides that often extend from Redwood Creek to the ridge top (Falls et. al; 2006). The large features do not appear to be recently active from a geomorphic perspective, but rather contain occasional areas of localized activity.

The travelled way and fill along the outboard edge of the roadway are within the limits of an active earth slide between approximately Station 318+10 and Station 323+25 along the design roadway alignment line titled HUM 1 shown on (Figure 2).

The headscarp of the active earth slide is located in the unpaved shoulder on the south side of the roadway. The landslide is approximately 415 feet wide at the wall layout line and extends approximately 250 feet below the roadway. The depth to the failure surface of the landslide is approximately 20 feet at the inboard edge of the roadway and approximately 54 feet at the wall layout line. A cross section of the landslide is shown in Figure 5. The roadway surface within the limits of the landslide is undulating and large cracks exist where the roadway traverses the lateral scarps. The approximately 10 to 20-foot thick layer of asphalt and cold mix observed in the borings indicates that Maintenance has paved the roadway numerous times in the past in an attempt to maintain the roadway grade.

Figure 3 indicates a Quaternary landslide exists upslope of the roadway. No movement was recorded in the slope inclinometers installed in borings R-10-023 through R-10-026. No evidence of recent landslide activity was observed upslope of the headscarp of the active earth slide located in the unpaved shoulder.

7.1.3. Subsurface Conditions

The project site is underlain by asphalt and cold mix varying in thickness between 10 and 20 feet. The asphalt is underlain by a fill composed of silty and clayey sands with fine gravel (SM/SC), varying between 8 and 33 feet. Underlying the fill is medium dense to very dense schist decomposed to silty

sand or clayey sand with silt (SM/SC), ranging in thickness between 12 and 36 feet thick. The depth to schist ranged between 35 to 65 feet. A profile of the subsurface conditions is provided in Figure 6 (Subsurface Geology along the Wall Layout Line).

Logs of Test Borings (LOTBs) will be provided at a future date to be included in the plans.

7.1.4. Groundwater Conditions

Groundwater levels were recorded periodically in all the borings between December 16, 2009 and May 11, 2010. A summary of the measured groundwater levels is provided in Appendix C.

Based on the groundwater measurements in Borings R-10-23 through R-10-26 groundwater above the roadway appears to be perched at the elevation of the fill/decomposed schist interface. The groundwater measurements in Borings R-09-020, R-09-21, R-09-50 and R-10-27 vary between 20.5 feet and 85.8 feet.

Seeps were observed on the slopes above and below the roadway. Water was also observed seeping from the horizontal drains throughout the year. The locations of the horizontal drains are shown on Figure 2. Surface water and hydrophilic plants were observed in the V-ditch throughout the year.

It should be noted that the measurements of the groundwater levels may not reflect the groundwater flow conditions because of the inherent slow response time of open pipe piezometers. The design groundwater surface is assumed to be higher than the levels observed in the borings. The groundwater surface assumed for design is shown on Figure 5.

8. CORROSION EVALUATION

Chemical analyses were performed on two (2) samples collected from Boring R-10-027 to evaluate corrosion potential of the on-site soils. Testing was performed by the Caltrans Materials laboratory in Eureka, CA. The results are shown in Table 2.

**TABLE 2
SOIL CORROSION TEST SUMMARY**

BOREHOLE ID	DEPTH (ft, bgs)	pH	MINIMUM RESISTIVITY (ohm-cm)
R-10-027	30-41.5	6.08	3,500
R-10-027	40-41.5	6.1	1,500

Based on Caltrans Corrosion Guidelines (Version 1.0, 2003) and the laboratory test results, the site may be considered non-corrosive.

9. GEOTECHNICAL AND FOUNDATION RECOMMENDATIONS

9.1.1. Wall Location and Height

The wall layout line is shown on Figure 2 and the subsurface geology along the wall layout line is shown on Figure 6. The wall extends approximately 10 feet beyond the limits of the active landslide. The proposed wall is approximately 544 feet in length with a maximum height of 50 feet. There are five levels of tiebacks. The recommended finished grade elevation on the down slope side of the wall at approximately Sta. 320+60 is 1547 feet, which is between the second and third level of tiebacks.

9.1.2. Slope Stability analysis and Design Parameters

The data from the inclinometers indicate that the movement of the slope to be retained is at the fill and decomposed schist interface.

The soil strength parameters for the design were initially determined by using the standard penetration test (SPT) N values obtained from the vertical boreholes, published correlations and laboratory data.

Given it is an active landslide, it is assumed that residual shear strength conditions prevail. Residual strengths were estimated based on a correlation of liquid limit, clay size fraction and effective normal stress at the failure zone (Stark and Eid, 1994). Atterberg limits were obtained for several samples. Liquid limits ranged from 23 to 27 with an average of 26 and the average clay size fraction was 9 percent. Residual Friction angles calculated from this correlation ranged between 24.5 to 28.5 degrees.

These initial values were used in the slope stability program SLOPE/W 2007 on critical cross section A-A' (Figures 2 and 5). A factor of safety of 1.0 was assumed for the existing slope. Observed tension cracks and depths to the landslide failure plane (from inclinometer data) were used to fix the entry and exit points of the failure surface. The soil strength parameters for the decomposed schist were adjusted until the failure plane matched the field observations for the design groundwater surface. The Spencer Method of limit equilibrium that satisfies both force and moment equilibrium was used to compute the factor of safety (Existing Condition Stability Analysis, Figure 7).

The recommended soil and rock parameters for the retaining wall design are provided in Table 3.

TABLE 3
Design Parameters

LAYER	APPROXIMATE THICKNESS (ft) ¹	TOTAL UNIT WEIGHT (pcf)	ANGLE OF INTERNAL FRICTION (degrees)	COHESION (c, psf)
(1) Asphalt	11.5	135	35	0
(2) Fill	35	131	30	0
(3) Decomposed Schist	13	113	27.5	0
(4) Schist	150 ²	130	33	1,000

Notes: 1 – At wall layout line
 2 – A thickness of 150 feet was chosen arbitrarily for the stability analysis.

9.1.3. Hydrostatic Forces

The recommended design groundwater surface elevation is 28 feet below top of the wall.

10. RECOMMENDATIONS FOR TIE-BACK ANCHORS

The ground anchor forces (lateral force) required to resist the landslide force were evaluated using SLOPE/W 2007 per BDS Section 5.5.5.7.1. A concentrated horizontal force (P_{TOTAL}) was then applied at the wall face at the mid-point of the wall height. P_{TOTAL} was then increased in the stability analysis until a factor of safety of 1.3 was achieved. The results of the stability analysis indicate that a total horizontal force of 60,000 pounds per foot is required to stabilize the slope to a factor of safety of 1.3 (P_{TOTAL} Stability Analysis, Figure 8). The recommended tieback design parameters are provided in Table 4. Per Caltrans Bridge Design Specifications, a surcharge pressure of 270 pounds per square feet (psf) was applied to the road surface behind the wall.

**TABLE 4
TIEBACK DESIGN PARAMETERS**

Tieback Design Parameters	
Horizontal Tieback Spacing	8 feet
Tieback Inclination	20°
Tie-back Unbonded Length (feet)	
Row 1	85
Row 2	70
Row 3	55
Row 4	40
Row 5	25

The downslope stability was evaluated at the proposed finish grade elevation of approximately 1547 ft, MSL between the second and third level of tiebacks (Downslope Stability Analysis, Figure 9). A factor of safety of 1.01 was obtained for the down slope stability for the same failure surface that was used in the global slope stability analysis.

11. EARTH WORK AND WALL BACKFILL RECOMMENDATIONS

Along the face of the buried portion of the wall we recommend a two foot wide chimney of Class I Type B permeable material be constructed 2 feet below the finished grade elevation to the base of lagging. Filter fabric should be placed between the permeable material and backfill. A 12 inch perforated plastic pipe should be placed 6 inches above the base of the permeable material and connected to a 12 inch solid plastic pipe and outlet into the creek at the east end of the wall.

12. CONSTRUCTION CONSIDERATIONS

12.1.1. Excavation and Drilling Difficulties

Caving conditions will likely be encountered during drilling for the piles and tiebacks due to the intensely fractured nature of the rock. Temporary casing, drilling under slurry, or placement of slurry cement backfill or concrete and re-drilling may be required to control caving and should be performed in conformance with the provisions in Section 49-4.03 "Drilled Holes," of the Standard Specifications.

Groundwater will likely be encountered in the pile and tieback holes. Pile and tieback installations may require dewatering or the placement of concrete and grout under water. If water is present and the holes are not dewatered, displacement of the water by means of a closed system using a concrete pump or tremie tube to place concrete and grout at the bottom of the holes will be required in conformance with the provisions in Section 51-1.10 “Concrete Deposited Under Water,” of the Standard Specifications.

Drill fluid circulation was lost during drilling of several of the exploratory borings and is interpreted to indicate the presence of cracks and voids in the subsurface materials. The potential for the loss of concrete and grout into voids should be expected. Controlling measures such as the use of a “grout sock,” could greatly reduce the potential for grout loss.

12.1.2. Hazardous Materials

The Quaternary landslide deposits and bedrock within the Project Limits do not contain Naturally Occurring Asbestos (NOA).

13. 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 for SSP-280 disclosing information originating from Geotechnical Services. Items listed to be included in the information Handout will be provided in Acrobat (pdf) format to addressee(s) of this report via electronic mail.

Data and information attached with the project plans are:
Log of Test Borings for Location 2

Data and information included in the Information Handout provided to the bidders and contractors are:

- A. Foundation Report for Retaining Wall – Green Point Sink Location 2 dated June 23, 2011

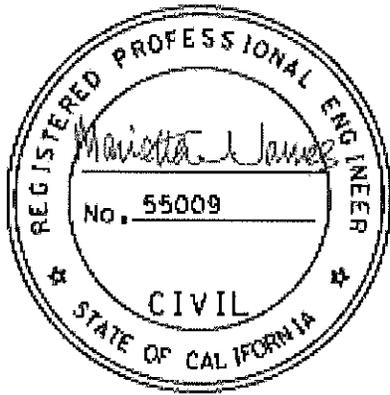
Data and Information available for observation at the Transportation Laboratory:

- A. Borehole Core Samples

Mr. Lewis Shen
July 5, 2011
Page 11

01-HUM-299-PM 20.4
01-0000000172
Green Point Sink Location 2

If you have any questions or require additional information, please contact June James at (707) 441-4692, Jim Morris at (530)265-9867, or Charlie Narwold at (707) 445-6036.



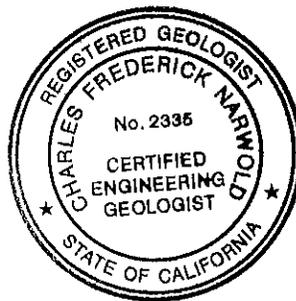
JUNE JAMES
Transportation Engineer
Office of Geotechnical Design – North



JAMES MORRIS
Senior Materials & Research Engineer
Office of Geotechnical Design – North

A handwritten signature in black ink, appearing to read "C.N.R.".

CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design – North



- List of Figures
Figure 1 - Vicinity Map
Figure 2 - Site Plan and Landslide Map

Mr. Lewis Shen
July 5, 2011
Page 12

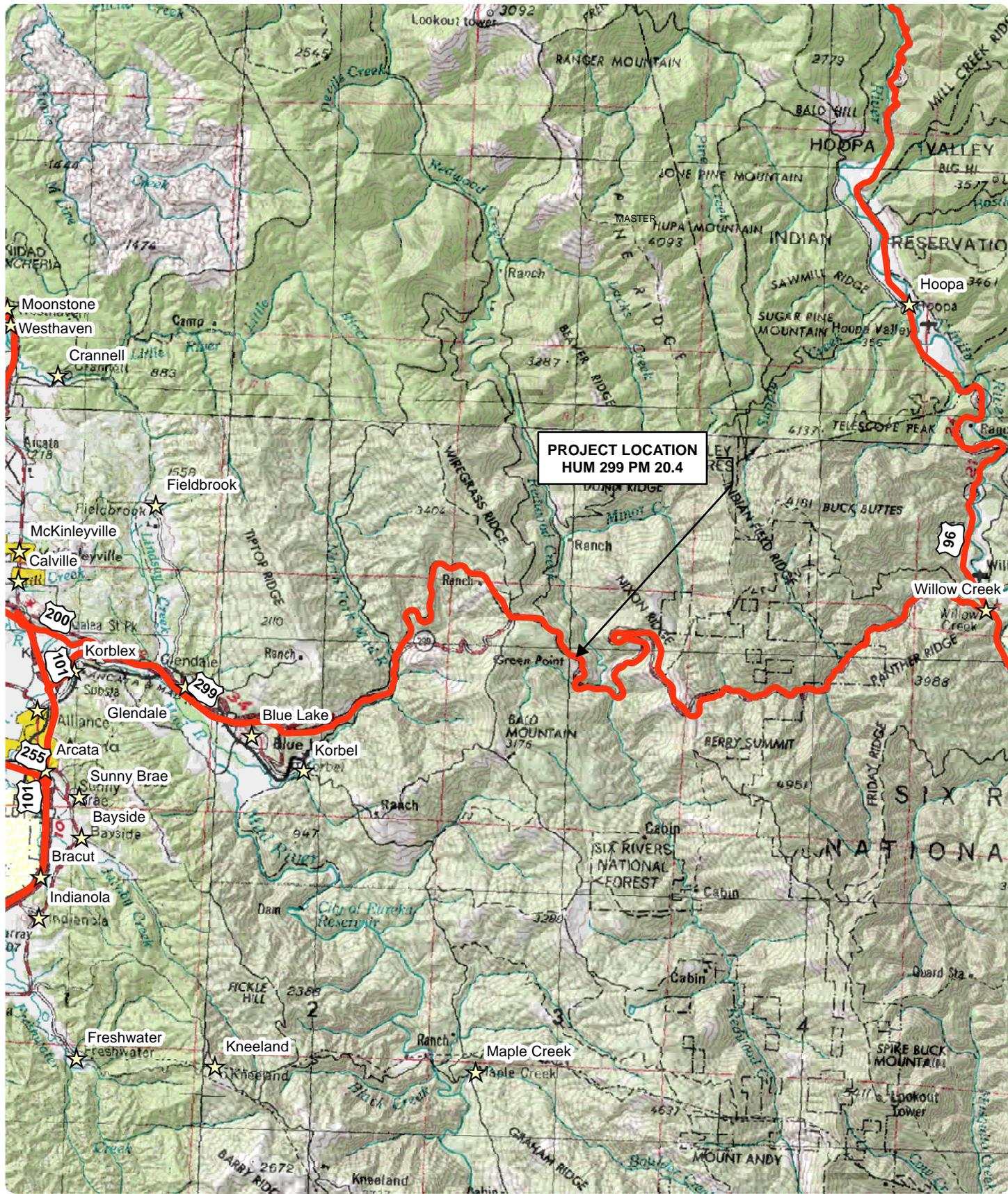
01-HUM-299-PM 20.4
01-0000000172
Green Point Sink Location 2

- Figure 3- Geologic Map
- Figure 4 - As-Built Plan Sheet
- Figure 5 - Cross Section A-A'
- Figure 6 - Subsurface Geology Along Wall Layout Line
- Figure 7- Existing Condition Stability Analysis
- Figure 8- P_{TOTAL} Stability Analysis
- Figure 9- Downslope Stability Analysis

Attachments:

- Appendix A: Slope Inclinator Data
- Appendix B: Laboratory Summary and Data Sheets
- Appendix C: Groundwater Data

- C: RBibbens (E-copy)
GS File Room (email gs_file_room@dot.ca.gov)
Structure Construction RE Pending File (email RE_pending_file@dot.ca.gov)
Project Manager



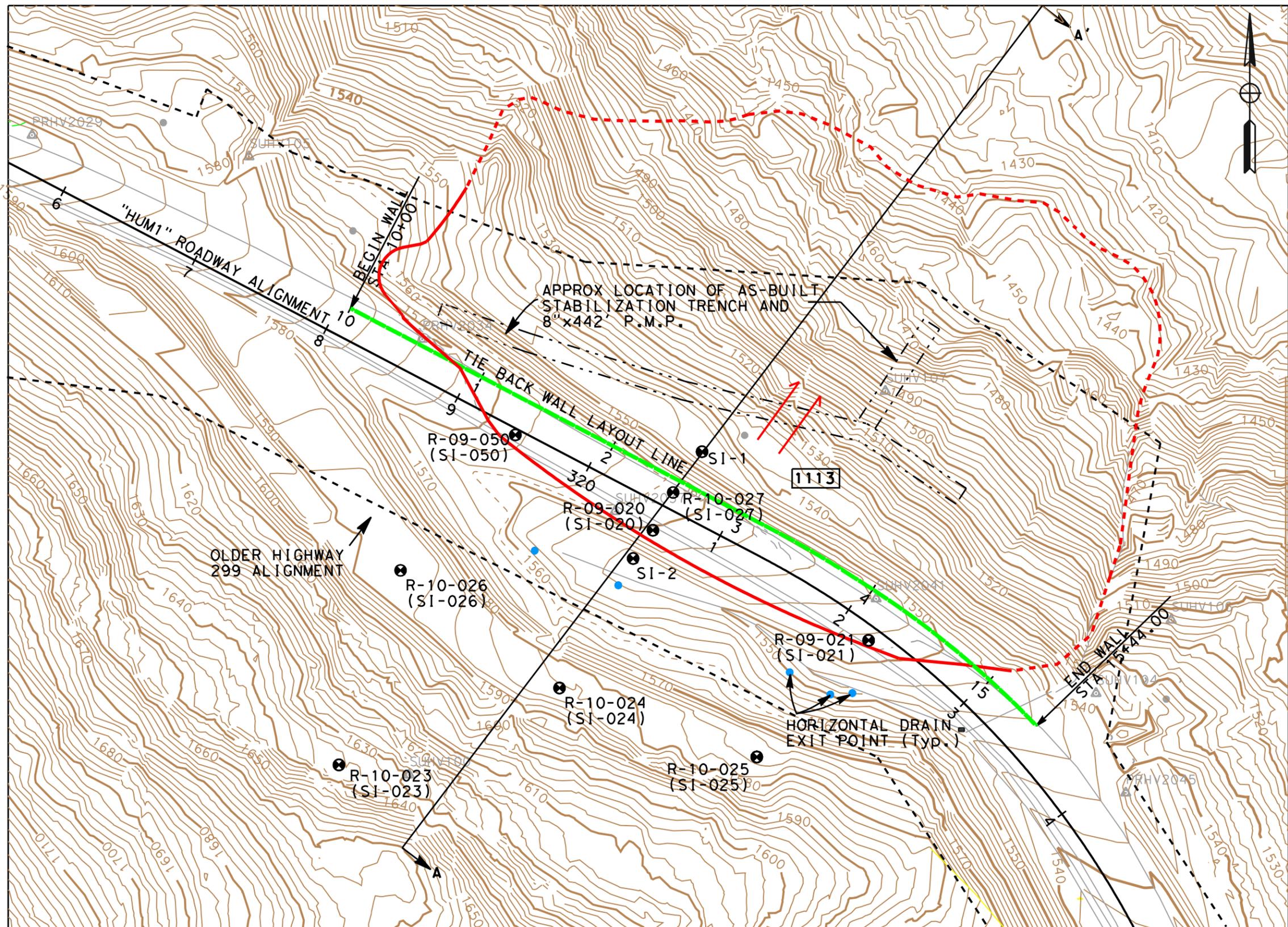
Department of Transportation
Division of Engineering Services
Geotechnical Services
Office of Geotechnical Design North- Branch B

EFIS:0100000172
Date: June 2011

VICINITY MAP

01-HUM-299-PM 20.4
GREEN POINT SINK RETAINING WALL NO. 2

FIGURE 1



LEGEND

- R-08-001 (SI-001) ● APPROXIMATE BORING AND SI LOCATION
- A—A' CROSS-SECTION LOCATION
- HORIZONTAL DRAINS
- - - RIGHT OF WAY LINE
- 1113 LANDSLIDE, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED IS UNCERTAIN. ARROWS INDICATE DIRECTION OF MOVEMENT.
- 1113 LANDSLIDE IDENTIFICATION NUMBER (REFER TO LANDSLIDE IDENTIFICATION CHART BELOW)

LANDSLIDE IDENTIFICATION CHART

STATE OF ACTIVITY

- 1=Active or Recently Active (areas of unstable ground with relatively recent/"fresh" geomorphic features such as ground cracks, hummocky topography, exposed soils, abrupt gradient breaks and/or disrupted vegetation, typically recent to 50 years.)
- 2=Dormant (areas of quasi-stable ground, with eroded or subdued geomorphic features, no exposed soils, somewhat re-vegetated but typically with different type or density, typically >50 to several hundreds of years old)
- 3=Ancient (areas of relatively stable ground, typically characterized by large, broad and deep landslides with highly eroded and subdued geomorphic features, re-vegetated with similar type and density, typically several hundreds to several thousands of years old)

CERTAINTY OF IDENTIFICATION

- 1=Definite
- 2=Probable
- 3=Questionable

DOMINANT TYPE OF MOVEMENT

- 1=Slide
- 2=Flow
- 3=Spread
- 4=Fall
- 5=Topple

THICKNESS OF DEPOSIT

- 1=Less than 5 Feet
- 2=5 to 15 Feet
- 3=15 to 50 Feet
- 4=Greater Than 50 Feet

1 2 3 4



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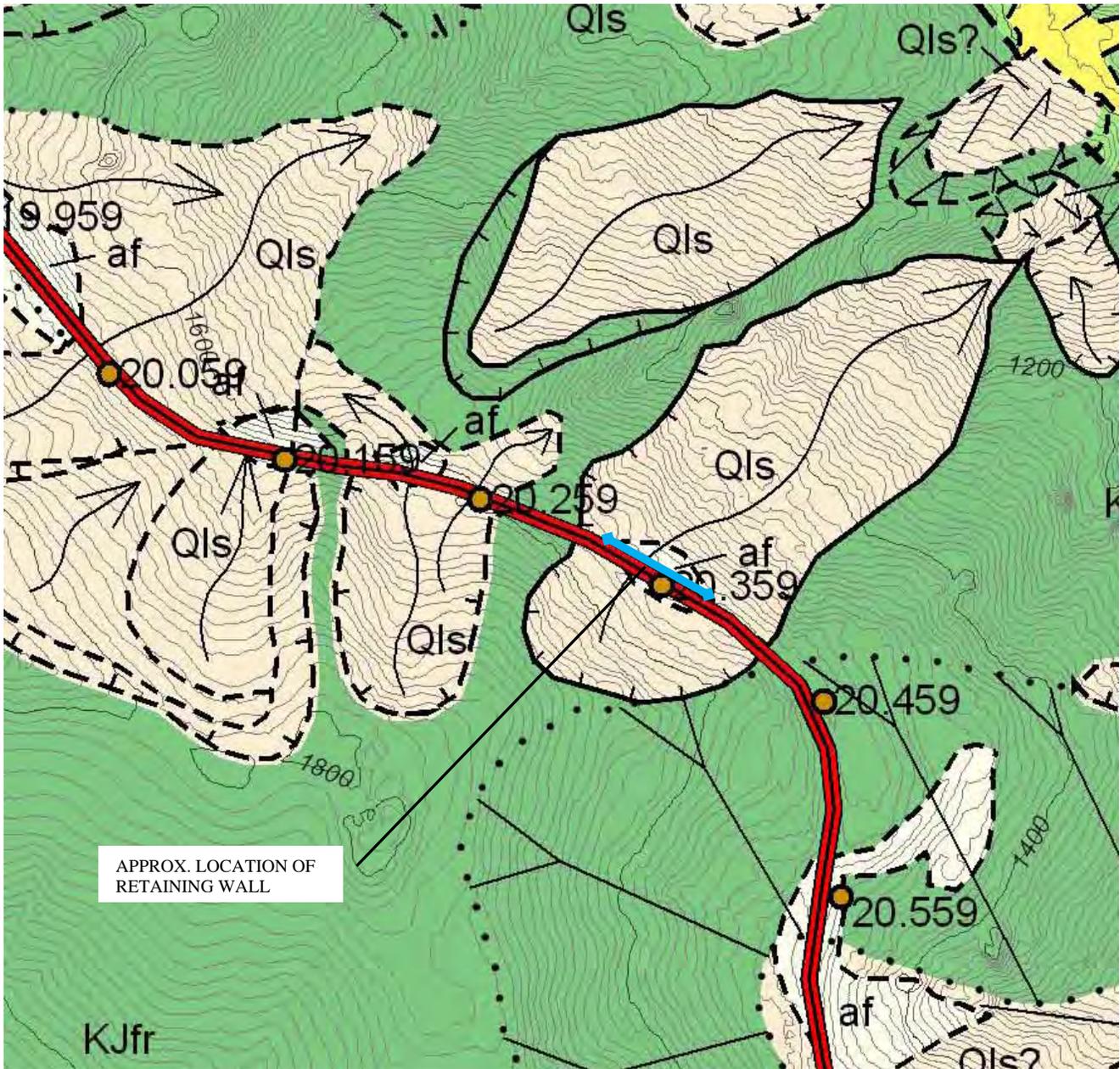
EFIS: 0100000172

DATE: JUNE 2011

SITE PLAN AND LANDSLIDE MAP

01-HUM-299-PM 20.4
 GREEN POINT SINK
 RETAINING WALL NO. 2

FIGURE
 2



Reference: Falls, James. N. et.al. "Geologic Map of the Highway 299 Corridor, Humboldt County, California" 2005

MAP UNIT DESCRIPTIONS

af	Artificial Fill
Qrt	Quaternary River Terrace Deposits
Qls	Quaternary Landslide
KJfr	Redwood Creek Schist

LINE SYMBOLS



ROCK SLIDE: Slope movement with bedrock as its primary source material. This class of failure includes rotational and translational landslides; relatively cohesive slide masses with failure planes that are deep-seated in comparison to those debris slides of similar areal extent. The slide plane is curved in a rotational slide. Movement along a planer joint or bedding surface may be referred to as translational. Complex versions with combinations of rotational heads and translational movement or earthflows downslope are common. Landslide boundary indicates confidence; solid line- definite, dashed line - probable, dotted line - questionable. ↑ indicates a scarp, arrows show direction of movement. Qls denotes deposit when present.



EARTHFLOW: Slow to rapid movement of mostly fine-grained soil with some rocky debris in a semi-viscous, highly plastic state. After initial failure, the mass may flow or creep seasonally in response to changes in groundwater level. These types of slope failures often include complexes of nested rotational slides and deeply incised gullies. Landslide boundary indicates confidence; solid line- definite, dashed line - probable, dotted line - questionable. ↑ indicates scarp, arrows show direction of movement. Qls denotes deposit when present.

LANDSLIDE SYMBOLS



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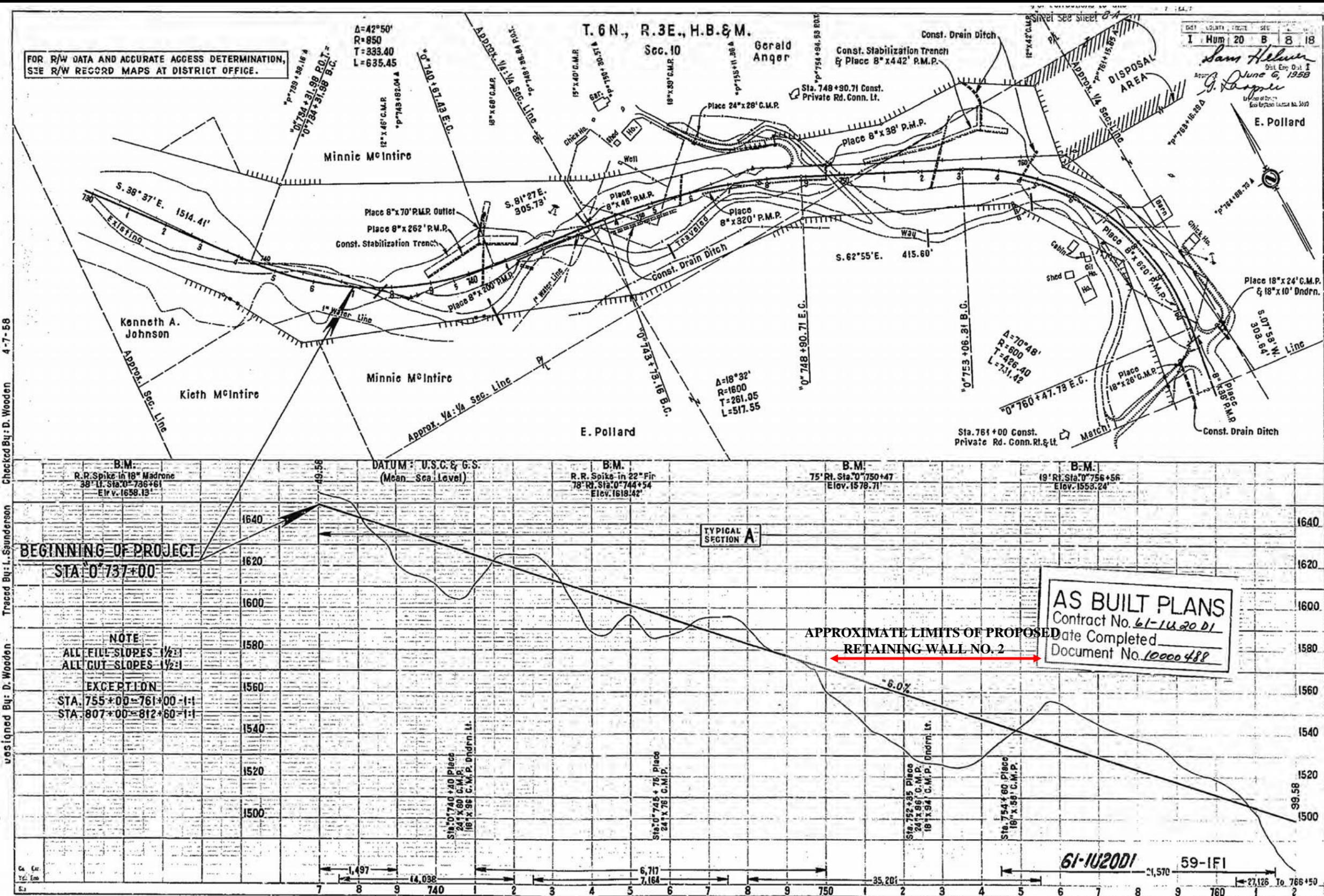
EFIS: 0100000172

Date: June 2011

**PROJECT GEOLOGIC
 MAP**

**01-HUM-299 PM 20.4
 GREEN POINT SINK
 RETAINING WALL NO. 2**

**Figure
 3**



Checked By: D. Woodson 4-7-58
 Traced By: L. Spunderson
 Designed By: D. Woodson

FOR R/W DATA AND ACCURATE ACCESS DETERMINATION, SEE R/W RECORD MAPS AT DISTRICT OFFICE.

DIST. NO. 20 B 8 18
 I Hum 20 B 8 18
 Sam Helmer
 June 6, 1958
 E. Pollard

B.M.
 R.R. Spike in 18" Madrone
 38" Lt. Sta. 0+735+61
 Elev. 1659.13'

DATUM: U.S.C. & G.S.
 (Mean Sea Level)

B.M.
 R.R. Spike in 22" Fir
 78" Rt. Sta. 0+744+54
 Elev. 1619.42'

B.M.
 75' Rt. Sta. 0+750+47
 Elev. 1578.71'

B.M.
 19' Rt. Sta. 0+756+56
 Elev. 1555.24'

BEGINNING OF PROJECT
 STA 0+737+00

NOTE
 ALL FILL SLOPES 1/2:1
 ALL GUT SLOPES 1/2:1
 EXCEPTION
 STA. 755+00-761+00 1:1
 STA. 807+00-812+60 1:1

AS BUILT PLANS
 Contract No. 61-1U20D1
 Date Completed _____
 Document No. 10000488

APPROXIMATE LIMITS OF PROPOSED
 RETAINING WALL NO. 2



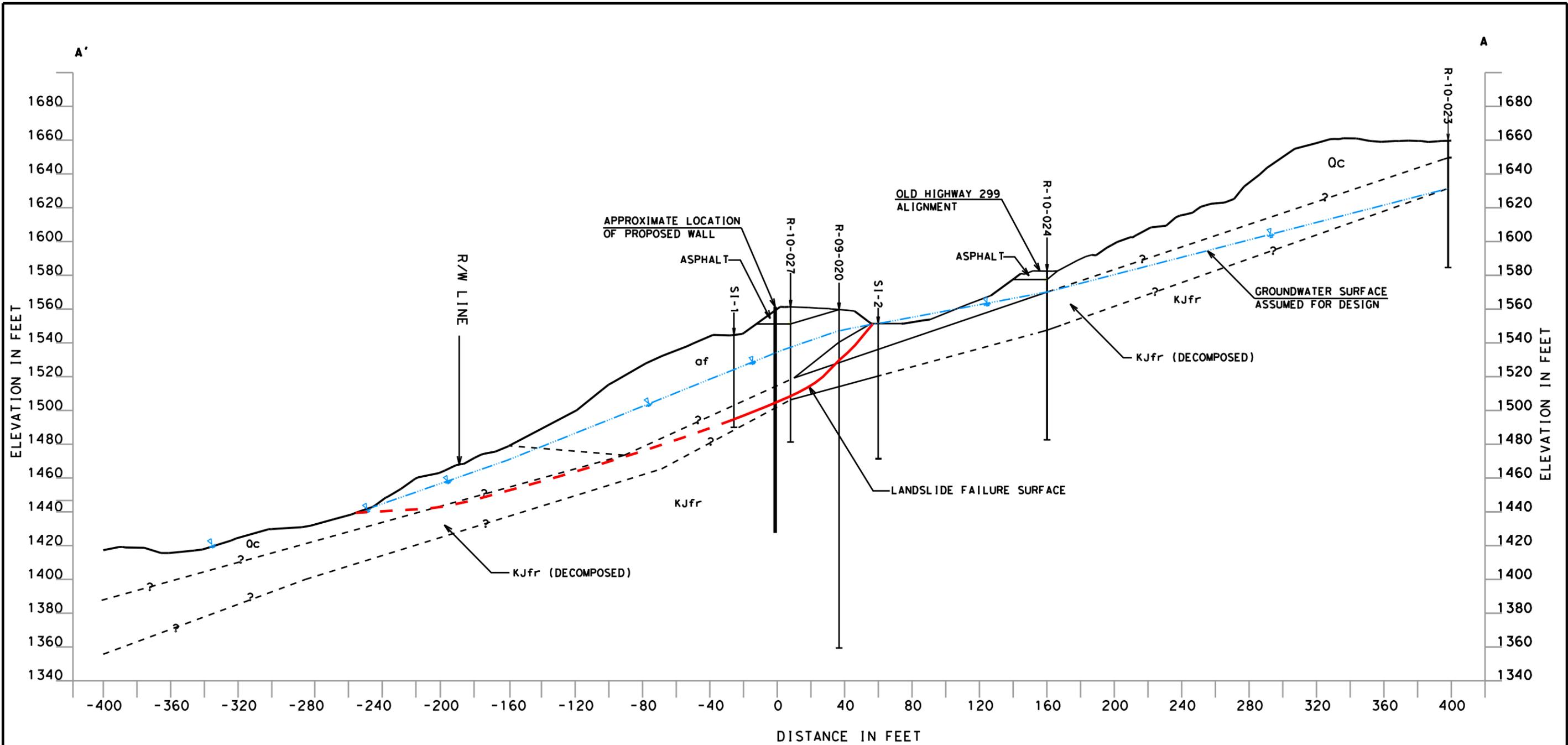
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EFIS:0100000172
 Date: JUNE 2011

AS-BUILT PLAN SHEET

01-HUM-299 PM 20.4
 GREEN POINT SINK RETAINING WALL NO. 2

Figure
 4



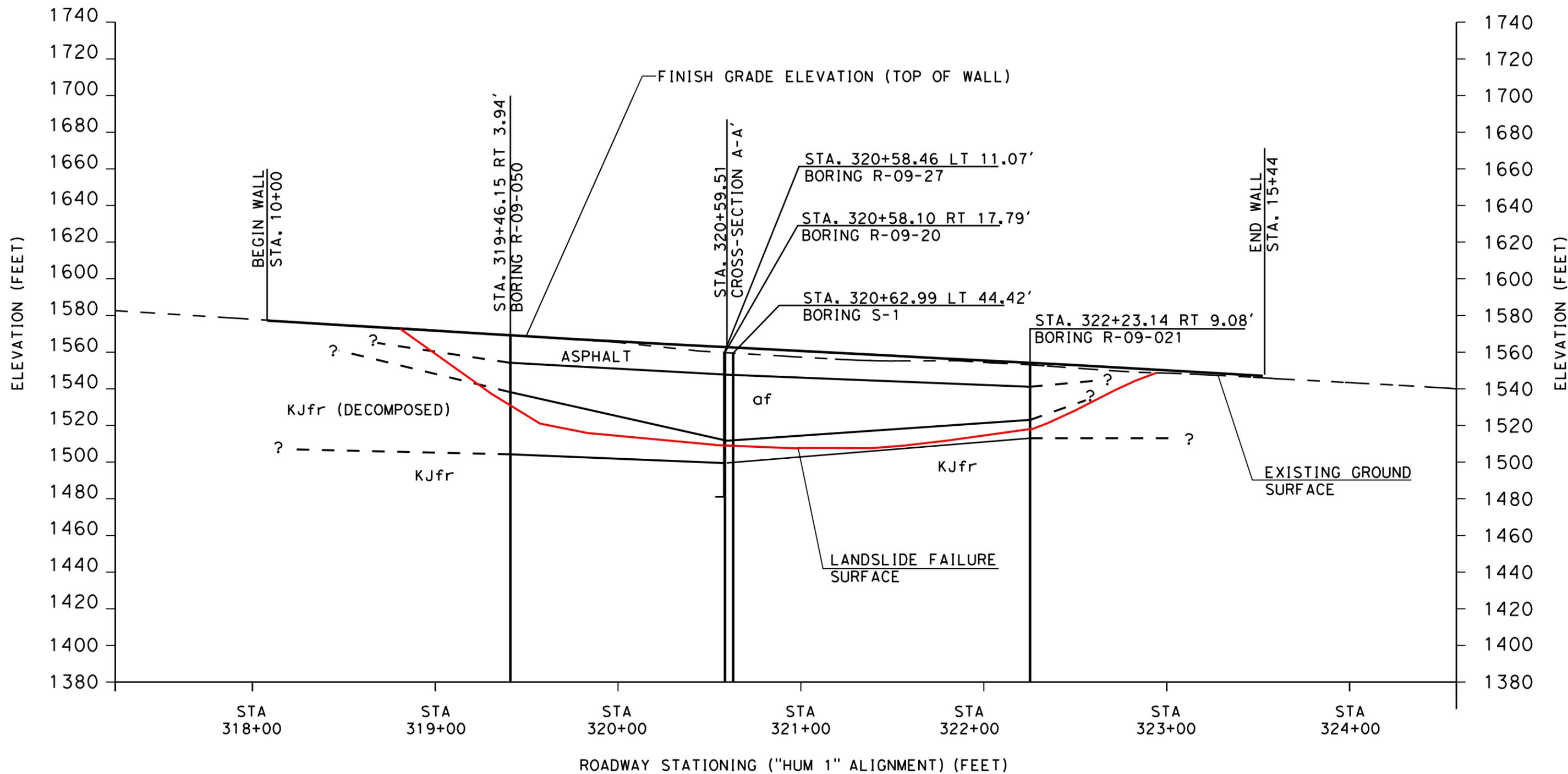
EXPLANATION

- GEOLOGIC CONTACT, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED AND QUERIED WHERE EXISTENCE IS UNCERTAIN
- LANDSLIDE FAILURE SURFACE, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED AND QUERIED WHERE EXISTENCE IS UNCERTAIN
- af ARTIFICIAL FILL
- Qc COLLUVIUM
- KJfr REDWOOD CREEK SCHIST



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EFIS: 0100000172	CROSS SECTION A-A'
DATE: JUNE 2011	
01-HUM-299 PM-20.4 GREEN POINT SINK RETAINING WALL NO. 2	FIGURE 5



LANDSLIDE CONTACT

 GEOLGIC CONTACT, SOLID WHERE CERTAIN, DASHED WHERE APPROXIMATELY LOCATED AND QUERIED WHERE EXISTENCE IS UNCERTAIN

 LANDSLIDE FAILURE SURFACE

af ARTIFICIAL FILL

KJfr REDWOOD CREEK SCHIST



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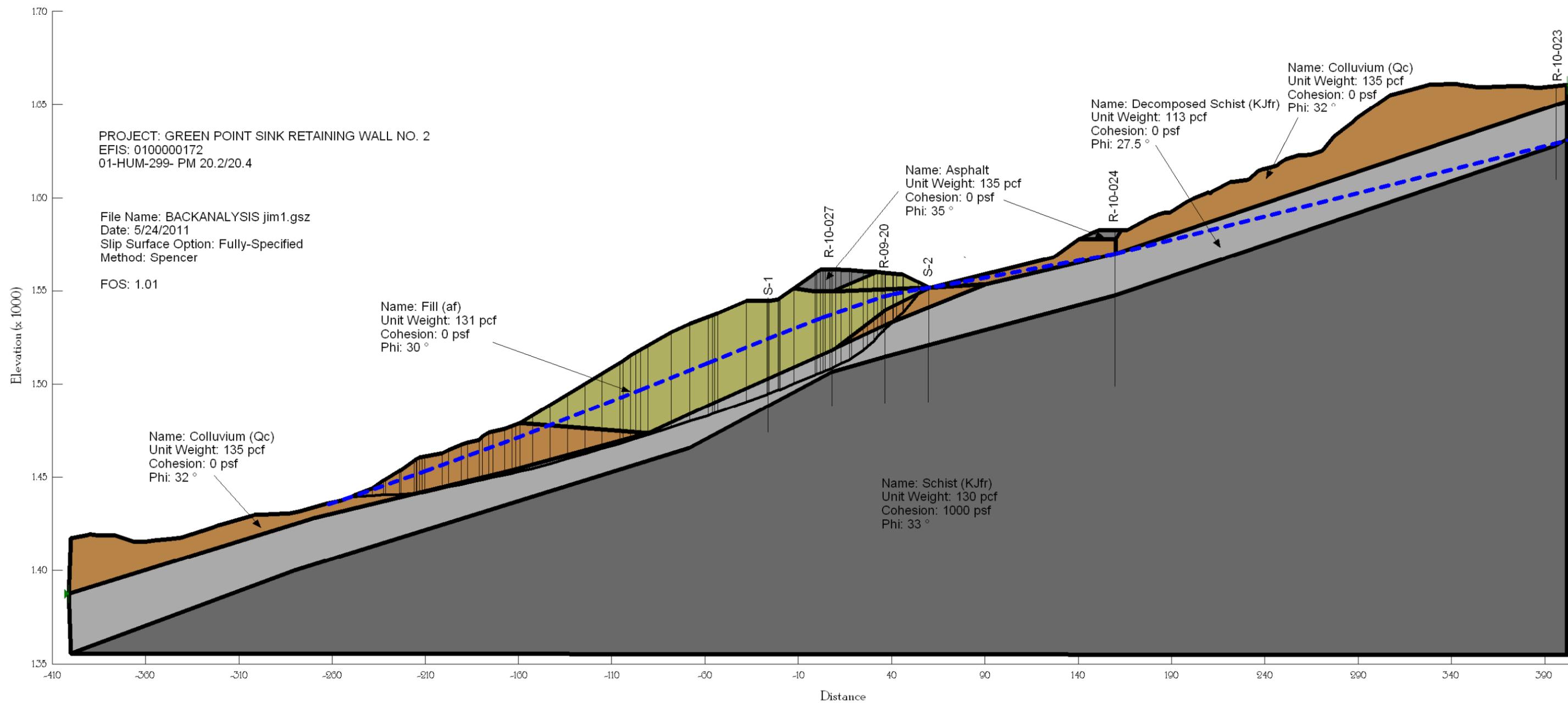
EFIS: 0100000172

DATE: JUNE 2011

SUBSURFACE GEOLOGY
 ALONG WALL LAYOUT LINE

01-HUM-299 PM 20.4
 GREEN POINT SINK
 RETAINING WALL NO. 2

FIGURE
 6



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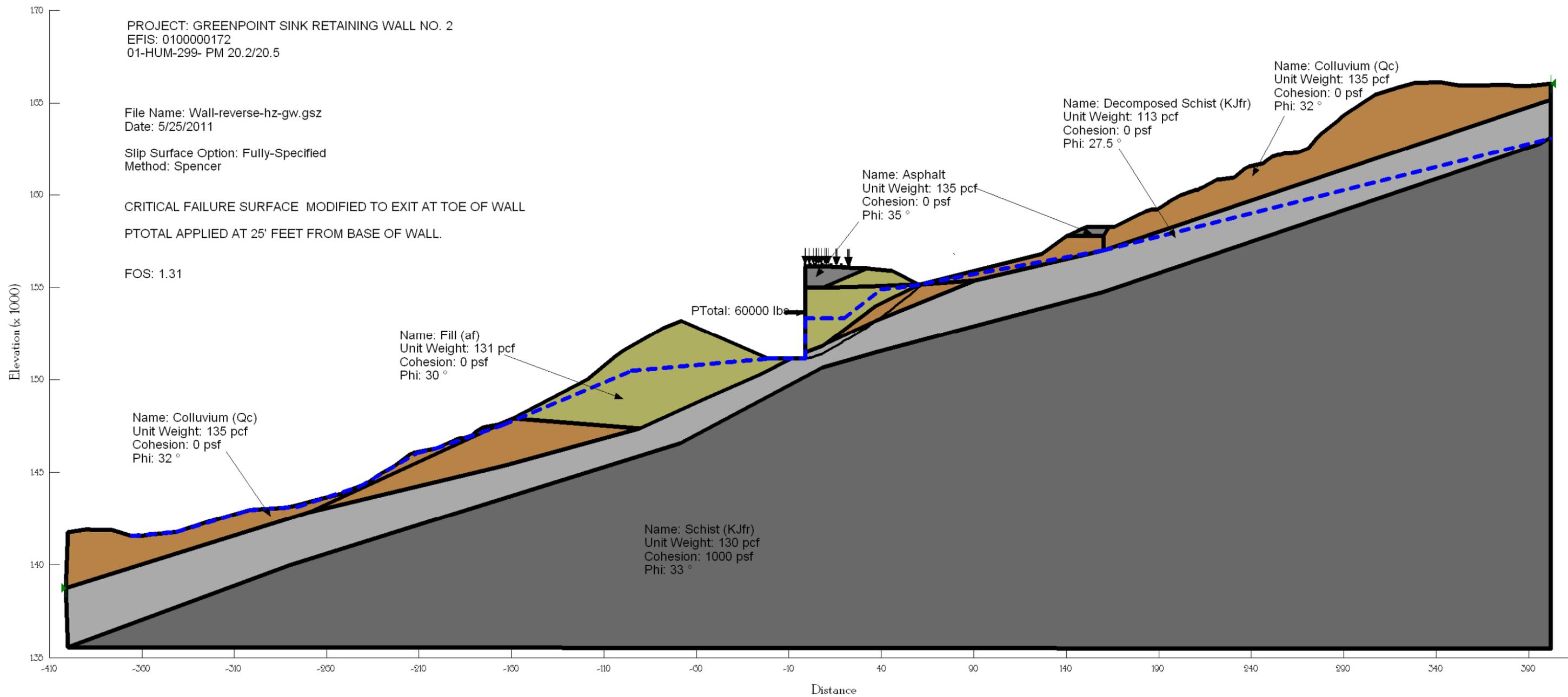
EFIS: 0100000172

Date: JUNE 2011

EXISTING CONDITION STABILITY ANALYSIS

**01-HUM-299 PM 20.4
 GREEN POINT SINK RETAINING WALL NO. 2**

**Figure
 7**



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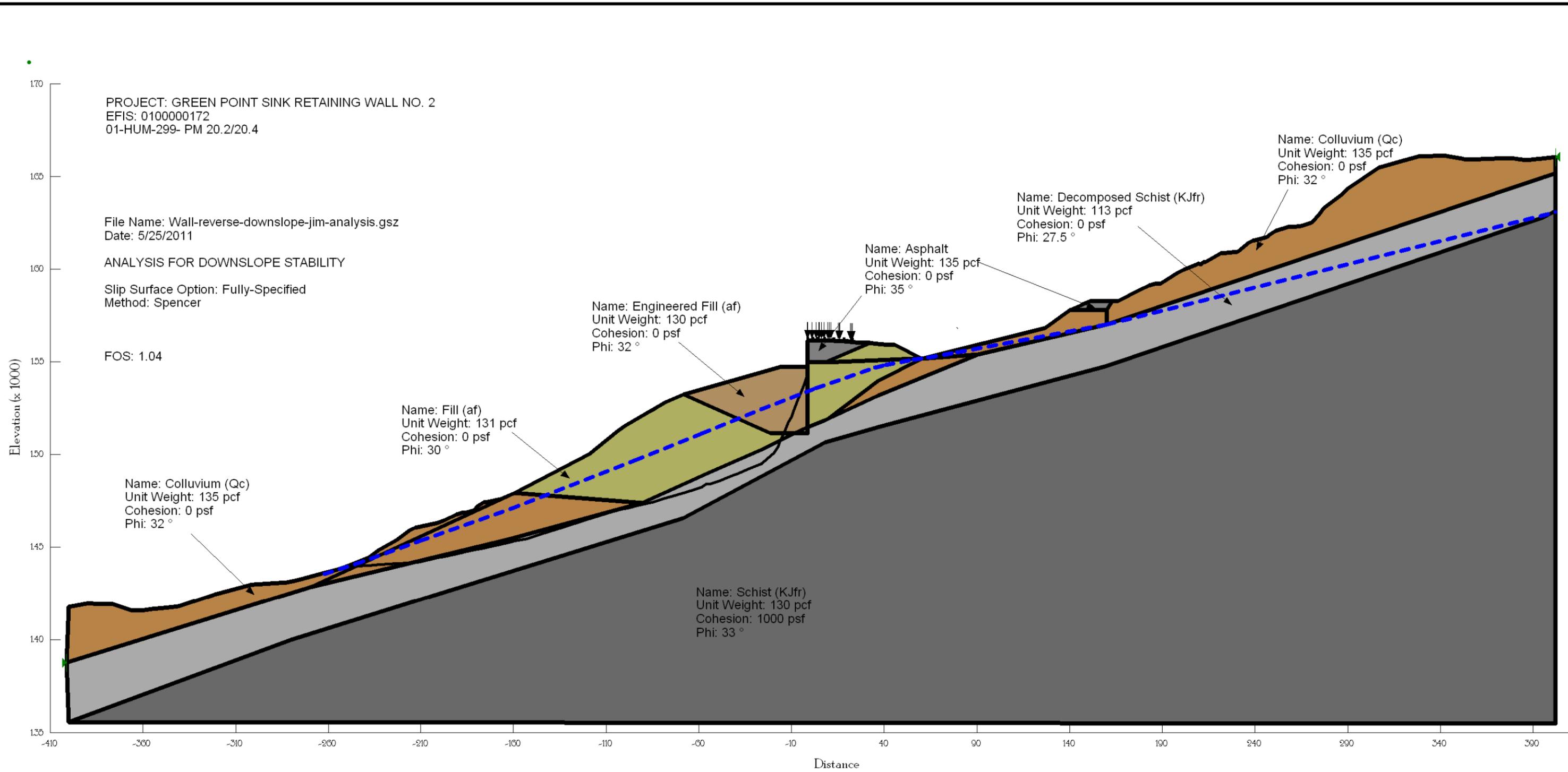
EFIS: 0100000172

Date: JUNE 2011

PTOTAL STABILITY ANALYSIS

01-HUM-299 PM 20.4
GREEN POINT SINK RETAINING WALL NO. 2

Figure
8



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EFIS: 0100000172

Date: JUNE 2011

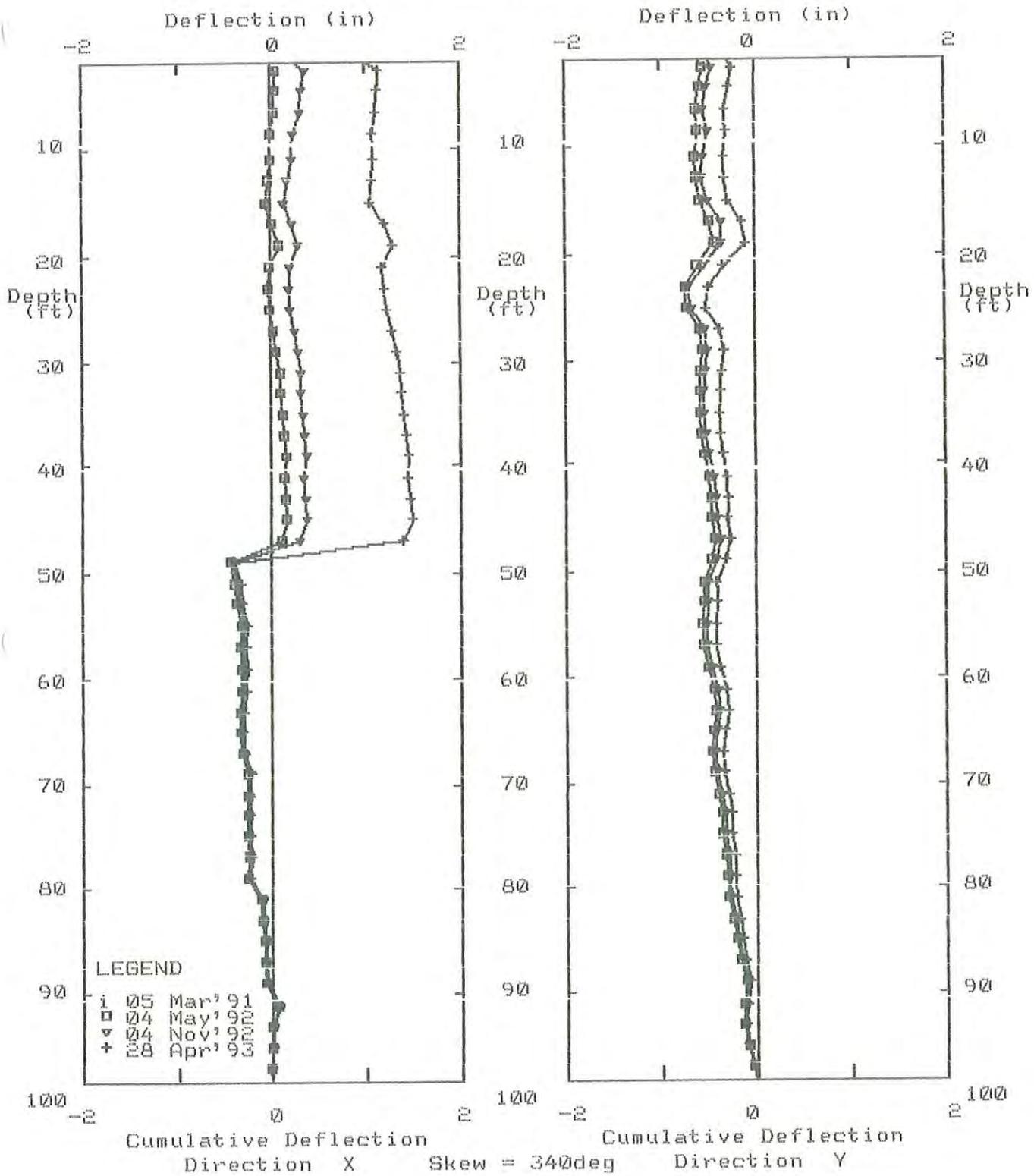
DOWNSLOPE STABILITY ANALYSIS

**01-HUM-299 PM 20.4
 GREEN POINT SINK RETAINING WALL NO. 2**

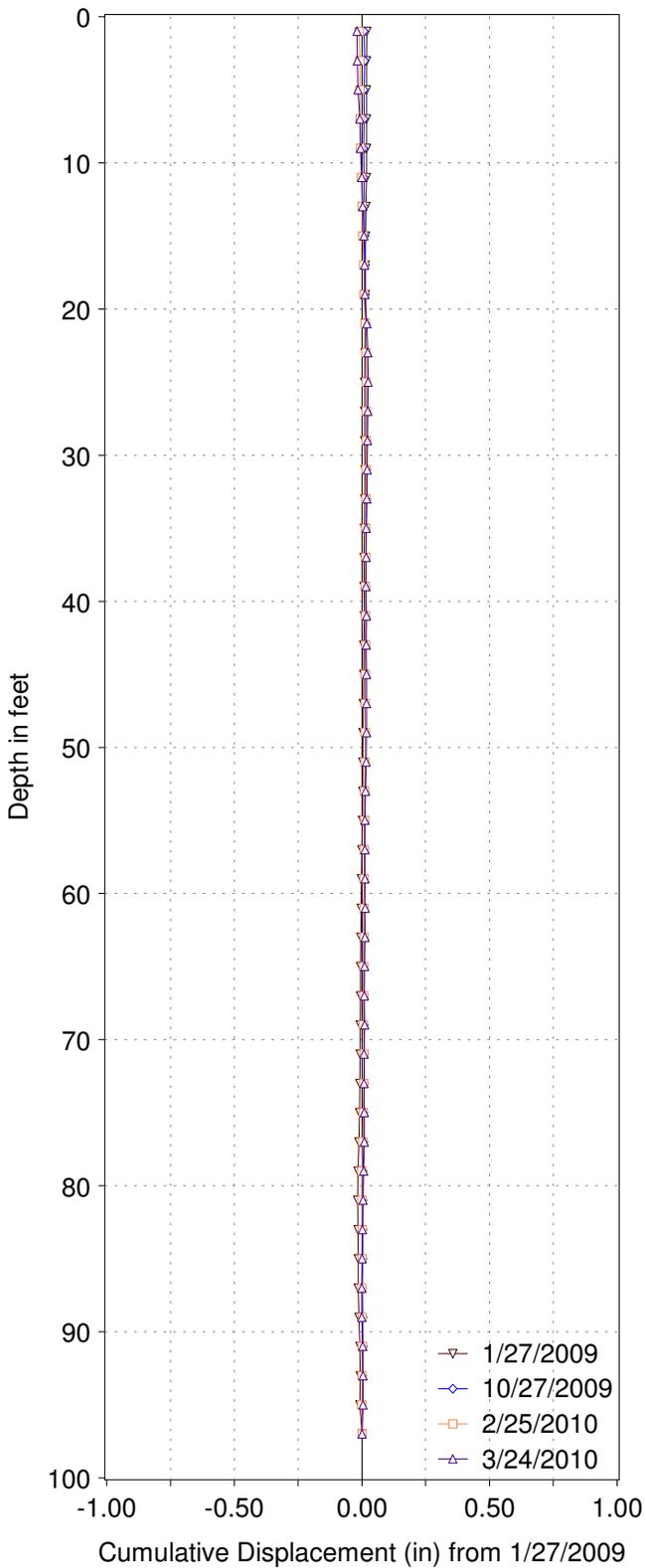
**Figure
 9**

APPENDIX A
SLOPE INCLINOMETER DATA

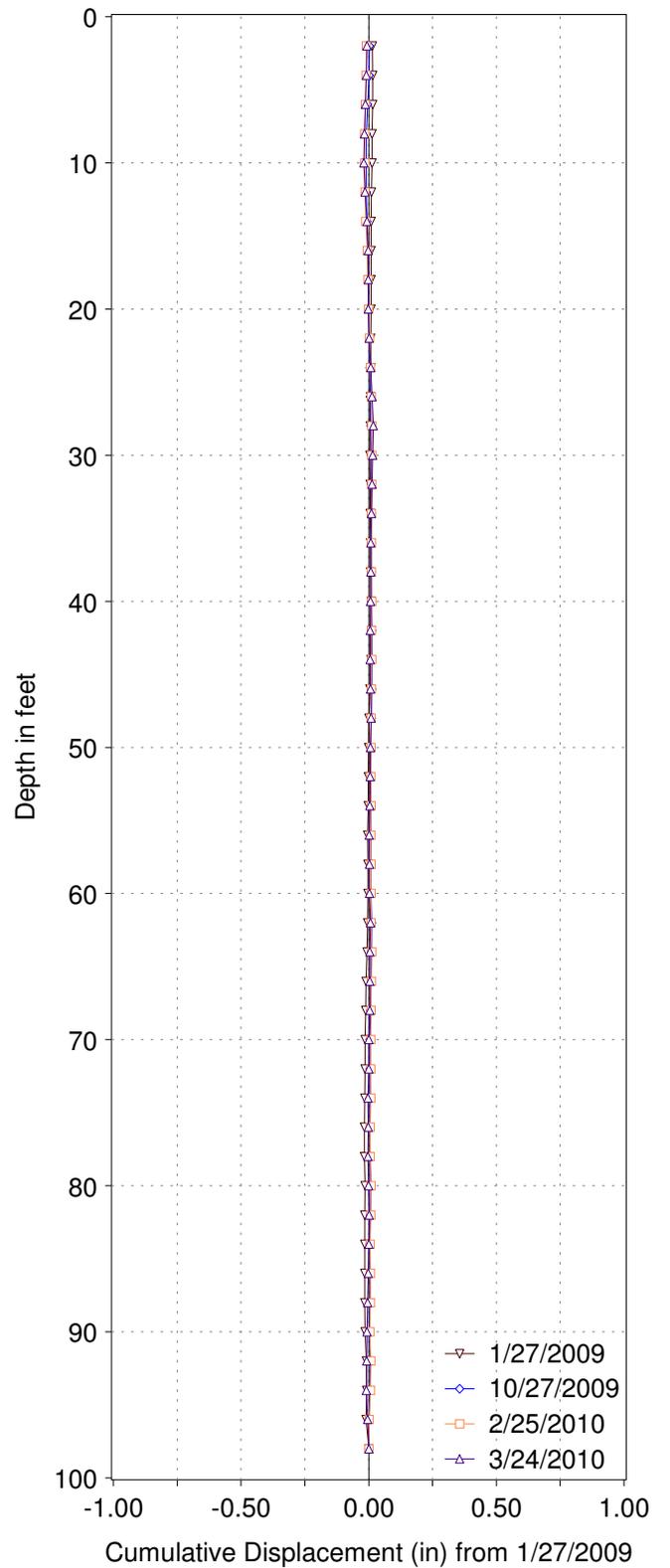
Failing fill monitor, Inclinator SI-1
Maintenance



GPS Old SI-2, A-Axis



GPS Old SI-2, B-Axis

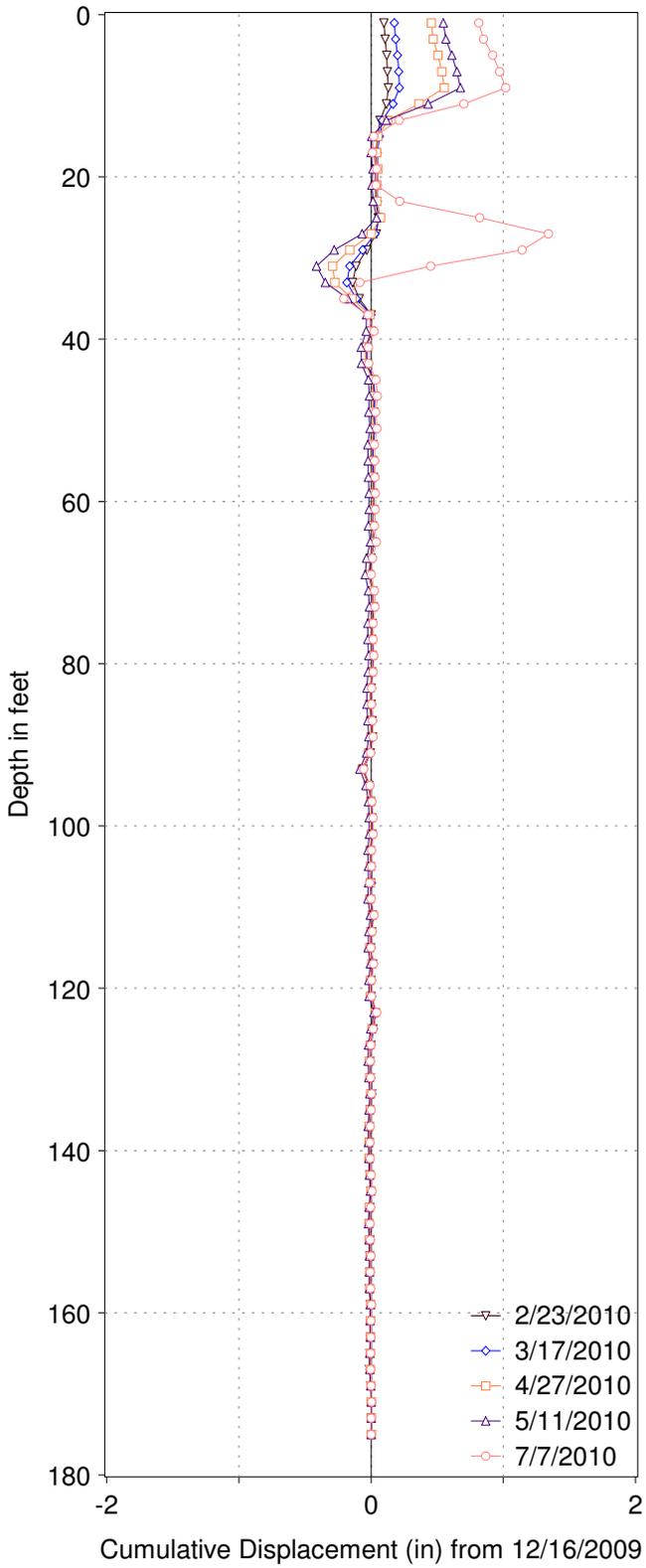


INCLINOMETER RESULTS

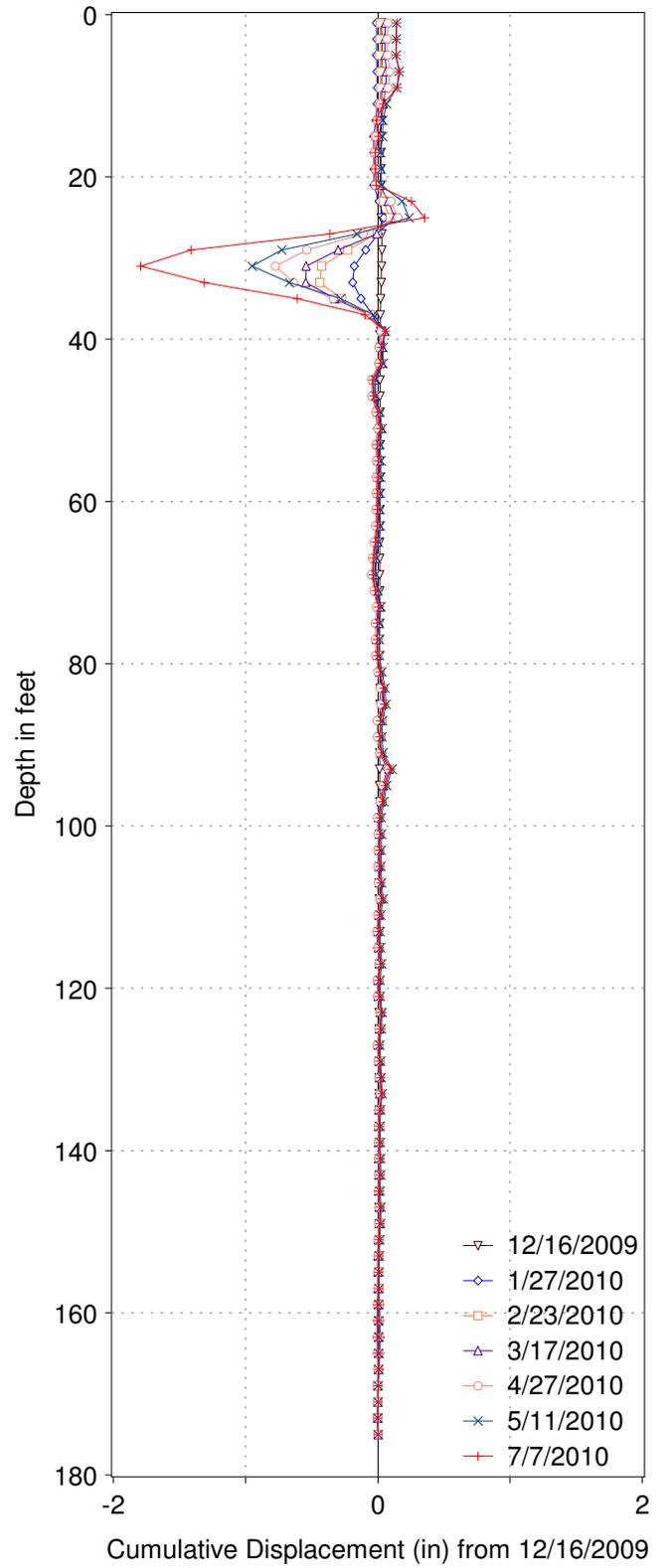
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Rt 299 Green Point Sink
E.A. No. 01-423700

Depth of Inclinometer Casing: 97 feet
Ao Direction: 340* (Magnetic North)
Location: HWY 299 P.M 20.2

GPS SI-020, A-Axis



GPS SI-020, B-Axis

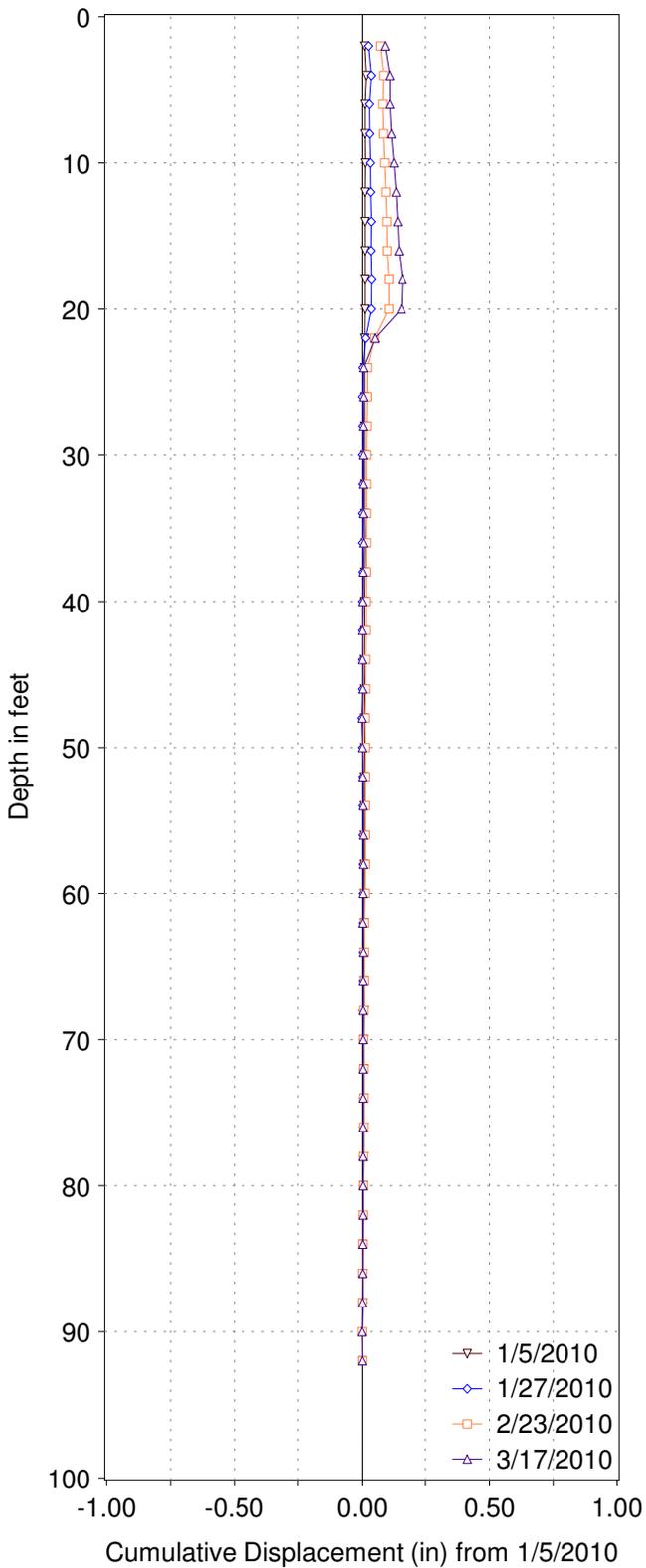


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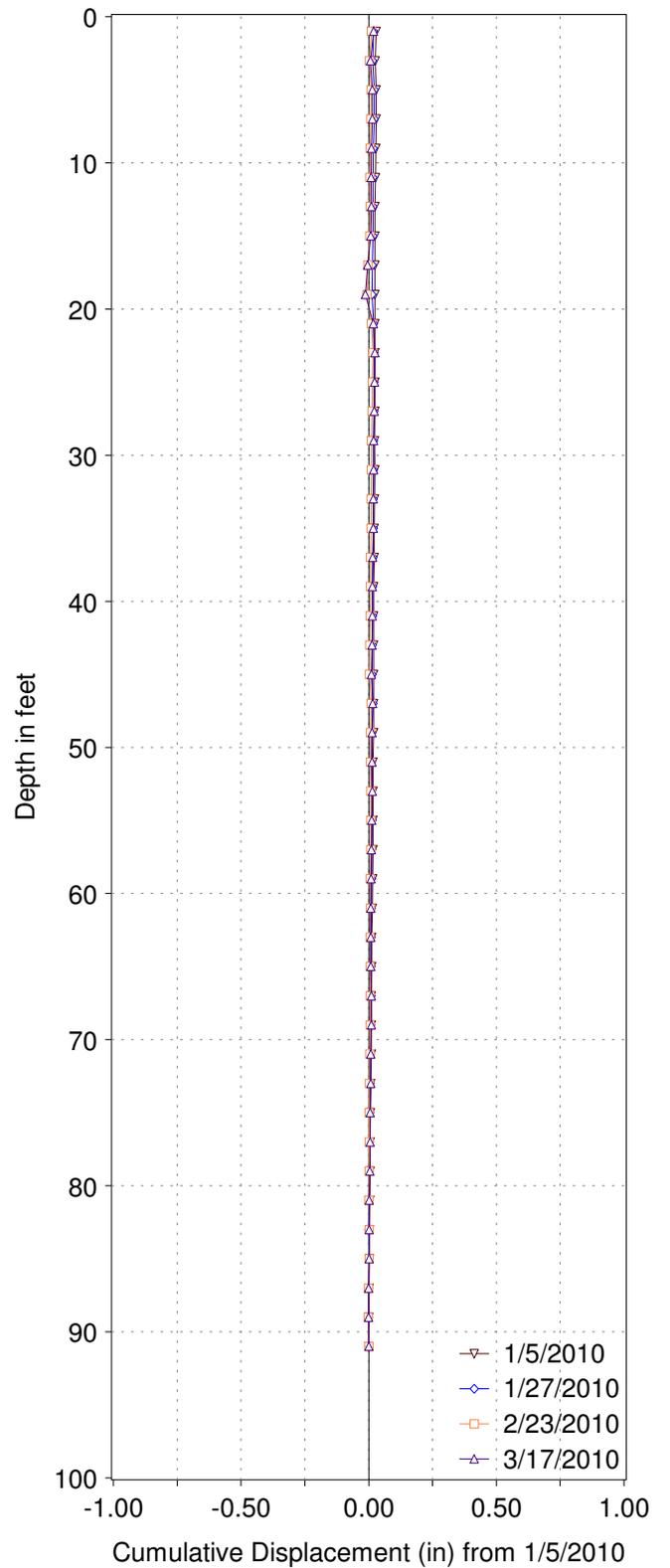
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 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinerometer Casing: 177.75 feet
 Ao Direction: 70 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-021, A-Axis



GPS SI-021, B-Axis

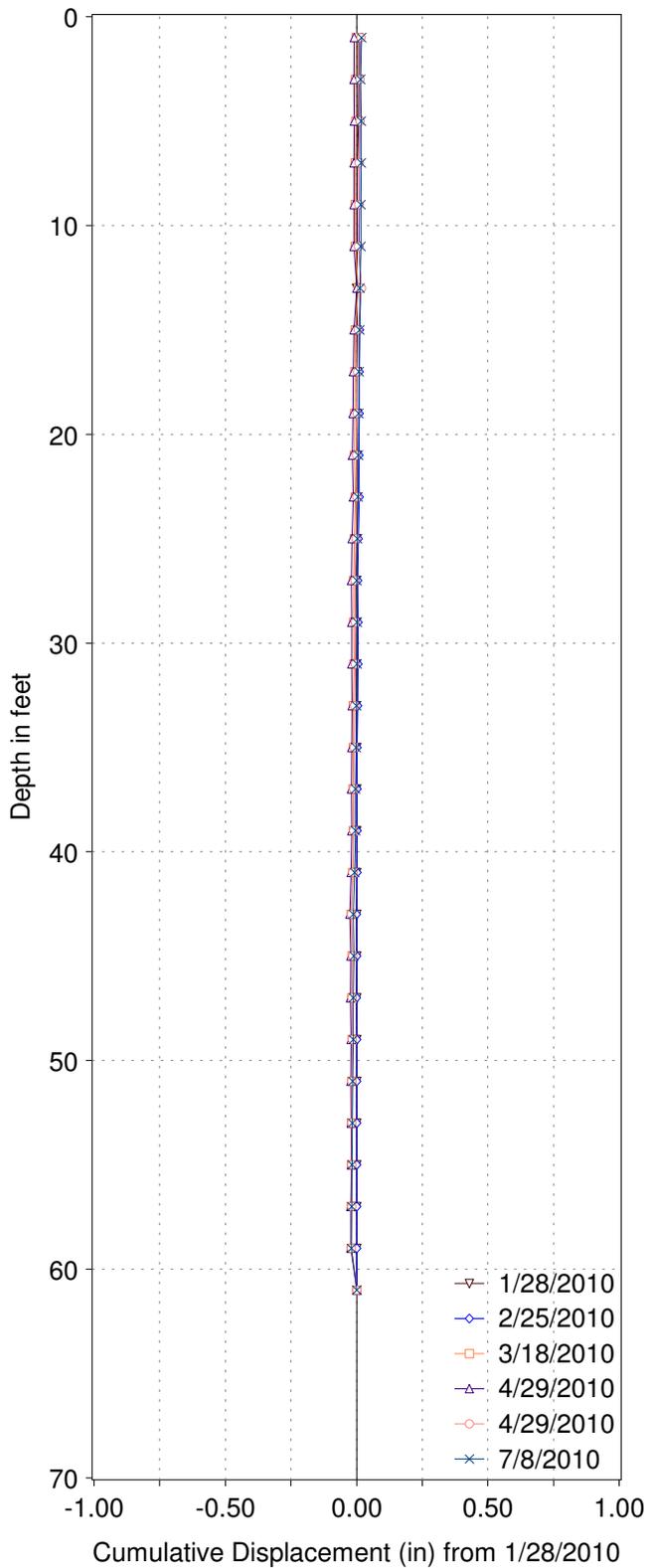


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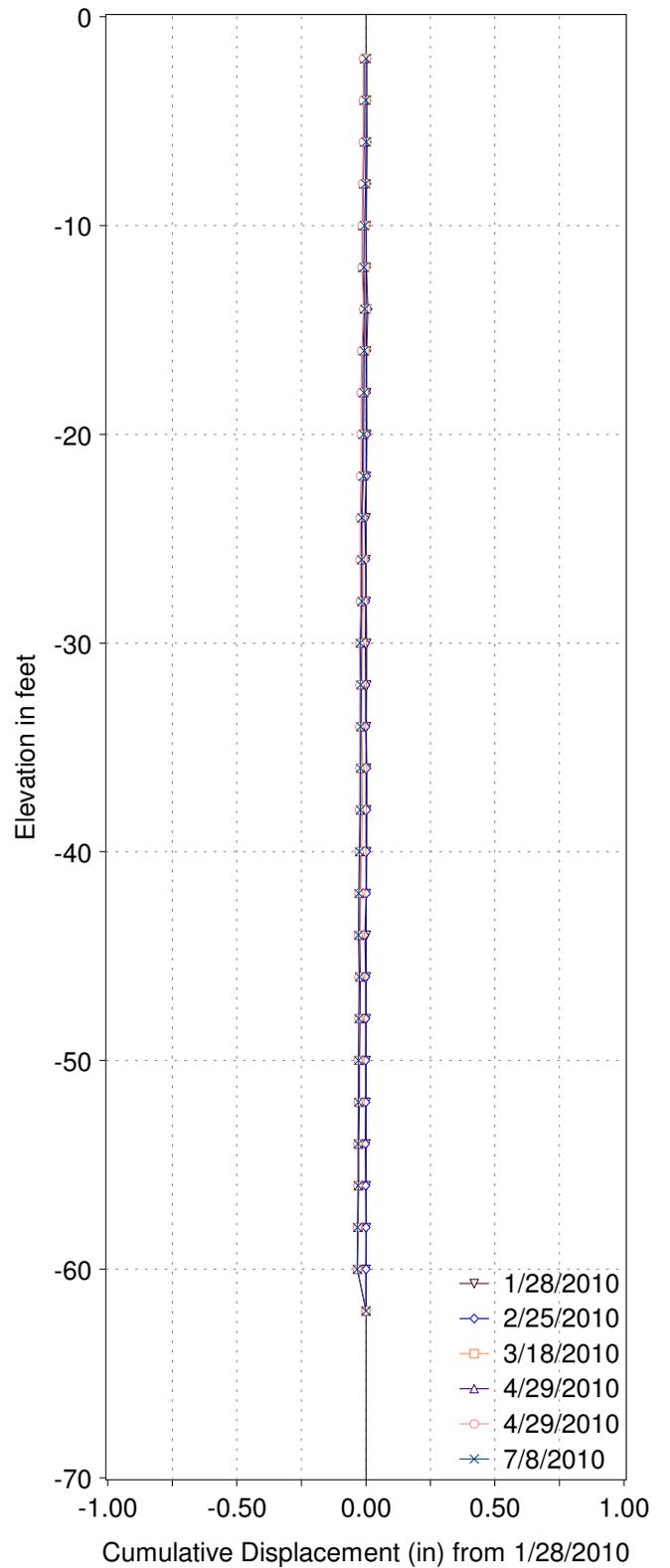
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 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 94.58 feet
 Ao Direction: 80 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-023, A-Axis



GPS SI-023, B-Axis

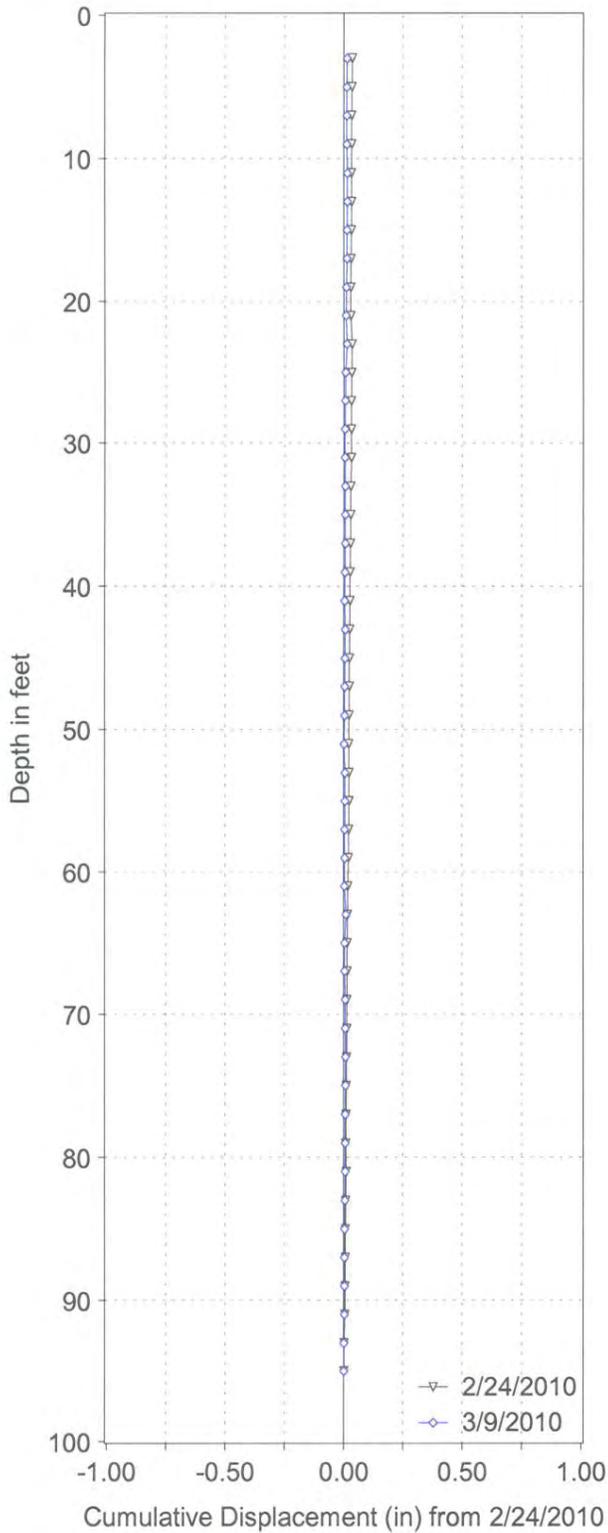


INCLINOMETER RESULTS

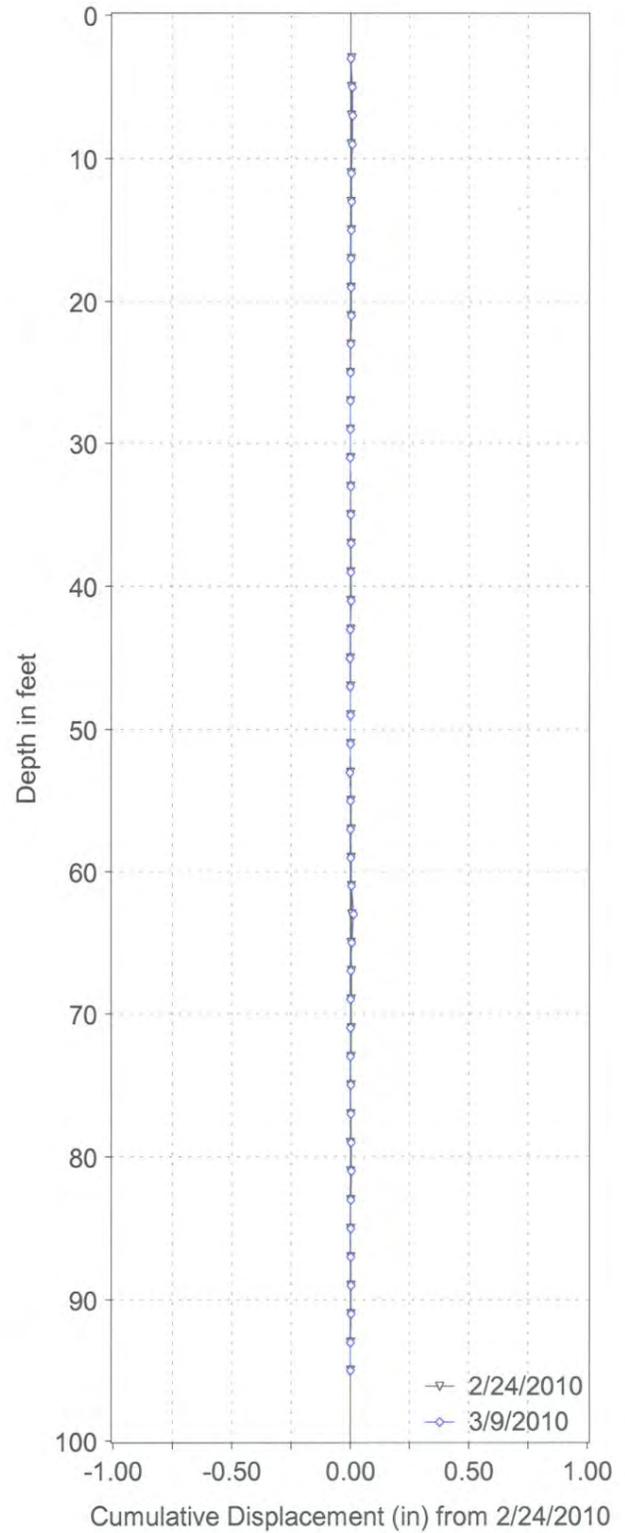
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 63.10 feet
 Ao Direction: 30 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-024, A-Axis



GPS SI-024, B-Axis

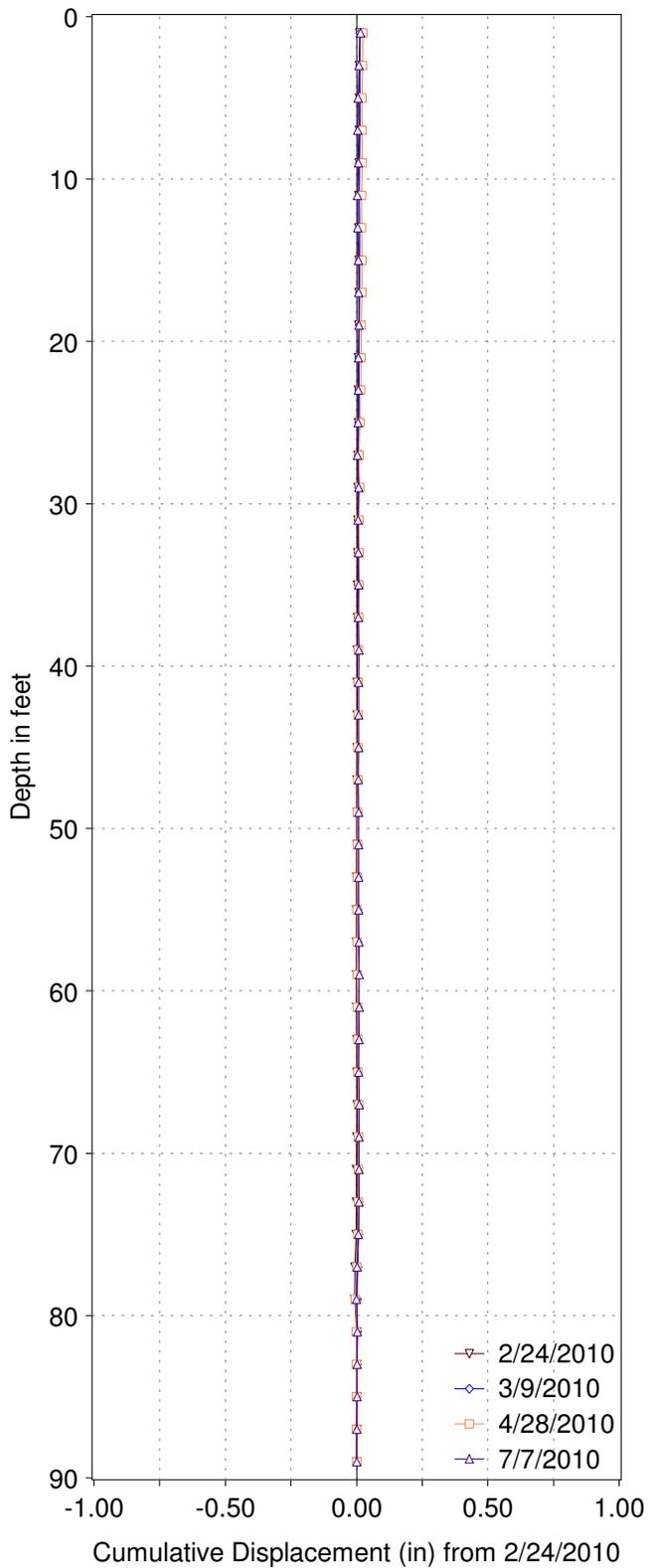


INCLINOMETER RESULTS

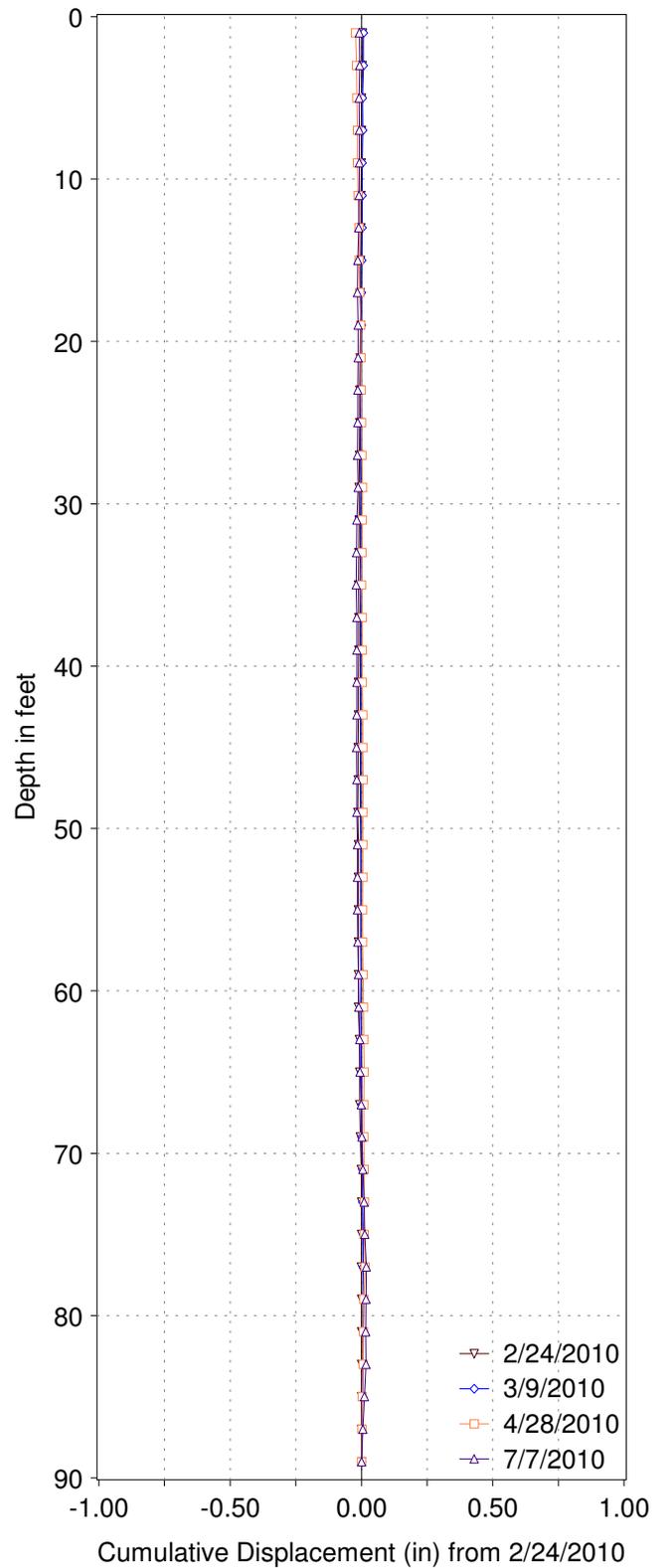
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Incliner Caseing: 96.0 feet
 Ao Direction: 30 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-025, A-Axis



GPS SI-025, B-Axis

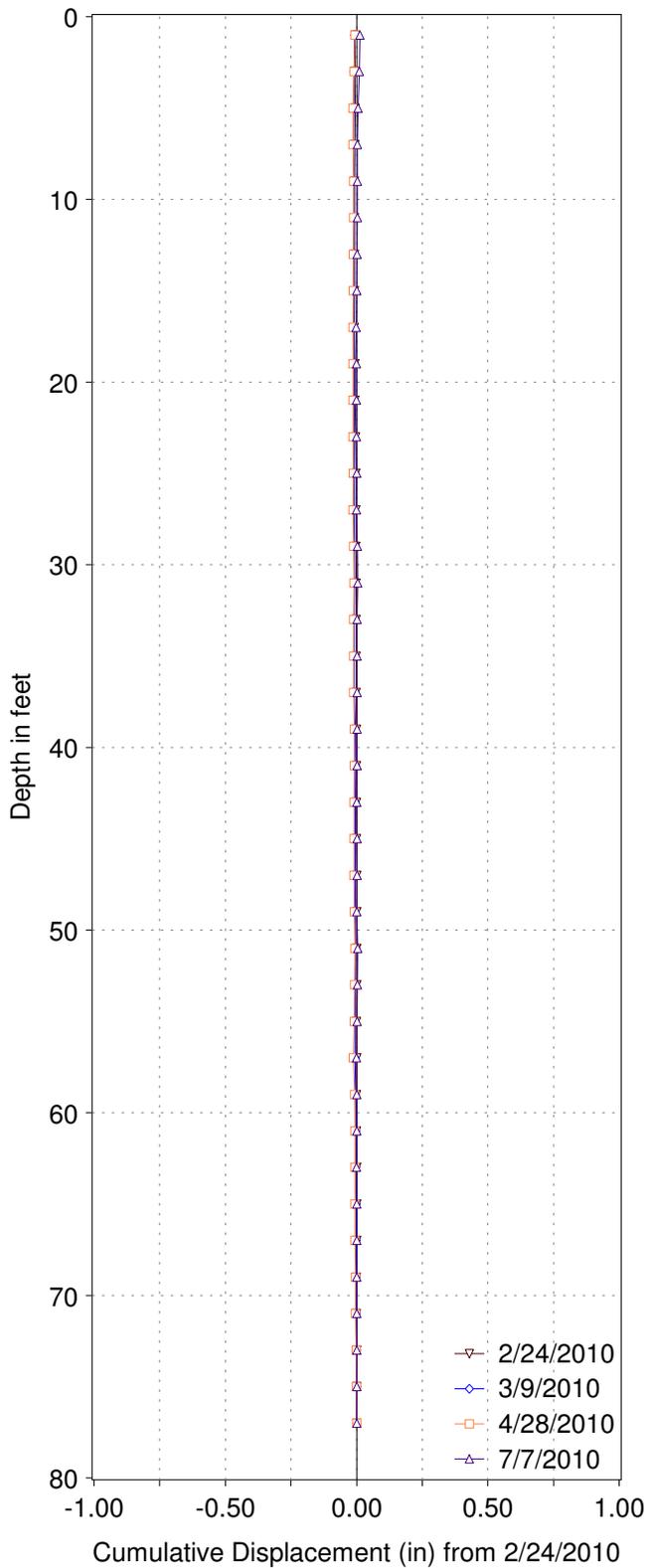


INCLINOMETER RESULTS

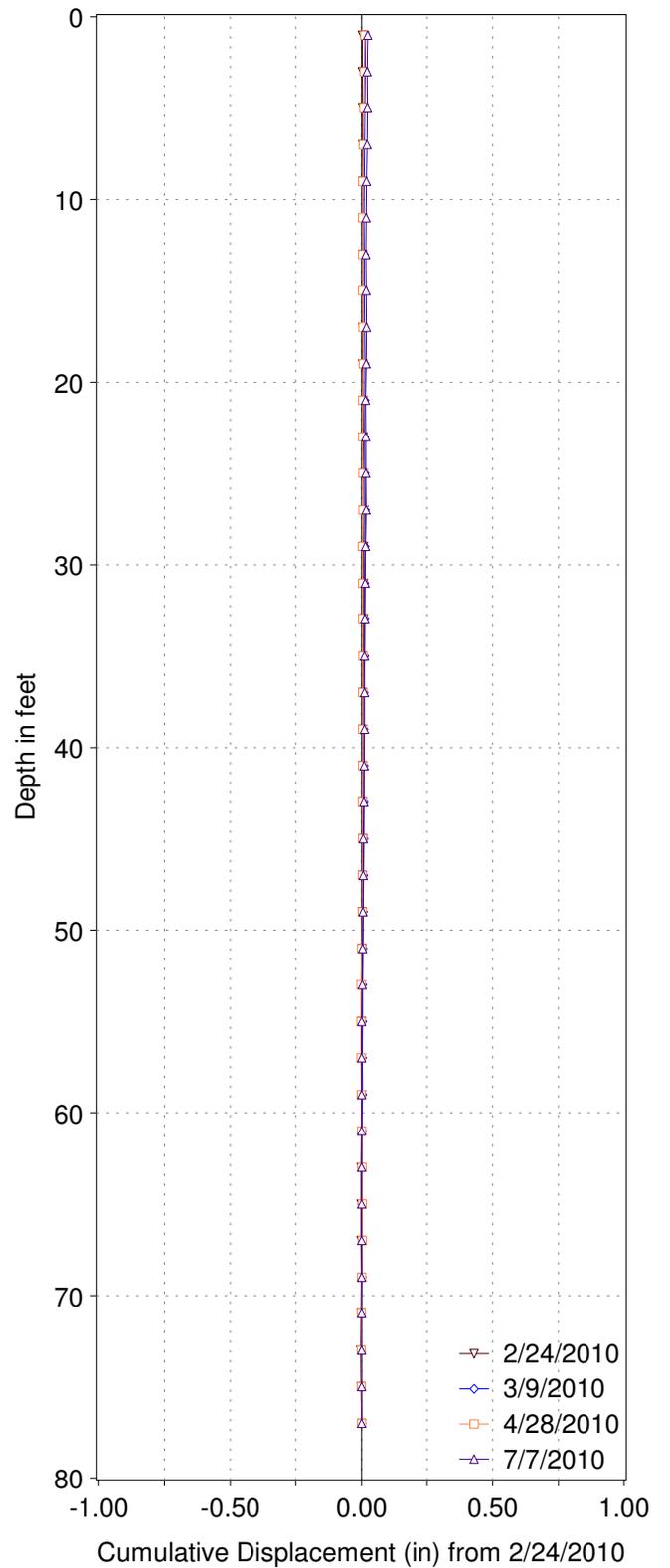
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 91.5 feet
 Ao Direction: 20 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-026, A-Axis



GPS SI-026, B-Axis

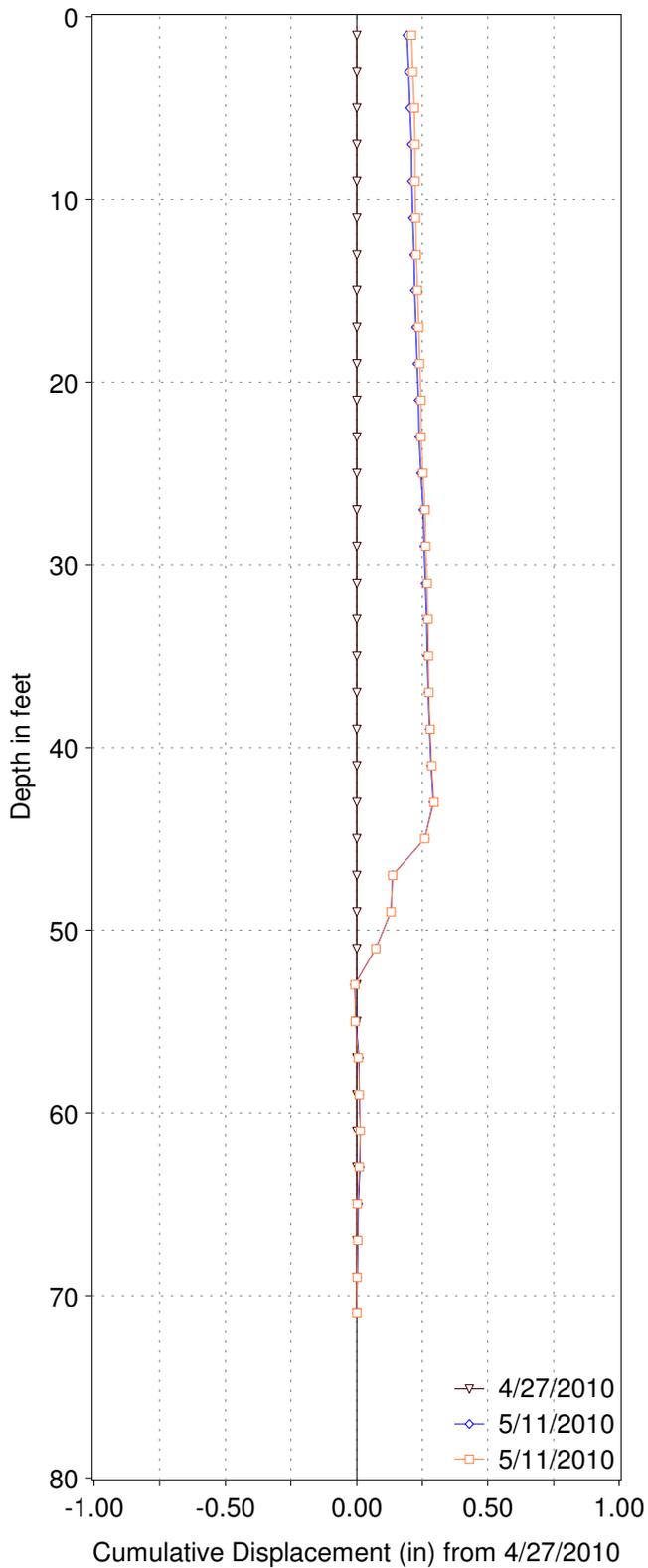


INCLINOMETER RESULTS

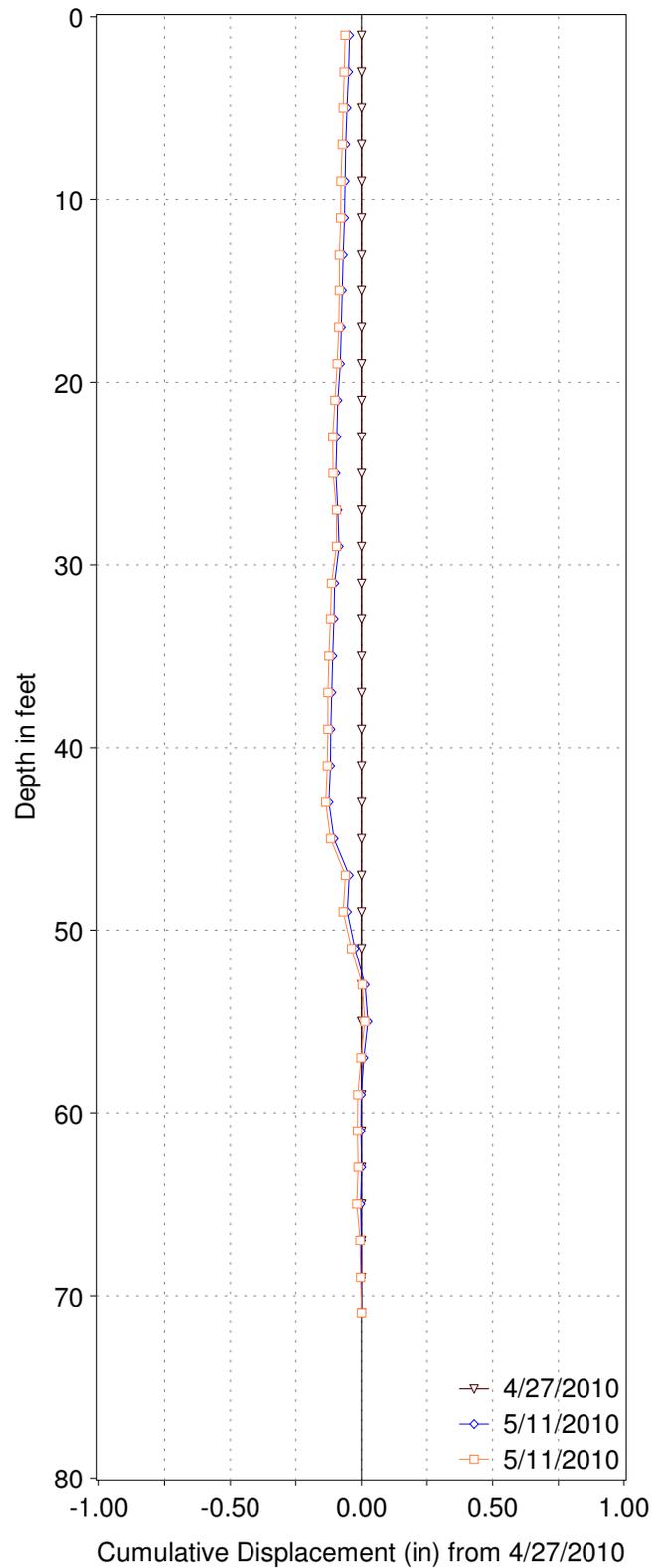
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 80.0 feet
 Ao Direction: 30 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-027, A-Axis



GPS SI-027, B-Axis

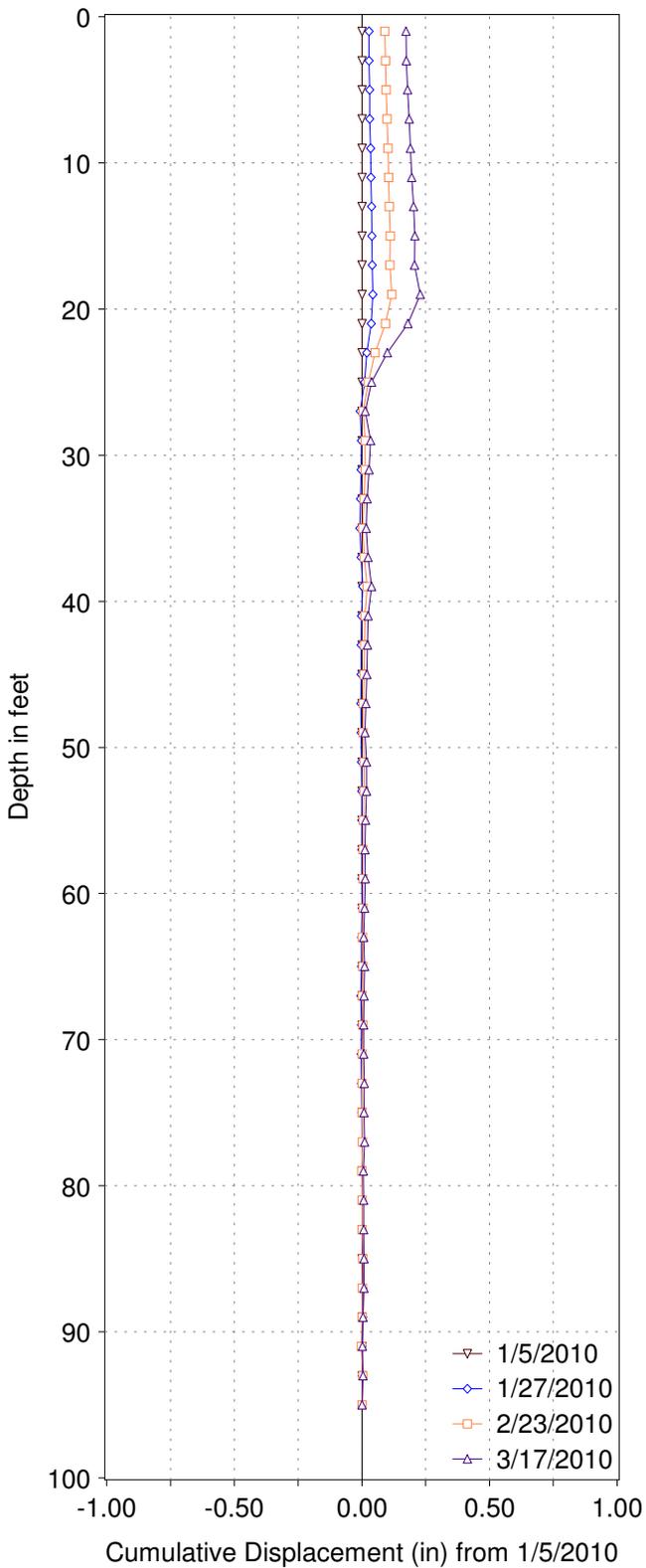


INCLINOMETER RESULTS

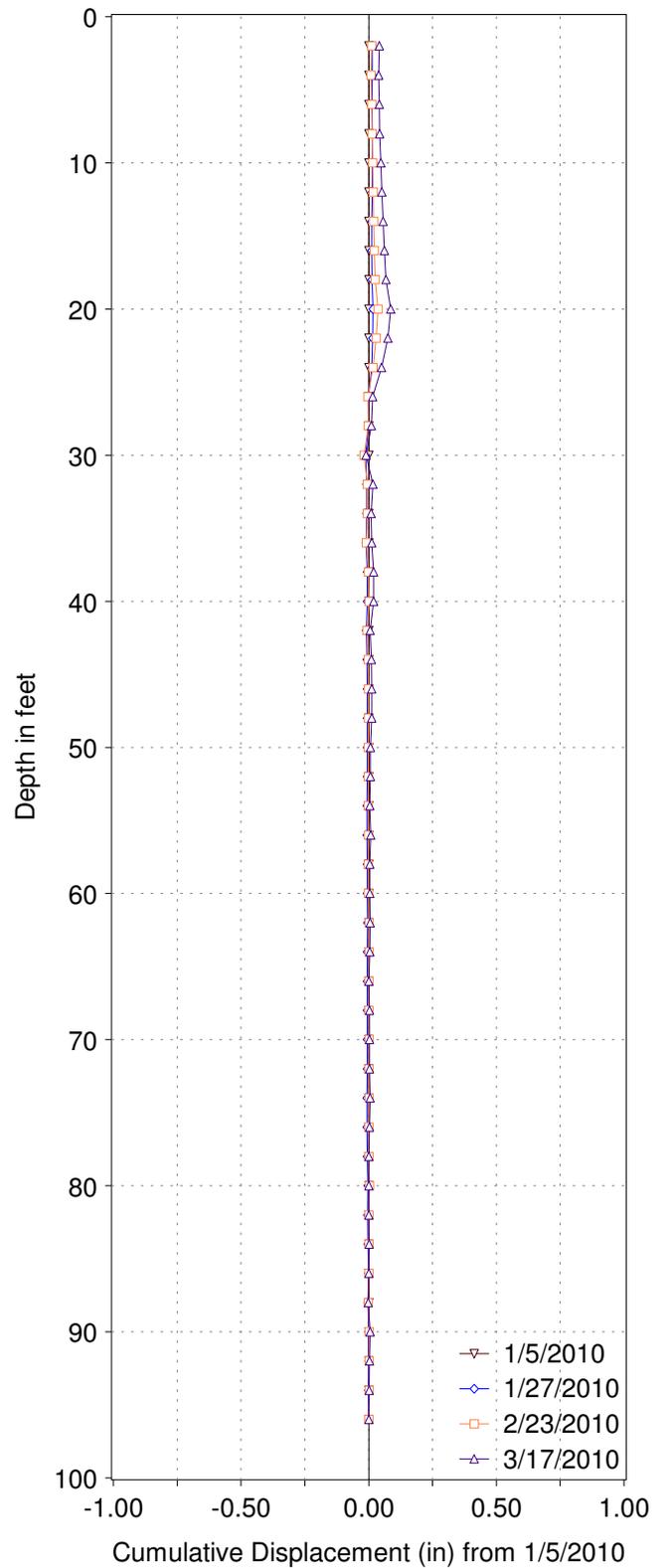
01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 69 feet
 Ao Direction: 60 (Magnetic North)
 Location: HWY 299 P.M 20.2

GPS SI-050, A-Axis



GPS SI-050, B-Axis



INCLINOMETER RESULTS

01-HUM-299 P.M. 20.2
 Rt 299 Green Point Sink
 E.A. No. 01-423700

Depth of Inclinator Casing: 97.75 feet
 Ao Direction: 20 (Magnetic North)
 Location: HWY 299 P.M 20.2

APPENDIX B
LABORATORY SUMMARY AND DATA SHEETS

SUMMARY OF LABORATORY TESTING

BORING ID	DEPTH (ft,bgs)	USCS	DESCRIPTION	UNIT WEIGHT (pcf)	IN-SITU MOISTURE CONTENT (%)	ASTM ATTERBERG LIMITS		
						PL	LL	PI
R-10-024	16.2			131	8.9			
	34.4-35			117	10.1			
	29.5				8.3			
	46	SC	Clayey Sand	135.7	9.4	25	17	8
	60.5	SC/SM	Silty, Clayey Sand	142.2	6.8	23	17	6
	72				9.1			
	78	SC	Clayey Sand	181.4	8.3	26	19	7
	89.5	SC	Clayey Sand	131.3	9.9	27	17	10
	92				8.1			
	94	SC	Clayey Sand	137.8	6.8	27	18	9
R-10-027	43.5-44	SC	Clayey Sand with Gravel	113	15	25	NP	-

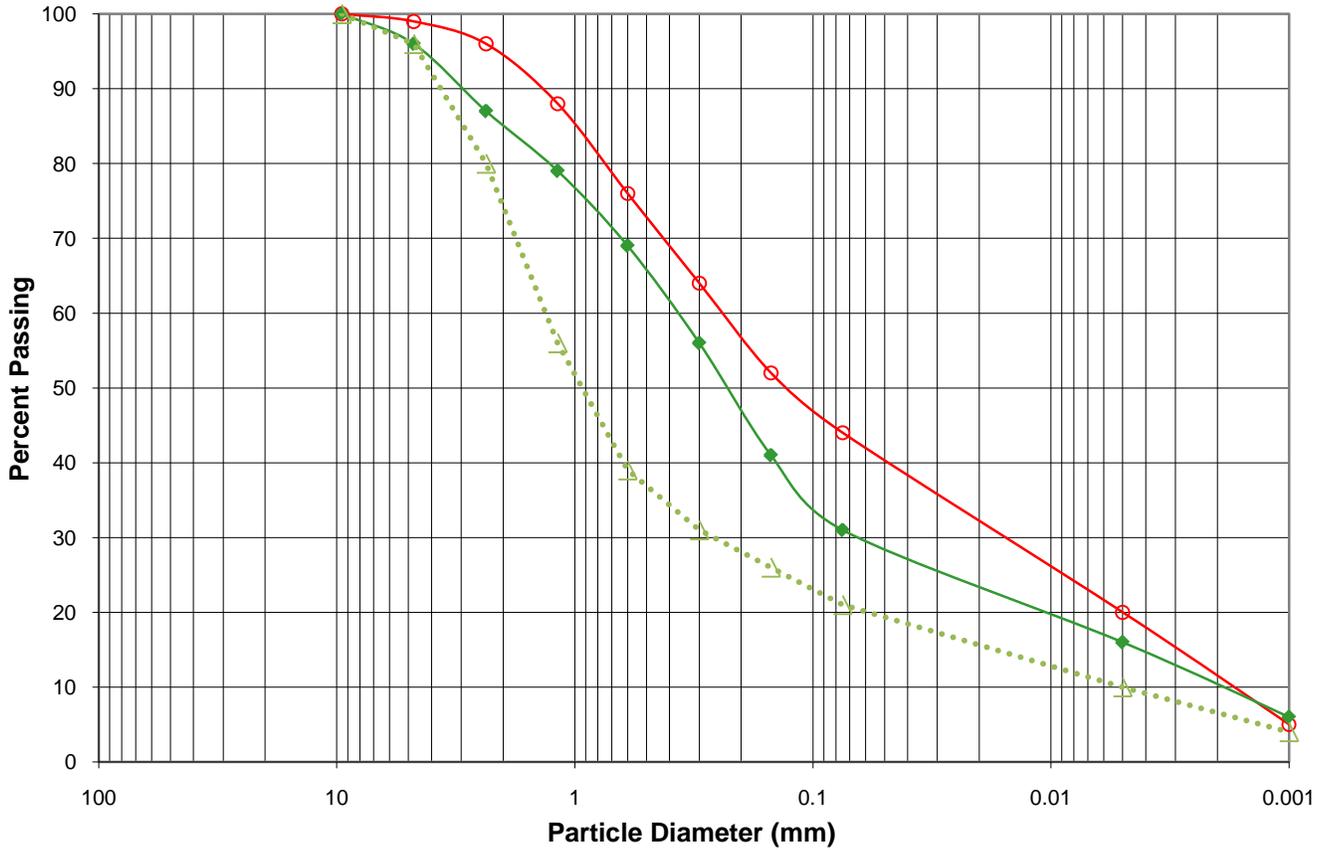


CLASSIFICATION TEST SUMMARY

SAMPLE ID	% FINER THAN																ATTERBERG LIMITS			AS RECEIVED		Gs	
	3"	2 1/2"	2"	1 1/2"	1"	3/4"	1/2"	3/8"	No. 4	No. 8	No. 16	No. 30	No. 50	No. 100	No. 200	5 μ	1 μ	LL	PI	Yd (pcf)	%m		
	R-10-024_1																						
R-10-024_2								100	99	96	88	76	64	52	44	20	5	25	8	135.7	9.4		
R-10-024_3								100	96	87	79	69	56	41	31	16	6	23	6	142.2	6.8		
R-10-024_4																						9.1	
R-10-024_5								100	96	80	56	39	31	26	21	10	4	26	7	181.4	8.3		
R-10-024_6								100	97	88	79	69	59	51	45	22	8	27	10	131.3	9.9		
R-10-024_7																						8.1	
R-10-024_8								100	99	95	87	78	67	56	47	23	7	27	9	137.8	6.8		

Gradation Analysis Test Results

US Standard Sieve Openings (Inches)					US Standard Sieve Number							Hydrometer (Cal Test 203)	
4"	2"	1"	3/4"	1/2" 3/8"	#4	#8	#16	#30	#50	#100	#200	5μm	1μm



GRAVELS		SANDS			SILT	CLAY
Coarse	Fine	Coarse	Medium	Fine		

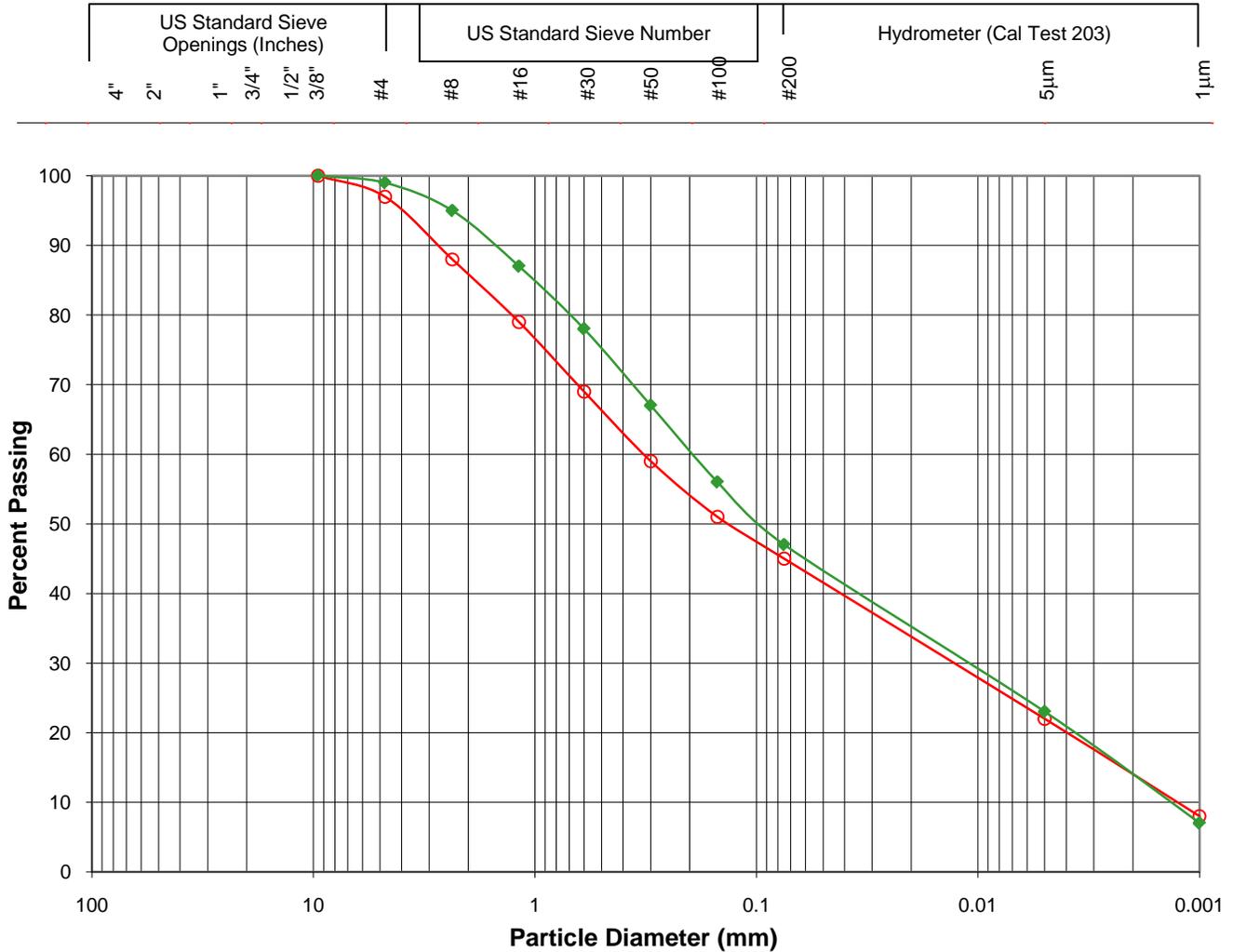
Sample ID: ○ R100242 ◆ R100243 ● R100245



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Project: Green Point Sink Location 2
EA: 01-00000172
D.-Co.-Rt.-: 01-Hum-299-20.4
Test Date: July -10-2010

Gradation Analysis Test Results



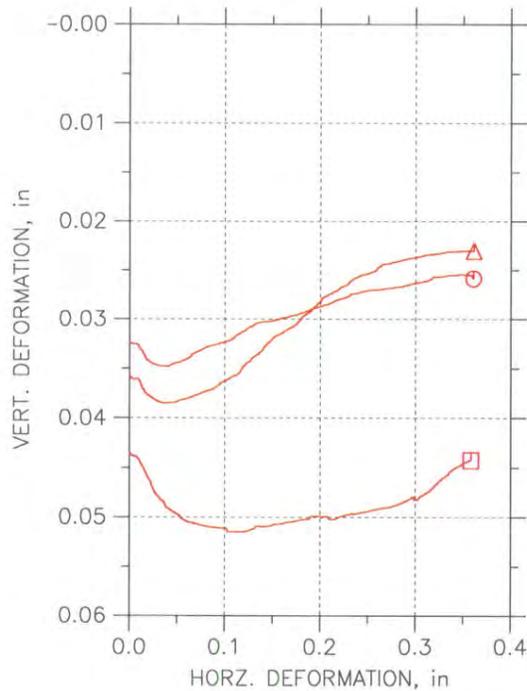
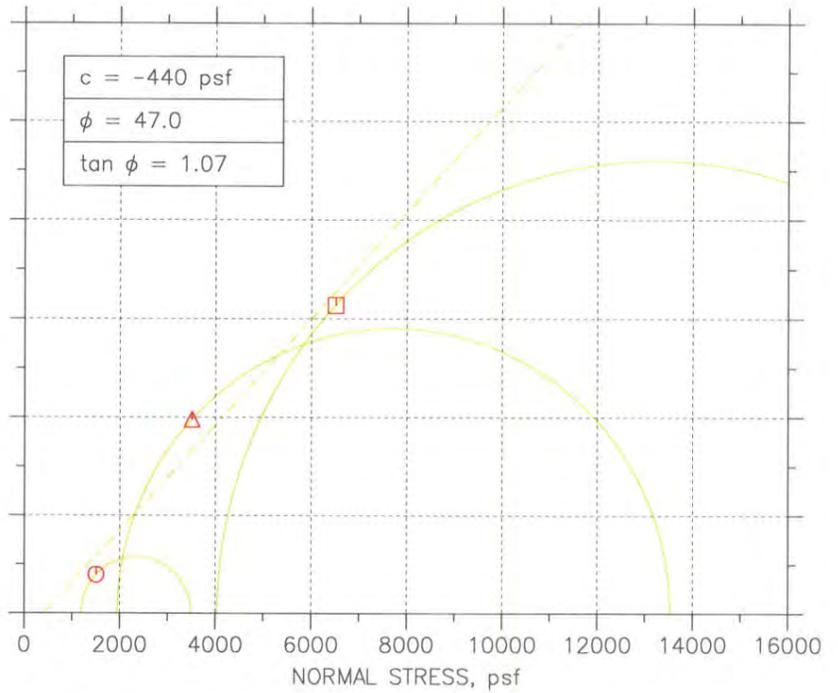
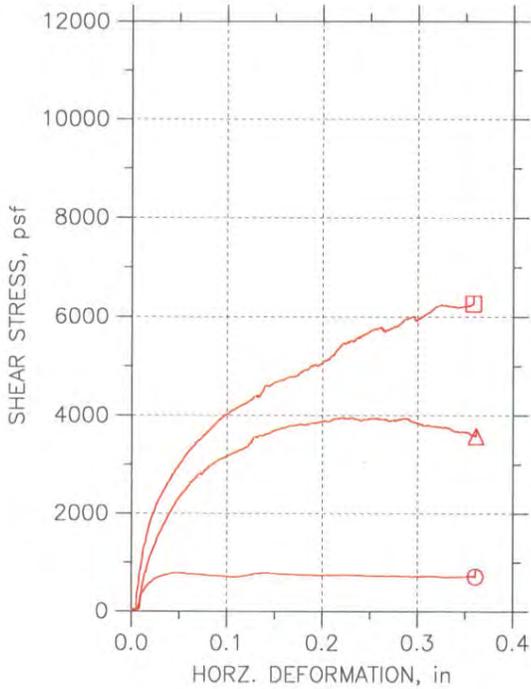
Sample ID: ○ R100246 ◆ R100248

Project: Green Point Sink Location 2
EA: 01-00000172
D.-Co.-Rt.-: 01-Hum-299-20.4
Test Date: July -10-2010



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DIRECT SHEAR TEST REPORT

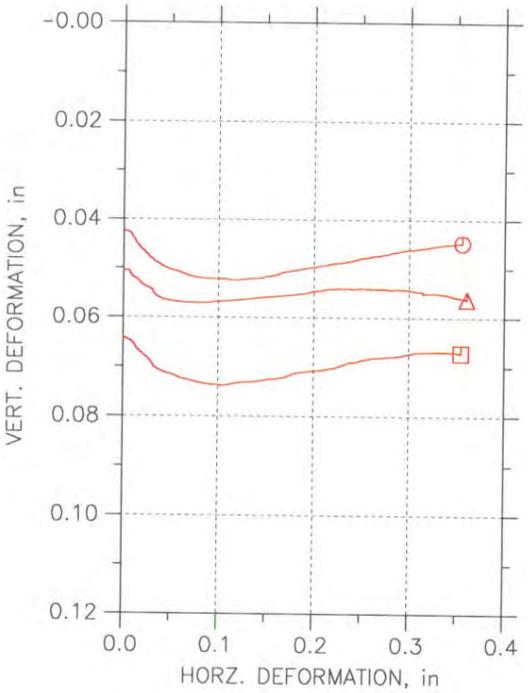
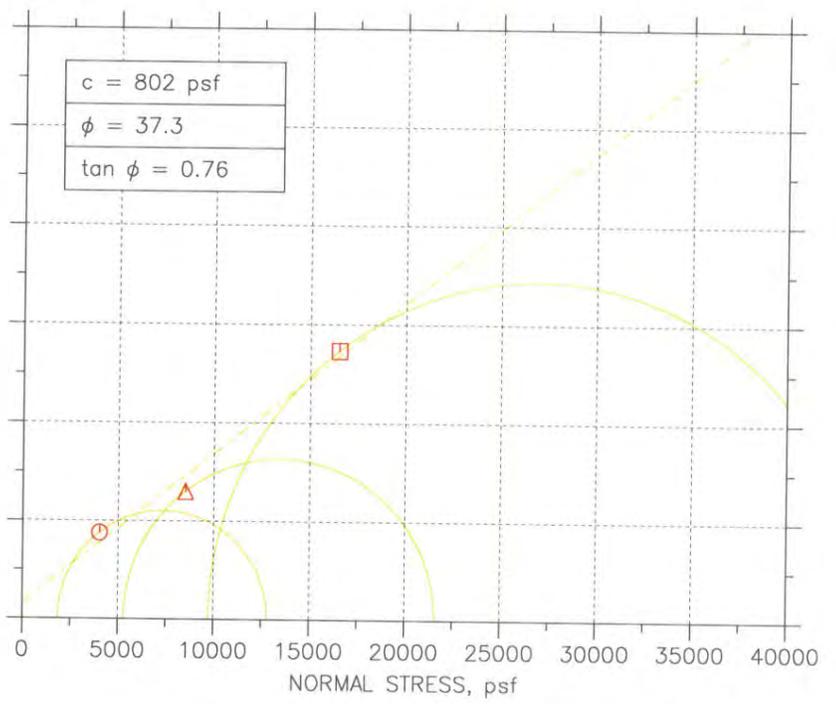
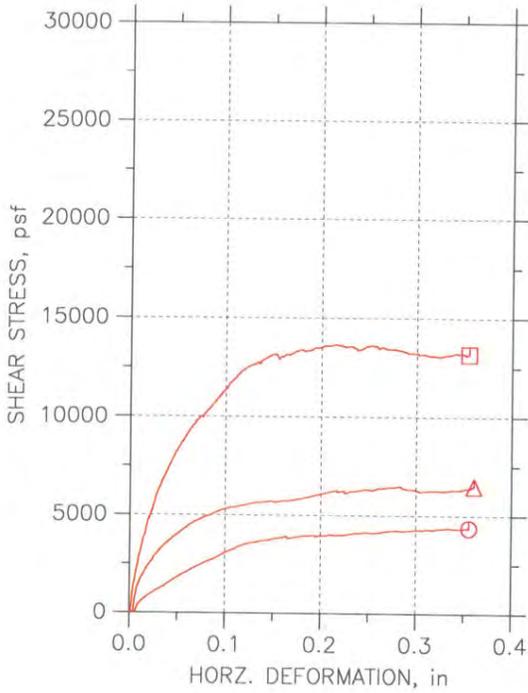


Symbol	⊙	△	□	
Test No.	DS10051A	DS10051B	DS10051C	
Sample No.	1	1	1	
Shape	Circular	Circular	Circular	
Initial	Dimension, in	2.375	2.375	2.375
	Area, in ²	4.4301	4.4301	4.4301
	Height, in	1	1	1
	Water Content, %	10.24	9.09	8.06
	Dry Density, pcf	130.97	124.86	137.59
	Saturation, %	90.62	66.68	89.49
	Void Ratio	0.31084	0.37494	0.24776
Consol. Height, in	0.96958	0.96511	0.95709	
Consol. Void Ratio	0.27097	0.32698	0.19421	
Final	Water Content, %	10.05	12.47	7.00
	Dry Density, pcf	134.44	127.81	143.96
	Saturation, %	99.76	99.87	99.97
	Void Ratio	0.27694	0.34325	0.19256
Normal Stress, psf	1501.1	3501.1	6503.3	
Max. Shear Stress, psf	781.79	3952.7	6268.4	
Ult. Shear Stress, psf	706.5	3577.2	6268.4	
Time to Failure, min	14.797	23.929	36.672	
Disp. Rate, in/min	0.01	0.01	0.01	
Implied Specific Gravity	2.75	2.75	2.75	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	
Plasticity Index	---	---	---	

Project: Greenpoint Sink Location2
Location: 01-HUM-299-20.4
Project No.: 01-423700
Boring No.: R-10-024
Sample Type: 2" Brass
Description: Moist, Dense, Very Dark Grey, Silver & White, Sand and Gravel with Silt
Remarks: ASTM D 3080.

WP 7/7

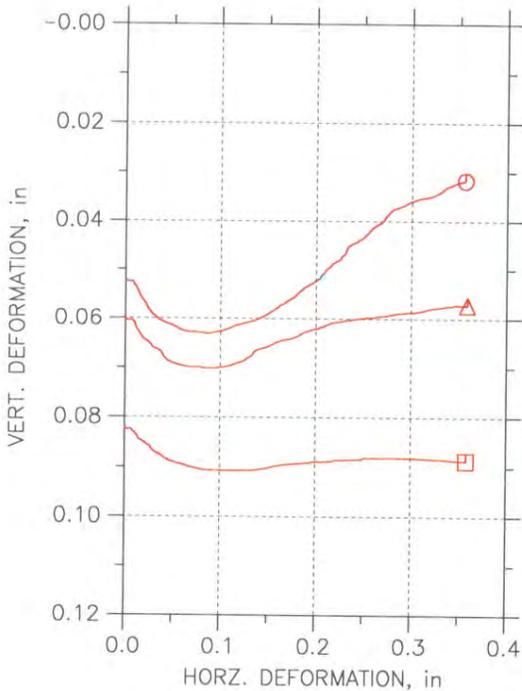
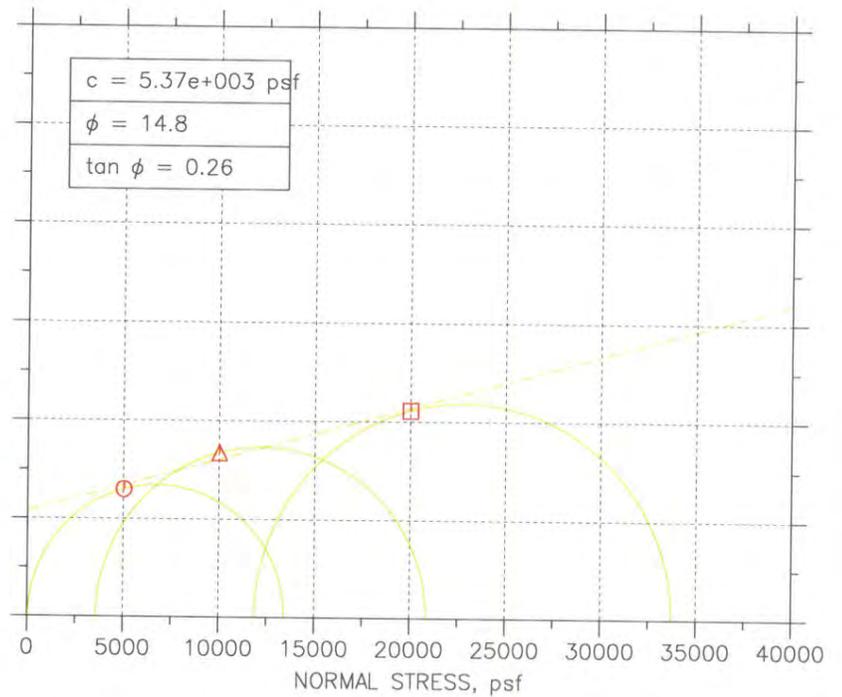
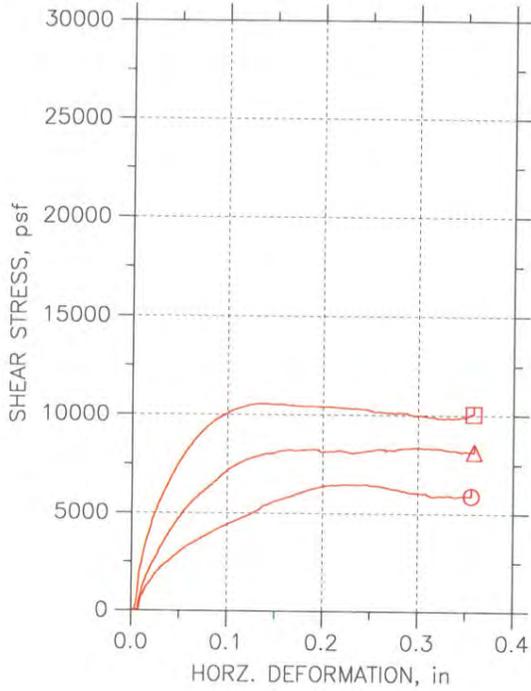
DIRECT SHEAR TEST REPORT



Symbol	⊙	△	□	
Test No.	DS10052A	DS10052B	DS10052C	
Sample No.	4	4	4	
Shape	Circular	Circular	Circular	
Initial	Dimension, in	2.375	2.375	2.375
	Area, in ²	4.4301	4.4301	4.4301
	Height, in	1	1	1
	Water Content, %	7.57	9.57	10.74
	Dry Density, pcf	124.95	129.33	124.95
	Saturation, %	55.67	80.42	78.95
	Void Ratio	0.374	0.3274	0.374
Consol. Height, in	0.95841	0.95005	0.93801	
Consol. Void Ratio	0.31685	0.2611	0.28882	
Final	Water Content, %	11.36	9.18	10.19
	Dry Density, pcf	130.81	137.04	133.94
	Saturation, %	99.96	99.83	99.43
	Void Ratio	0.31242	0.25275	0.28171
Normal Stress, psf	4000	8499.9	16501	
Max. Shear Stress, psf	4360.7	6475.8	13658	
Ult. Shear Stress, psf	4349.3	6473.2	13180	
Time to Failure, min	34.408	29.405	22.892	
Disp. Rate, in/min	0.01	0.01	0.01	
Implied Specific Gravity	2.75	2.75	2.75	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	
Plasticity Index	---	---	---	

Project: Greenpoint Sink Location2	
Location: 01-HUM-299-20.4	
Project No.: 01-423700	
Boring No.: R-10-024	
Sample Type: 2.4" CORE	
Description: Moist, Medium Dense, Silvery Dark Grey with White, Silty Gravel with Clay. Extensively patched.	
Remarks: ASTM D 3080.	<i>[Signature]</i> 7/6/10

DIRECT SHEAR TEST REPORT



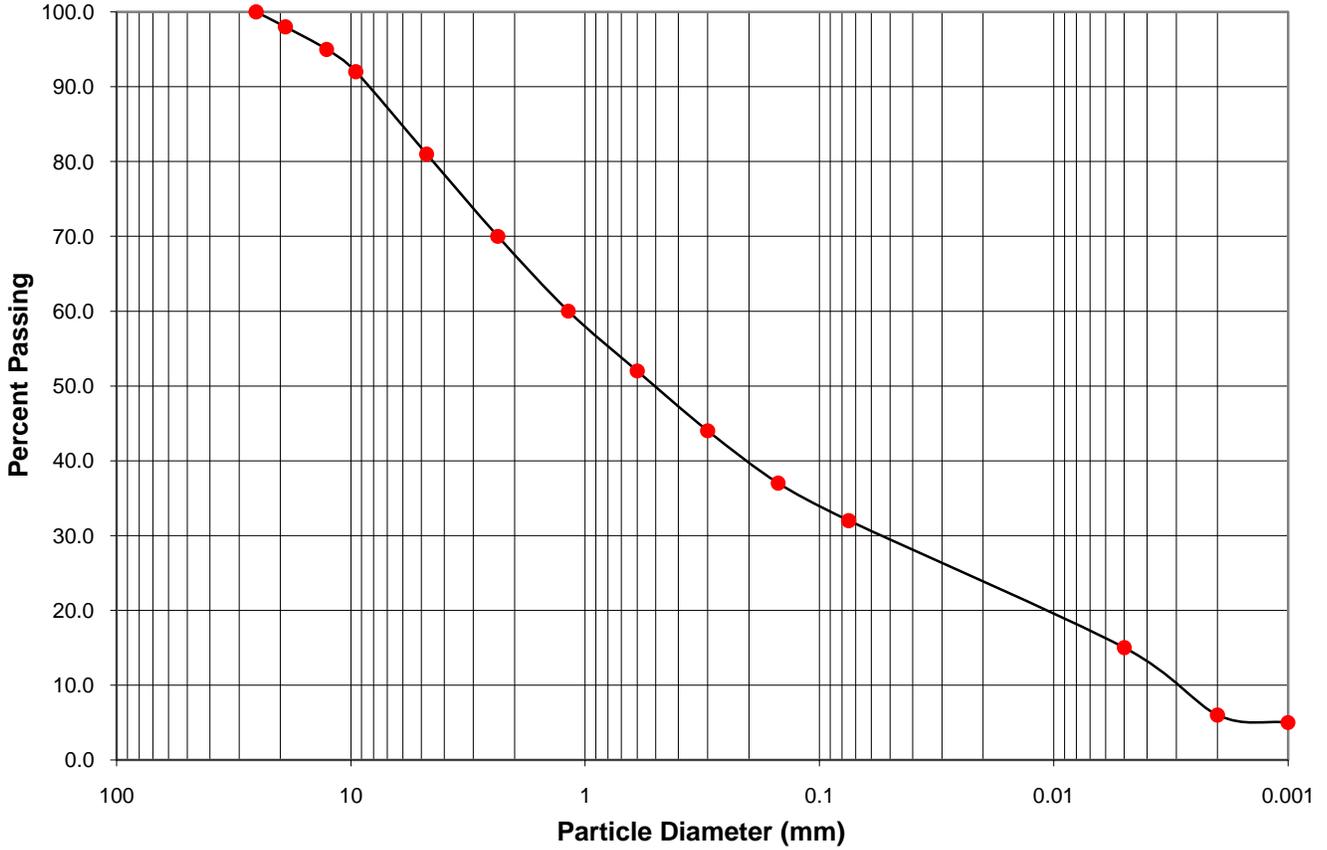
Symbol	⊙	△	□	
Test No.	DS10053A	DS10053B	DS10053C	
Sample No.	7	7	7	
Shape	Circular	Circular	Circular	
Initial	Dimension, in	2.37	2.37	2.37
	Area, in ²	4.4115	4.4115	4.4115
	Height, in	1	1	1.01
	Water Content, %	5.80	6.61	10.50
	Dry Density, pcf	136.96	139.81	132.78
	Saturation, %	62.93	79.74	98.54
	Void Ratio	0.25348	0.22793	0.29292
Consol. Height, in	0.94893	0.94041	0.92802	
Consol. Void Ratio	0.18947	0.15476	0.18797	
Final	Water Content, %	7.76	5.68	6.50
	Dry Density, pcf	141.45	148.3	145.56
	Saturation, %	99.80	99.12	99.70
	Void Ratio	0.21369	0.15765	0.17939
Normal Stress, psf	5008.4	10001	20000	
Max. Shear Stress, psf	6478.6	8356.5	10560	
Ult. Shear Stress, psf	5893.1	8133.2	10071	
Time to Failure, min	25.655	30.469	14.8	
Disp. Rate, in/min	0.01	0.01	0.01	
Implied Specific Gravity	2.75	2.75	2.75	
Liquid Limit	---	---	---	
Plastic Limit	---	---	---	
Plasticity Index	---	---	---	

Project: Greenpoint Sink Location2
Location: 01-HUM-299-20.4
Project No.: 01-423700
Boring No.: R-10-024
Sample Type: 2.4" CORE
Description: Moist, Medium Dense, Silvery Dark Grey, Silty Gravel with Clay. Extensively patched.
Remarks: ASTM D 3080.

[Handwritten Signature]
8/6/10

Gradation Analysis Test Results

US Standard Sieve Openings (Inches)					US Standard Sieve Number						Hydrometer (Cal Test 203)			
4"	2"	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200	5 μ m	1 μ m



GRAVELS		SANDS			SILT	CLAY
		Coarse	Fine	Coarse		

Sample ID: ● 43.5-44'



CALTRANS
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Engineering North -
 Branch B

Project: Greenpoint Sink Wall #2
EA: 01-423700
D.-Co.-Rt.: 01-HUM-299-PM 20.4
Test Date: 5/13/2010

APPENDIX C
GROUNDWATER DATA

Memorandum

*Flex your power!
Be energy efficient!*

To: JOE DOWNING
Division of Structure Design
Office of Bridge Design North
Branch 3

Date: September 06, 2011
File: 01-HUM-299-PM 20.2
Green Point Sink Location 1
EFIS ID: 0100000172

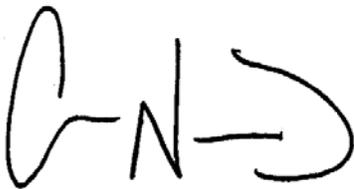
Attn: Lewis Shen

From: DEPARTMENT OF TRANSPORTATION
DIVISION OF ENGINEERING SERVICES
GEOTECHNICAL SERVICES – OGDN

Subject: Foundation Report Addendum for Retaining Wall - Green Point Sink Location 1

The information contained in this Foundation Report Addendum supersedes the information provided in the Foundation Report for Green Point Sink Location 1 dated July 25, 2011. Attached is a profile along the wall layout line (Figure 5) showing a revised approximate finished grade based on constructability and design considerations.

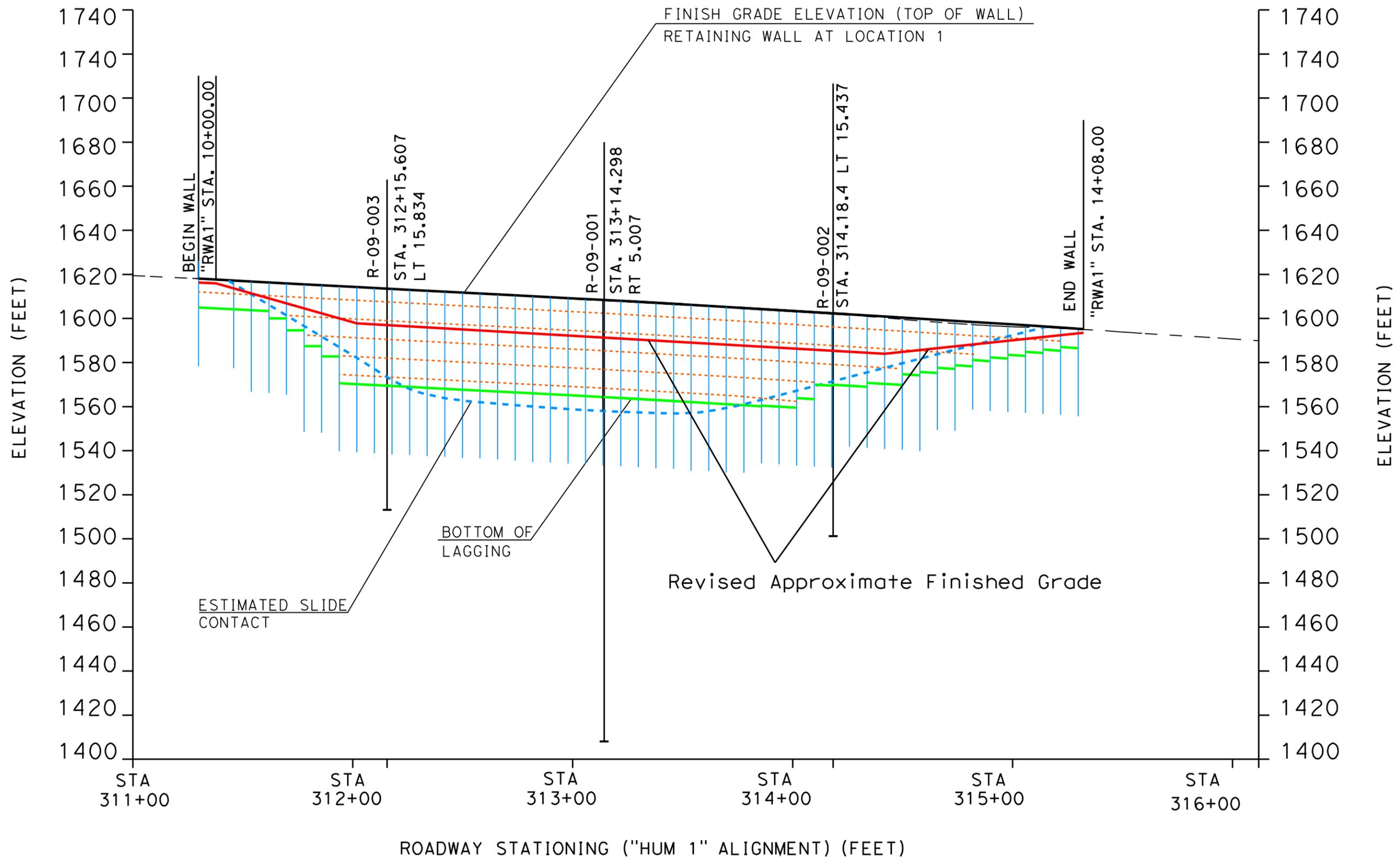
If you have any questions or require additional information please contact Charlie Narwold at (707) 445-6036.



CHARLIE NARWOLD
Senior Engineering Geologist
Office of Geotechnical Design – North



C: RBibbens (E-copy)
GS File Room (email gs_file_room@dot.ca.gov)
Structure Construction RE Pending File (email RE_pending_file@dot.ca.gov)
Project Manager



Department of Transportation
 Division of Engineering Services
 Geotechnical Services
 Office of Geotechnical Design - North

EA: 01-00000172	PROFILE ALONG WALL LAYOUT LINE
DATE: SEPTEMBER 2011	
LOCATION 1 FOUNDATION REPORT	FIGURE 5