URS

December 15, 2005

Mr. Jerry Wickham
Department of Environmental Health
Alameda County Health Agency
1131 Harbor Bay Parkway
Alameda, California 94502

Subject: **Submittal of *Subsurface Investigation Report, Chevron Pipeline Release, Sunol, CA***

Dear Mr. Wickham:

On behalf of the Chevron Pipeline Company, URS Corporation has conducted a four-phase subsurface investigation to evaluate the soil and groundwater impacts of the gasoline pipeline release that occurred on August 14, 2005, near milepost 2.7 along Calaveras Road in Sunol, California. The findings of this investigation are detailed in the attached *Subsurface Investigation Report, Chevron Pipeline Release, Sunol, CA* dated December 15, 2005. If you have any questions, please feel free to contact me at (510) 874-3201.

Sincerely,

Joe Morgan III
Project Manager, URS

Cc: Mr. Jeff Cosgray (Chevron Pipeline Company)
Mr. Joe Naras (SFPUC)
Mr. John Service (Valley Crest Tree Company)

URS Corporation
1333 Broadway, Suite 800
Oakland, CA 94612-1924
Tel: 510.893.3600
Fax: 510.874.3268

FINAL

SUBSURFACE INVESTIGATION REPORT CHEVRON PIPELINE RELEASE SUNOL, CALIFORNIA

Prepared for

Chevron Pipeline Company
2811 Hayes Road
Houston, Texas 77082

December 15, 2005

URS Corporation
1333 Broadway, Suite 800
Oakland, California 94612

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µg/L	micrograms per liter
ACPWA	Alameda County Public Works Agency
ARCH	air rotary casing hammer
bgs	below ground surface
BTEX	benzene, toluene, ethylbenzene, and total xylenes
Chevron Pipeline	Chevron Pipeline Company
DIPE	di-isopropyl ether
DPT	direct-push technologies
ETBE	ethyl tert-butyl ether
HASP	Health and Safety Plan
HSA	hollow-stem auger
LCS	laboratory control samples
LCSD	laboratory control sample duplicate
mg/kg	milligrams per kilogram
MS	matrix spikes
MSD	matrix spike duplicate
MTBE	methyl tertiary butyl ether
MW	monitoring well
PID	photoionization detector
PVC	polyvinyl chloride
ROW	right-of-way
SFPUC	San Francisco Public Utilities Commission
SVE	soil vapor extraction
TAME	tert-amyl methyl ether
TBA	tert-butyl alcohol
TPH-g	total petroleum hydrocarbons quantified as gasoline
URS	URS Corporation
USEPA	US Environmental Protection Agency

On behalf of the Chevron Pipeline Company (Chevron Pipeline), URS Corporation (URS) has conducted an iterative subsurface investigation to evaluate the soil and groundwater impacts of a gasoline pipeline release that occurred on August 14, 2005, in Sunol, California. A total of 19 Geoprobe® borings, nine hand-augered borings, two hollow-stem auger borings, and four air-rotary auger borings were advanced. In addition, three groundwater monitoring wells (MWs; MW-1 through MW-3) were installed.

Based on the results of the subsurface investigation, URS has installed a soil vapor extraction (SVE) system on the dirt road adjacent to the release as an interim remedial measure to remove the gasoline as soon as possible.

The three groundwater monitoring wells will be sampled quarterly until conditions have stabilized. The free product gasoline found in MW-1 will be bailed weekly, and the need for a more permanent system to remove the free product will be evaluated.

A Biological Resource Impact Assessment conducted to evaluate biological effects of the release is attached in Appendix A.

The slope below the release location that was exposed during the emergency response activities has been revegetated. Wattles were installed across the slope to prevent erosion, and the slope was hydroseeded according to the Erosion Control and Revegetation Plan (see Appendix B).

Additional activities currently being considered include the following:

- Installation of additional groundwater monitoring wells to investigate the impact of groundwater immediately downgradient from the release area.
- Installation of additional groundwater monitoring wells between the Valley Crest Tree Company property and Alameda Creek.
- Assessment of future remedial options.

On behalf of the Chevron Pipeline Company (Chevron Pipeline), URS Corporation (URS) has conducted an iterative subsurface investigation to evaluate the soil and groundwater impacts of a gasoline pipeline release that occurred on August 14, 2005, in Sunol, California (Figure 1). The work was performed according to the proposals submitted by URS on August 18, September 15, and October 18, 2005, to Chevron Pipeline. This report presents the release history, field activities, sampling procedures, analysis program, and investigation findings.

The scope of work included the following:

- Advancing 19 Geoprobe® borings to groundwater or refusal (CP-SB-1 through CP-SB-13, CP-SB-13R, CP-SB-20, CP-SB-21, and CP-SB-25 through CP-SB-27).
- Advancing nine hand-augered borings to 10 feet below ground surface (bgs) or refusal (SB-13R, SB-14 through SB-19, and SB-22 through SB-24).
- Advancing two hollow-stem auger borings to groundwater or refusal (HSA-1 and HSA-2).
- Advancing four air-rotary auger borings to groundwater or refusal (AR-1 through AR-4).
- Installation of three groundwater monitoring wells (MWs; MW-1 through MW-3).

Soil samples were collected as described in Section 3. Groundwater samples were collected in borings where groundwater was encountered. A surface water sample was collected from the unnamed creek located north and downhill of the release location that flows into the Alameda Creek floodplain. All of the soil borings, groundwater samples, surface water samples, and monitoring wells are shown on Figure 2.

The remainder of this report is organized as follows:

- Section 2 describes the release history and the subsurface investigation.
- Section 3 describes the field activities conducted.
- Section 4 presents the geology and hydrogeology of the release site.
- Section 5 presents the analytical results of the investigation.
- Section 6 presents conclusions and recommendations.
- Section 7 outlines the limitations applicable to this report.

- Section 8 lists the reference materials used to prepare this report.

This section describes the release history, site location, and the subsurface investigation.

2.1 RELEASE HISTORY

A release of unleaded gasoline occurred on August 14, 2005, when a motor grader that was grading the dirt road parallel to Calaveras Road struck the Bay Area Product Line owned by Chevron Pipeline. Chevron Pipeline estimated that approximately 700 barrels (29,400 gallons) of unleaded gasoline were released onto the adjacent hillside and Calaveras Road downgradient from the pipeline. The gasoline sprayed approximately 50 feet into the air, affecting a number of trees, and spilled downslope and west of the pipeline break. No personal injuries related to the release were reported.

Chevron Pipeline conducted emergency remedial activities immediately following the identification of the release. The pipeline rupture was repaired and the soils surrounding the release location were excavated. Twelve roll-off bins of soils were removed and disposed of off-site at an appropriate landfill. The repaired section of the pipeline was left open and exposed. The impacted roadway of Calaveras Road was repaved.

Chevron Pipeline has conducted this investigation voluntarily. The party responsible for the rupture has yet to assume responsibility for this incident. The regulatory agency for the gasoline release investigation is the Alameda County Department of Environmental Health. The Alameda County Department of Environmental Health caseworker, Mr. Jerry Wickham, requested that groundwater samples be collected and analyzed to evaluate potential impacts related to the release.

2.2 SITE LOCATION AND DESCRIPTION

The pipeline release location is approximately 2.7 miles south of the intersection of Interstate 680 and Calaveras Road, between mileposts 2.7 and 2.8 of Calaveras Road, Sunol Valley, Valle de San Jose Mexican land grant (La Costa Valley Quadrangle) in Alameda County, California, approximately 5 miles from the city of Sunol, California. The pipeline extends along Calaveras Road and traverses a steep hillside above the east side of the road (Figure 2). The pipeline crosses beneath a narrow (approximately 10-foot-wide) dirt road that begins at Calaveras Road and extends north to south up the slope. The San Francisco Public Utilities Commission (SFPUC) owns and leases the property to a cattle rancher. Immediately to the west of Calaveras

Road is a tree nursery, Valley Crest Tree Company, which also leases the property from the SFPUC.

The release location is on a steep, west-facing slope with an 80 to 90 percent grade. Vegetation at the site is predominantly oak woodlands. An unnamed creek (which had a flow rate of less than 0.5 cubic feet per second right after the release) is located approximately 150 to 200 feet north of and downhill from the release location and flows into the Alameda Creek floodplain. URS and Chevron Pipeline observed no visible impacts to the unnamed creek immediately after the pipeline release. A surface water sample was later collected to confirm the visual observations. The foliage and surrounding vegetation in the vicinity of the unnamed creek corridor do not appear to be impacted. URS' *Biological Resource Impact Assessment* (Appendix A) discusses the immediate and potential impacts to the area surrounding the release location in further detail. The majority of the gasoline released sprayed downslope and southwest of the break due to the position of the break and the prevailing southeasterly wind at the time of the release. To address impacts to the understory, the slope surrounding the release location was revegetated on December 6, 2005. Wattles were installed across the slope to prevent erosion, and the slope was hydroseeded according to the Erosion Control and Revegetation Plan (see Appendix B).

In response to Alameda County's request to locate groundwater to the west of the release site, URS conducted a four phase subsurface investigation. The purpose of the subsurface investigation was to evaluate the lateral and vertical extent of gasoline-impacted soil and groundwater at the site. A total of 19 Geoprobe® borings, nine hand-augered borings, two hollow-stem auger borings, and four air-rotary auger borings were advanced to collect soil and groundwater samples. Sampling locations are shown on Figure 2. Field activities were conducted from August 25 to November 10, 2005.

3.1 PERMITS AND PRE-DRILLING PROCEDURES

Before initiating field activities, URS obtained soil boring permits from the Zone 7 Alameda County Flood Control and Water Conservation District and an encroachment permit from the ACPWA. Permits are attached in Appendix C. URS obtained underground utility clearance by notifying Underground Service Alert 48 hours prior to initiating field activities. In addition, Cruz Brothers Locators, Inc. of Scotts Valley, California, used electromagnetic methods to clear all boring locations for the presence of underground utilities.

A site Health and Safety Plan (HASP) was developed that described hazards associated with the work. The HASP addressed the proposed soil borings, groundwater sampling, and well development protocol. A copy of the HASP was available on-site at all times. The URS site supervisor held tailgate safety meetings each morning to discuss relevant aspects of the HASP. Job safety analyses were developed for specific tasks and were discussed during the daily tailgate safety meetings.

3.2 BORINGS AND SAMPLE COLLECTION

The subsurface investigation was completed in four separate phases as described below.

3.2.1 Phase 1

On August 25 through 29, 2005, Gregg Drilling and Testing, Inc. of Martinez, California, used a truck-mounted Geoprobe™ direct-push technologies (DPT) rig to advance 10 soil borings (CP-SB-1 through CP-SB-10 along the Calaveras Road ROW, downgradient from the release site (Figure 2). A URS geologist observed the boring activities and collected soil samples for lithologic characterization and laboratory analysis. The DPT rig encountered refusal due to

cobbles at depths of approximately 21 to 38 feet bgs, and the borings were terminated. Boring logs are included in Appendix D.

Soil samples from above 5 feet bgs were collected in glass jars by a hand auger. Soil samples from below 5 feet bgs were collected in acetate liners by a DPT-driven core barrel sampler. The borings were continuously cored from 5 feet to their total depths, and soil samples were collected for laboratory analysis at approximately 0.5 to 1.0 feet bgs, 1.0 to 1.5 feet bgs, 2.0 to 2.5 feet bgs, and 5.0 to 5.5 feet bgs, followed by approximately 5-foot intervals to total boring depth. The collected soil samples were screened at regular depth intervals for volatile hydrocarbons using a PID. Volatile hydrocarbon concentrations measured by PID in sample headspaces were generally low in the DPT borings located along Calaveras Road downgradient from the pipeline release site. PID measurements are included in the boring logs in Appendix D. Groundwater was not encountered in any of the borings.

Boring locations CP-SB-3, CP-SB-4, CP-SB-6, CP-SB-7, and CP-SB-9 were resampled on October 13, 2005, to replace soil samples damaged during shipment to the lab. Soil samples were collected from the hand-augered borings in brass or stainless steel liners by a hand-operated slide hammer–driven core barrel sampler from depths of approximately 0.5 to 1 feet bgs, 1.0 to 1.5 feet bgs, and 2.0 to 2.5 feet bgs.

3.2.2 Phase 2

The second phase of the subsurface investigation took place on October 11 through October 25, 2005. After obtaining right of entry to allow access to the SFPUC property, URS advanced eighteen soil borings (CP-SB-11 through CP-SP-27, and CP-SB-13R) along the dirt road and on the hillside in the vicinity of the pipeline release (Figure 2). ResonantSonic International (RSI) of Woodland, California, advanced nine borings (CP-SB-11 through CP-SB-13, CP-SB-13R, CP-SB-20, CP-SB-21, and CP-SB-25 through CP-SB-27) using either a truck-mounted PowerProbe™ DPT rig or a Geoprobe™ 6620 DT rig. A URS geologist observed the boring activities and collected soil samples for lithologic characterization and laboratory analysis. The borings were terminated due to refusal encountered by the DPT rig in cobbles or bedrock at depths of approximately 10 to 40 feet bgs (Appendix D).

All borings were hand augered to a depth of 5 feet bgs. The borings were then continuously cored from 5 feet to their total depths using a direct push rig, and soil samples were collected for laboratory analysis at approximately 0.5 to 1.0 feet bgs, 1.0 to 1.5 feet bgs, 2.0 to 2.5 feet bgs, and 5.0 to 5.5 feet bgs, followed by approximately 5-foot intervals to the total boring depth. Groundwater or wet soils were encountered in four of the borings—CP-SB-11, CP-SB-12, CP-SB-20, and CP-SB-25—at approximate depths of 20, 24, 36, and 39 feet bgs, respectively. Temporary ¾-inch polyvinyl chloride (PVC) well screens were installed in the borings, and a grab groundwater sample was collected from each boring using a dedicated disposable bailer.

Nine additional borings (CP-SB-14 through CP-SB-19 and CP-SB-22 through CP-SB-24) were advanced by hand auger on October 13 and 14, 2005, to total depths ranging from 3 to 10.5 feet bgs, where refusal was encountered. Groundwater was not encountered in any of the hand-augered borings. Soil samples were collected for laboratory analysis at approximately 0.5 to 1.0 feet bgs, 1.0 to 1.5 feet bgs, 2.0 to 2.5 feet bgs, and 5.0 to 5.5 feet bgs, followed by approximately 5-foot intervals to total boring depth.

Soil samples from above 5 feet bgs (and in hand-augered borings below 5 feet bgs) were collected in brass or stainless steel liners by a hand-operated slide hammer–driven core barrel sampler. Soil samples from below 5 feet bgs in the DPT borings were collected in acetate liners by a DPT-driven core barrel sampler. The collected soil samples were screened at regular depth intervals for volatile hydrocarbons using a PID. Volatile hydrocarbon concentrations measured by PID in sample headspace were generally moderate to high in the DPT and hand-augered borings located near the pipeline release site. PID measurements are included in the boring logs in Appendix D.

3.2.3 Phase 3

Because groundwater was not encountered during the first phase of investigation using the DPT rig, a truck-mounted hollow-stem auger (HSA) drill rig was used to conduct additional groundwater exploration. The third phase of the subsurface investigation included two soil borings advanced in the Valley Crest Tree Company property west of Calaveras Road and downgradient from the release site (Figure 2). Due to the nursery fence, overhead power lines, and a buried utility cable running along the west side of Calaveras Road, the borings were advanced approximately 50 feet west road. On October 10, 2005, Clear Heart Drilling, Inc. of

Santa Rosa, California (under contract to RSI), advanced borings HSA-1 and HSA-2 using a HSA drill rig to total depths of 37 and 50.5 feet bgs, respectively. Boring HSA-1 was terminated due to refusal encountered in cobbles, and HSA-2 was terminated due to refusal encountered in bedrock. Additional planned borings were not drilled due to refusal encountered in the first two. Possible groundwater was encountered in HSA-1 at the total depth of 37 feet bgs, but there was insufficient quantity to collect a sample. Groundwater was not encountered in HSA-2.

A URS geologist observed the boring activities and collected soil samples for lithologic characterization and laboratory analysis. Soil samples were collected at approximately 0.5 to 1.0 feet bgs, 1.0 to 1.5 feet bgs, 2.0 to 2.5 feet bgs, and 5.0 to 5.5 feet bgs, followed by approximately 5-foot intervals to a depth of about 20 feet bgs. Below approximately 20 feet bgs, soil samples were collected at approximately 30 feet bgs in HSA-1, and at approximately 45 and 50 feet bgs in HSA-2. Additional attempts to collect soil samples were met with refusal due to cobbles or bedrock. Soil samples from above 5 feet bgs were collected in brass or stainless steel liners by a hand-operated slide hammer–driven core barrel sampler. Soil samples from below 5 feet bgs were collected in brass or stainless steel liners by a downhole hammer-driven split spoon sampler. The collected soil samples were screened at regular depth intervals for volatile hydrocarbons using a PID. Volatile hydrocarbon concentrations measured by PID in sample headspace were generally very low to nondetectable in the HSA borings located downgradient from the pipeline release site. However, moderate down-borehole PID readings were measured at the top of the auger at the total depth of borings HSA-1 and HSA-2. PID measurements are included in the boring logs in Appendix D.

3.2.4 Phase 4

Due to the refusal encountered by the HSA rig in cobbles, a truck-mounted air rotary casing hammer (ARCH) drill rig was used for the fourth phase of subsurface investigation, which consisted of four soil borings located in the Valley Crest Tree Company property west of Calaveras Road and downgradient from the release site (Figure 2). The purpose of the fourth investigative phase was to further evaluate the lateral and vertical extent of petroleum hydrocarbons in soil and groundwater downgradient from the pipeline release site. The boring locations were constrained due to the presence of overhead power lines west of Calaveras Road and San Francisco Department of Public Works underground aqueducts farther to the west. On

October 18 through October 21, 2005, Test America Drilling Corporation of Anaheim, California (under contract to RSI), advanced borings AR-1 through AR-4 to respective total depths of approximately 41 feet bgs, 108 feet bgs, 39 feet bgs, and 38 feet bgs. Boring AR-2 was advanced to almost 80 feet below the alluvium/bedrock contact without encountering groundwater. Groundwater was encountered in borings AR-1 and AR-3 at 37.9 feet bgs and 38.7 feet bgs, respectively, just above the alluvium/bedrock contact. Groundwater was not encountered during drilling in boring AR-4, which was terminated approximately 5 feet below the alluvium/bedrock contact.

A URS geologist observed the boring activities and collected soil samples for lithologic characterization and laboratory analysis. Soil samples were collected for lithologic characterization and/or laboratory analysis at approximately 10-foot depth intervals until bedrock was encountered at depths of approximately 23 to 39 feet bgs. Generally, samples were only collected for laboratory analysis immediately above the bedrock contact because shallow soil samples had previously been collected nearby in the HSA borings. In boring AR-2, soil samples were collected within the bedrock unit (encountered at approximately 23 feet bgs) at variable intervals for lithologic characterization only to the total boring depth of 108 feet bgs. Soil samples intended for possible laboratory analysis were collected in 2-inch diameter stainless steel liners by a downhole hammer-driven split spoon sampler. Soil samples intended for lithologic characterization only were collected in a 1.5-inch diameter downhole hammer-driven split spoon standard penetrometer without liners. The collected soil samples were screened at regular depth intervals for volatile hydrocarbons using a PID. Volatile hydrocarbon concentrations measured by PID in sample headspace were generally very low to nondetectable in the ARCH borings located downgradient from the pipeline release site. However, moderate down-borehole PID readings were measured at the top of the drive casing at the total depth of boring AR-1. PID measurements are included in the boring logs in Appendix D. A grab groundwater sample was collected from boring AR-1 using a dedicated disposable bailer within the drive casing prior to the installation of MW-1. Grab groundwater samples were also collected at MW-2 and MW-3.

In addition to samples collected during the intrusive investigation efforts, a surface water sample was also collected to ensure that gasoline had not impacted a nearby, unnamed creek located

north and downhill from the release location that flows into the Alameda Creek floodplain. The unnamed creek and sampling location are shown on Figure 2.

3.2.5 Sample Preparation

Soil samples selected for laboratory analysis were covered at each end by Teflon™ tape and plastic caps. Water samples were collected in 40-milliliter (ml) volatile organic analysis containers preserved with hydrochloric acid. All samples were placed in an ice-filled cooler and transported under chain-of-custody by URS to Lancaster Laboratories, Inc., a California Department of Health Services certified analytical laboratory located in Lancaster, Pennsylvania. Chain-of-custody forms are included in Appendix E.

3.2.6 Boring Completion

Following completion of sampling activities, all hand augered, DPT, HSA, and ARCH borings except for AR-1, AR-3, and AR-4 were sealed to the surface with a tremied Portland cement/bentonite grout slurry. Borings AR-1, AR-3, and AR-4 were completed as groundwater monitoring wells MW-1, MW-2, and MW-3 as described below. Investigation-derived waste including soil cuttings and decontamination rinsate was stored on-site in a soil roll-off bin and in 55-gallon drums pending characterization and either disposal at a Chevron-approved facility or on-site reuse, if appropriate.

3.3 MONITORING WELL INSTALLATION AND DEVELOPMENT

The ARCH borings AR-1, AR-3, and AR-4 were completed as groundwater monitoring wells MW-1, MW-2, and MW-3, respectively. Although groundwater was not encountered in boring AR-4/MW-3 during drilling, it was completed as a monitoring well due to the possibility of rising water levels during the winter. (Groundwater was observed in MW-3 on November 10, 2005, and all subsequent site visits.) The wells were also intended to be used as possible groundwater extraction wells if necessary. The three wells were constructed with 4-inch diameter schedule 40 PVC blank casings and 0.020-inch-slot PVC well screens. The PVC bottom cap extended approximately 0.7 feet below the well screen. The screened interval extended from 29 to 39 feet bgs in MW-1, 24 to 39 feet bgs in MW-2, and 22 to 37 feet bgs in MW-3. The wells were completed with #3 Lonestar™ sand filter packs placed within the annulus of the well from

the bottom of the casing to approximately 2 to 2.5 feet above the top of the well screen. The annulus of the well was sealed with 2.5 to 3 feet of hydrated bentonite chips on top of the filter pack, and a hydrated Portland cement and 5% bentonite grout slurry seal was tremied to the surface. All wells were completed with flush-mount vault box completions and locking watertight well caps. Copies of soil boring logs and well construction details are included in Appendix D.

On October 27, 2005, after allowing the cement grout seal and well heads to cure for over 72 hours, a URS geologist and an RSI driller developed the newly installed monitoring wells MW-1 and MW-2. MW-3 was not developed because no groundwater was present in the well at this time. The total well depth and depth to water were measured at MW-1 and MW-2 using an electronic water level indicator, and subsequently developed using a surge block to remove sediment from the well and filter pack and a 10-foot stainless steel bailer to purge the entrained sediments. Approximately seven to 10 well volumes (well casing volume plus sandpack volume) of groundwater were removed from each well. Periodic measurements of pH, conductivity, temperature, and turbidity were recorded during development using a Horiba U-10 multi-parameter meter. During the development of MW-1, odors and product sheen on the purge water were observed. After removing several well volumes of groundwater, slight product accumulation was observed on the drummed purge water, as noted on the development log. The well development forms for MW-1 and MW-2 are presented in Appendix F. All purge water generated during well development was stored on-site in 55-gallon drums pending characterization and either disposal at a Chevron approved facility or on-site re-use, if appropriate.

3.4 ANALYSIS PROGRAM

All soil, groundwater, and surface water samples collected for chemical analysis were placed in a cooler with ice and transported under URS chain-of-custody to Lancaster Laboratories as described above. The soil, groundwater, and surface water samples were analyzed for the following:

- Total petroleum hydrocarbons quantified as gasoline (TPH-g) by U.S Environmental Protection Agency (USEPA) Method 8015 modified for gasoline.

- Benzene, toluene, ethylbenzene, and total xylenes (BTEX) plus six fuel oxygenates: methyl tertiary butyl ether (MTBE), di-isopropyl ether (DIPE), ethyl tert-butyl ether (ETBE), tert-amyl methyl ether (TAME), tert-butyl alcohol (TBA), and ethanol by USEPA Method 8260B.

Surface soil samples collected at two depths from borings SB-1 through SB-10 (up to 1.5 feet bgs) were also analyzed for lead by USEPA Method 6020.

The pipeline release site is located on a steep hillside above the east side of Calaveras Road. Bedrock is present on the hillside at shallow depths and is exposed in numerous outcrops upslope. The bedrock geology of the hillside consists of Miocene-age marine sandstone and/or siltstone of the Briones Formation, the bedding of which dips steeply to the east as part of the western limb of a syncline. The axis of the syncline is located upslope a few hundred feet east of Calaveras Road and trends northwest paralleling the ridge line. Farther up the hillside east of the synclinal axis, the bedding reverses dip direction toward the west. The Calaveras Fault, which is located approximately 300 feet west of Calaveras Road, lies near the bottom of the hillside along the east edge of an alluvial plain that makes up the floor of Sunol Valley (California Division of Mines and Geology 1966; Dibblee 1980). Immediately to the west of Calaveras Road is a tree nursery, Valley Crest Tree Company, which is located on what appears to be a terrace. The Alameda Creek floodplain is located about 500 feet to the west of the nursery and is about 35 feet lower in elevation.

Each soil boring advanced during this investigation was logged by a URS geologist and is presented in Appendix D. Cross sections A-A' and B-B', representing the subsurface geology, were generated using soil borings from this investigation and are presented in Figures 3 and 4. The cross section locations are shown on Figure 2.

Based on logs obtained from the recent borings, local lithology on the hillside above Calaveras Road consists of sandy silt to silty sand colluvium extending to depths ranging from approximately 3 to 32 feet bgs. The silty sand colluvium is underlain by gravelly fine sand and fine sandy gravel to total depths ranging from approximately 10 to 40 feet bgs. Beneath the sand and gravel layer (observed in the borings that reached the greatest depth below ground surface) a thin silty/clayey weathered zone was encountered just before refusal on what appeared to be the sandstone/siltstone bedrock. Sandstone bedrock overlain by a gravel bed is exposed in the dirt road cut below the pipeline release site.

No continuous water-bearing zone was encountered within the colluvial deposits on the hillside. However, perched groundwater zones were encountered on the hillside at depths ranging from 24 to 39 feet bgs in four of the borings (CP-SB-11, CP-SB-12, CP-SB-20, and CP-SB-25).

Based on logs obtained from the recent borings along Calaveras Road and in the tree nursery property to the west, local lithology at the base of the hillside consists of sandy to clayey silt and

silty sand to a depth of about 17 to 35 feet bgs, underlain by sandy to silty gravel to a depth of about 29 to 43 feet bgs. Highly weathered sandy siltstone bedrock (with the consistency of sandy clay) is encountered at depths ranging from 29 to 43 feet bgs, underlain by progressively less weathered sandy siltstone, clayey siltstone, and silty claystone to approximately 97 feet bgs as observed in boring AR-2, where a weathered and sheared clay layer was encountered that appears to be fault gouge. At approximately 105 feet bgs, hard, dark ultrabasic igneous rock, which appeared to be basalt or gabbro (possibly of the Franciscan Formation), was encountered at the total explored depth of 108 feet bgs. It is possible that the clay layer could be fault gouge marking the contact with the Calaveras Fault, which is located approximately 300 feet west of Calaveras Road (Dibblee 1980). As verified in the westernmost boring (AR-2), the depth to the alluvium/bedrock contact does not increase with distance west from the hillside, unlike what is suggested by the angle of the slope (Figures 3 and 4).

Groundwater was encountered during drilling in three of the borings (HSA-1, AR-1/MW-1, and AR-3/MW-2) advanced west of Calaveras Road below the hillside, at a depth of approximately 37 to 39 feet bgs. During the development of MW-1 and MW-2 on October 27, 2005, continuous groundwater recharge was observed at both wells, indicating that the perched groundwater zone within the gravel alluvium may behave like a continuous water table during seasons of high precipitation. No groundwater was encountered at MW-3 (installed at boring AR-4) at this time. On November 10, 2005, groundwater was encountered within all three monitoring wells at depths of 37.85, 33.77, and 36.34 feet below the top of the well casings at MW-1, MW-2, and MW-3, respectively. Groundwater depths and well details are included in Tables 1A through 1C, and the groundwater elevations are presented on Figure 5. On November 10, free-phase gasoline was also encountered on the groundwater surface within MW-1 and MW-3. The product was measured to be 0.17 feet thick at MW-1 and 0.005 feet thick at MW-3. No product was encountered at MW-2. Product levels and thicknesses and groundwater data are presented in Tables 1A through 1C.

5.1 ANALYTICAL RESULTS

As discussed in Section 3, all soil, groundwater, and surface water samples collected at each boring/well location were submitted to Lancaster Laboratories for analysis. Soil and groundwater samples collected from all four phases of the investigation, as well as the surface water sample collected from the unnamed creek, were analyzed for BTEX and fuel oxygenates by EPA Method 8260B and TPH-g by USEPA Method 8015M. In addition, soil samples collected during the first phase of investigation (CP-SB-1 through CP-SB-10) from 0 to 0.5 foot and 1 to 1.5 foot depth intervals were analyzed for total lead by USEPA Method 6010. Section 3 includes a detailed discussion of the activities conducted during each phase of the investigation.

Boring and well locations are identified in Figure 2. Soil analytical results are provided in Table 2, and groundwater and surface water analytical results are provided in Table 3. MTBE is the only fuel oxygenate displayed on Tables 2 and 3 because it is a USEPA chemical of concern. Analytical results for all other fuel oxygenates are provided in the laboratory analytical reports included in Appendix E.

5.1.1 Phase 1

During the initial phase of the investigation, a total of 83 soil samples were analyzed from 10 boring locations (CP-SB-1 though CP-SB-10) along Calaveras Road at depths ranging from 0.5 to 39.5 feet bgs (Figure 2). No groundwater was encountered during the initial investigation, and therefore no groundwater samples were analyzed.

TPH-g concentrations ranged from below detection limits to 180 mg/kg, with the highest concentration from the soil sample collected from boring CP-SB-8 at 0.5 to 1 foot bgs.

Benzene concentrations ranged from below detection limits to 0.009 milligrams per kilogram (mg/kg), with the highest concentration from the sample collected from boring CP-SB-9 at 9.5 to 10 feet bgs. Toluene concentrations ranged from below detection limits to 0.029 mg/kg, also from the soil sample collected from boring CP-SB-9 at 9.5 to 10 feet bgs. Concentrations of ethylbenzene were reported from below method detection limits to 0.01 mg/kg from the soil sample collected from boring CP-SB-8 at 0.5 to 1 foot bgs. Total xylenes concentrations ranged from below method detection limits to 0.29 mg/kg, also from the sample collected from boring CP-SB-8 at 0.5 to 1 foot bgs.

All fuel oxygenates concentrations were found to be below method detection limits for all 83 soil samples collected from CP-SB-1 through CP-SB-10.

All soil samples analyzed for lead (0.5 to 1 foot bgs and 1 to 1.5 foot bgs) contained detectable concentrations of lead (see Table 2). The lowest concentration of lead was 0.757 mg/kg in the sample collected from CP-SB-10 at 1 to 1.5 feet bgs. The highest lead concentration was 29.1 mg/kg, in the sample collected from CP-SB-3 at 0.5 to 1 foot bgs.

5.1.2 Phase 2

The second phase of the investigation included advancing 18 borings (CP-SB-11 through CP-SB-27, and CP-SB-13R) on the hillside near the pipeline leak. A total of 93 soil samples and four groundwater samples were submitted for laboratory analysis. Soil samples were collected at depths ranging from 0.5 to 38.5 feet bgs.

The highest concentrations of BTEX and TPH-g were reported from soils collected from the borings advanced directly downslope from the pipeline leak (CP-SB-16 through CP-SB-19), with the maximum concentrations found at CP-SB-19 at a depth of 1 to 1.5 feet bgs. The sample contained detections of TPH-g at 17,000 mg/kg, benzene at 9.4 mg/kg, toluene at 1,200 mg/kg, ethylbenzene at 350 mg/kg, and xylenes at 2,700 mg/kg (see Table 2). All fuel oxygenate concentrations were found to be below method detection limits for all 93 soil samples collected from CP-SB-11 through CP-SB-27.

Groundwater samples were submitted from each boring location where groundwater was encountered. During the second phase of investigation, groundwater was encountered in four borings: CP-SB-11, CP-SB-12, CP-SB-20, and CP-SB-25. BTEX and TPH-g concentrations were reported above detection limits in all four groundwater samples. High concentrations were reported for all five analyzed constituents from the sample collected at CP-SB-20: 570,000 micrograms per liter (µg/L) of THP-g, 6,800 µg/L of benzene, 64,000 µg/L of toluene, 9,000 µg/L of ethylbenzene, and 45,000 µg/L of xylenes. The lowest concentrations in the range were reported from the sample collected at CP-SB-25, with detections of THP-g at 450 µg/L, benzene at 2 µg/L, toluene at 12 µg/L, ethylbenzene at 1 µg/L, and xylenes at 6 µg/L .

5.1.3 Phase 3

The third phase of the investigation included advancing two soil borings (HSA-1 and HSA-2) on the Valley Crest Tree Company property on the west side of Calaveras Avenue. A total of 12 soil samples were collected for laboratory analysis. Soil samples were collected at depths ranging from 0.5 to 50.5 feet bgs. No groundwater was encountered in sufficient quantities to collect and submit for analysis. Concentrations of TPH-g, benzene, ethylbenzene, and all fuel oxygenates were below method detection limits in all 12 soil samples submitted for analysis. Toluene concentrations ranged from below method detection limits to a high concentration of 0.003 mg/kg in the sample collected from boring HSA-2 at 50 to 50.5 feet bgs. Total xylenes concentrations ranged from below method detection limits to a high concentration of 0.002 mg/kg in the sample collected from HSA-2 at 45 to 45.5 and 50 to 50.5 feet bgs (Table 2).

5.1.4 Phase 4

Samples submitted during the fourth phase of the investigation were collected from two of the four boring/well locations advanced on the Valley Crest Tree Company property on the west side of Calaveras Road. In total, three soil samples and three groundwater samples were submitted for laboratory analysis. Of the three soil samples collected, the highest BTEX concentrations were found in the sample collected from AR-1/MW-1 at 38.5 to 39 feet bgs, with benzene at 0.003 mg/kg, toluene at 0.025 mg/kg, ethylbenzene at 0.003 mg/kg, and total xylenes at 0.017 mg/kg (Table 2). The TPH-g and fuel oxygenates concentrations were below detection limits for all three soil samples. The groundwater sample collected at MW-1 contained the highest BTEX concentrations, with benzene at 2,200 µg/L, toluene at 24,000 µg/L, ethylbenzene at 3,400 µg/L, xylenes at 19,000 µg/L. THP-g was also detected in the sample from MW-1 at 120,000 µg/L. The sample collected at MW-3 contained the lowest concentrations of BTEX and THP-g, all of which were below method detection limits (Table 3). None of the groundwater samples contained concentrations of fuel oxygenates above method detection limits.

One surface water sample (SW-Creek) was collected from the unnamed creek north and downslope from the release location on the east side of Calaveras Road. This sample was analyzed to ensure that no gasoline impacts had reached the nearby surface water, which flows into the Alameda Creek floodplain. Concentrations for benzene, toluene, ethylbenzene, total

xylenes, TPH-g, and all fuel oxygenates were below method detection limits. The sampling location is illustrated on Figure 2, and the analytical results are summarized in Table 3.

5.2 WASTE PROFILING RESULTS

Soil and groundwater samples were collected from the 55-gallon drums and the roll-off bin, and the analytical results are presented in Tables 4A and 4B.

6.1 SUMMARY OF QA/QC REVIEW PARAMETERS

The quality assurance/quality control (QA/QC) program includes using standard sample collection procedures in the field and established analytical methodologies in the laboratory. Laboratory and field QC sample results were evaluated to assess the quality of the individual sample results and overall method performance. Analytical performance was evaluated on a "batch QC" basis by evaluating the QC sample results for groups of samples that were prepared and analyzed together. The data evaluation performed included review of:

- Blanks (laboratory method blanks and trip blanks)
- Spikes (laboratory control sample spikes, matrix control spikes, and surrogate spikes)
- Duplicates (laboratory control sample duplicates and field duplicates)
- Sample Integrity (chain-of-custody documentation, sample preservation, and holding time compliance)

6.1.1 Method Holding Times

Analytical methods have prescribed holding times. The method holding time is defined as the maximum amount of time after collection that a sample may be held prior to extraction and/or analysis. Sample integrity becomes questionable for samples extracted and/or analyzed outside of the prescribed holding times due to degradation and/or volatilization of the sample. The QA/QC review identifies results with exceeded method holding times. No analytical method holding times were exceeded during the groundwater sample analysis during the current reporting period.

6.1.2 Method Blanks

Method blanks are prepared in the laboratory using deionized, distilled (Reagent Grade Type II) water. Method blanks are extracted and/or analyzed following the same procedures as an environmental sample. Analysis of the method blank indicates potential sources of contamination from laboratory procedures (e.g. contaminated reagents, improperly cleaned laboratory equipment) or persistent contamination due to the presence of certain compounds in the ambient

laboratory environment. The QA/QC review identifies method blanks with detections of target analytes and evaluates the effect of the detections on associated sample results.

6.1.3 Trip Blanks

Trip blanks are samples of deionized, distilled (Reagent Grade Type II) water that are prepared in the laboratory, taken to the field, retained on site throughout sample collection, returned to the laboratory, and analyzed with the environmental samples. The QA/QC review identifies trip blanks with detections of target analytes and evaluates the effect of the detections on associated sample results.

6.1.4 Matrix Spikes and Laboratory Control Samples

Matrix spikes (MS), matrix spike duplicates (MSD), laboratory control samples (LCS) and laboratory control sample duplicates (LCSD) are analyzed by the laboratory to evaluate the accuracy and precision of the sample extraction and analysis procedures and to evaluate potential matrix interference. Matrix interference, the effect of the sample matrix on the analysis, may partially or completely mask the response of analytical instrumentation to the target analyte(s). Matrix interference may have a varying impact on the accuracy and precision of the extraction and/or analysis procedures, and may bias the sample results high or low.

The MS or MSD is prepared by adding a known quantity of the target compound(s) to a sample. The sample is then extracted and/or analyzed as a typical environmental sample and the results are reported as percent recovery. The spike percent recovery is defined as:

$$\text{Recovery (\%)} = \frac{\text{spike analysis result - original sample concentration}}{\text{concentration of spike addition}} \text{x100\%}$$

MS and MSD recoveries are reviewed for compliance with laboratory-established control limits to evaluate the accuracy of the extraction and/or analysis procedures.

LCS and LCSD are prepared exactly like MS and MSD using a clean control matrix rather than an environmental sample. Typical control matrices include Reagent Grade Type II water and clean sand. LCS and LCSD are used to evaluate laboratory accuracy independent of matrix effects.

The QA/QC review identifies spike recoveries outside laboratory control limits and evaluates the effect of these recoveries on the associated sample results.

6.1.5 Laboratory Duplicate Analyses

Duplicate analyses are performed by the laboratory to evaluate the precision of analytical procedures. The laboratory may perform MSD and/or LCSD analyses.

Precision is evaluated by calculating a relative percent difference (RPD) using the following equation:

$$\text{RPD (\%)} = \left| \frac{(\text{Spike Concentration} - \text{Spike Duplicate Concentration})}{\frac{1}{2}(\text{Spike Concentration} + \text{Spike Duplicate Concentration})} \right| \times 100\%$$

The RPD is compared to laboratory-established control limits to evaluate analytical precision. The QA/QC review identifies RPDs outside laboratory control limits and evaluates the effect of these recoveries on the associated sample results.

6.1.6 Field Duplicate Analyses

Field duplicate samples are collected in the field and analyzed to evaluate the heterogeneity of the matrices. Field duplicate samples were not collected for this project.

6.1.7 Surrogate Recoveries

Surrogates are organic compounds that are similar to the target analytes in terms of their chemical structures and response to the analytical instrumentation, but are not usually detected in environmental samples. Surrogates are added to each environmental and laboratory QC sample to monitor the effect of the matrix on the accuracy of the extraction and/or analysis of organic analytes. Results for surrogate analyses are reported in terms of percent recovery (defined above). Reported recoveries are compared to laboratory-established control limits to evaluate sample-specific accuracy. The QA/QC review identifies surrogate recoveries outside laboratory control limits and evaluates the effect of these recoveries on the sample results.

6.2 EXPLANATION OF ANALYTICAL DATA QUALIFIERS

The analytical data were reviewed and qualified following USEPA guidelines for organic data review (USEPA, 1999). A "J" qualifier indicates that the analyte was positively identified, but that the associated numerical value is an approximate concentration of the analyte in the sample. A "UJ" qualifier indicates that the analyte was not detected above the reported sample quantitation limit (i.e., the laboratory reporting limit), however, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. An "R" qualifier indicates that the sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria, and therefore, the presence or absence of the analyte could not be verified.

6.3 SUMMARY OF QA/QC REVIEW FINDINGS

The results of the data evaluation are summarized in the following paragraphs.

Eight soil sample jars were found to be broken upon receipt by the laboratory, due to poor packaging and shipment procedures. Soil sample CP-SB3-1-1.5 was submitted at the same time as the sample jars that were broken, but the laboratory did not have any record of having received this sample, and therefore it was concluded that the sample was probably among the sample jars that were broken during shipment. These samples were recollected during the follow-on phase of work at the site. In addition, some of the coolers arrived at the laboratory with elevated temperatures ranging from 7.9 degrees Celsius to 15.1 degrees Celsius. Samples were not qualified based on the elevated temperatures noted in the coolers. Fourteen soil samples were noted by the laboratory as having headspace in the jars. The laboratory did not quantify the amount of headspace in each jar, and it was concluded that the headspace was due to the soil samples setting in the jars during sample shipment.

For soil samples CP-SB1-0.5-1, CP-SB10-1-1.5, CP-SB10-5.5-6, CP-SB10-15.5-16 and CP-SB10-19.5-20, the GC/MS volatile internal standard peak areas were outside the QC limits for both the initial analysis by US EPA Method 8260B and the re-analysis. The laboratory confirmed that the internal standards that failed method criteria were less than 50 percent recovery. VOCs were not detected in any of the samples, and so the non-detections were qualified with UJ, indicating that the analytes were not detected above the reporting limit,

however, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analytes in the sample.

All reported results for the laboratory method blanks were non-detect (less than the laboratory reporting limit), indicating no evidence of contamination from laboratory instrumentation. All reported results for the trip blanks were non-detect (less than the laboratory reporting limit), indicating no evidence of contamination during shipping of the laboratory samples. Since field duplicate samples were not collected, it was not possible to verify that the sample matrix was homogeneous and the results repeatable.

All reported laboratory control sample (LCS), matrix control sample (MS) and surrogate spike recoveries were within laboratory QC limits, with the exception of the following surrogate spike recoveries, which required qualification:

- Low trifluorotoluene surrogate recoveries were noted in samples CP-SB8-0.5-1, HSA-2-9.5-10.0, CP-SB15-1-1.5, CP-SB16-0.5-1, CP-SB17-1-1.5, CP-SB18-1-1.5, CP-SB18-2-2.5, CP-SB18-5-5.5, CP-SB18-8.5-9, CP-SB18-0.5-1, CP-SB19-0.5-1, CP-SB19-1-1.5 and CP-SB19-2-2.5 due to the dilutions needed to perform the analysis. The TPH-gas results in samples CP-SB8-0.5-1, CP-SB17-1-1.5, CP-SB18-1-1.5, CP-SB18-2-2.5, CP-SB18-5-5.5, CP-SB18-8.5-9, CP-SB18-0.5-1, CP-SB19-0.5-1, CP-SB19-1-1.5 and CP-SB19-2-2.5 were qualified with a J, indicating that the analyte was positively identified, but that the associated numerical value is an approximate concentration of the analyte in the sample. The TPH-gas non-detections in samples HSA-2-9.5-10.0, CP-SB15-1-1.5 and CP-SB16-0.5-1 were qualified with a UJ, indicating that the analyte was not detected above the reporting limit, however, the reporting limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
- Low trifluorotoluene surrogate recovery was noted in sample CP-SB1-0.5-1 due to the dilution needed to perform the analysis. Since the surrogate recovery was less than 10%, the TPH-gas non-detection in this sample was qualified with an R, indicating that the sample result was rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria, and therefore, the presence or absence of the analyte could not be verified.

- Low 4-bromofluorobenzene surrogate recovery was noted in sample HSA-2-50.0-50.5. The toluene and xylenes detections in this sample were qualified with a J, indicating that the analytes were positively identified, but that the associated numerical values are approximate concentrations of the analytes in the sample. The benzene, ethylbenzene and oxygenate non-detections in this sample were qualified with a UJ, indicating that the analytes were not detected above the reporting limits, however, the reporting limits are approximate and may or may not represent the actual limits of quantitation necessary to accurately and precisely measure the analytes in the sample.
- High toluene surrogate recovery was noted in sample CP-SB19-1-1.5 due to the dilution needed to perform the analysis. The benzene, toluene, ethylbenzene and xylene detections in this sample were qualified with a J, indicating that analytes were positively identified, but that the associated numerical values are approximate concentrations of the analytes in the sample.

Chain-of-custody documentation is complete and consistent. Samples were preserved as required per method specifications. All samples were analyzed within method specified holding times. Based on the data quality evaluation, no systematic problems were detected and the overall data objectives for sample contamination, precision, accuracy, and sample integrity were met. These analytical data are of acceptable quality and may be used for their intended purposes.

Based on the field PID results and the laboratory analytical results, the highest gasoline concentrations in soil were found in the hillside beneath the dirt road. Even though the steep slope hinders a full exploration of the hillside to reach groundwater, the release area appears to extend down the hillside between the dirt road and Calaveras Road. Based on the results of the subsurface investigation, URS has installed a soil vapor extraction (SVE) system on the dirt road as an interim remedial measure to remove the gasoline as soon as possible.

The three groundwater monitoring wells (MW-1 through MW-3) will be sampled quarterly until conditions have stabilized. The free product found in MW-1 will be bailed weekly, and the need for a more permanent system to remove the gasoline will be evaluated.

A Biological Resource Impact Assessment was conducted and is attached in Appendix A.

The slope below the release location that was exposed during the emergency response activities has been revegetated. Wattles were installed across the slope to prevent erosion, and the slope was hydroseeded according to the Erosion Control and Revegetation Plan (see Appendix B).

Additional activities currently being considered include the following:

- Installation of additional groundwater monitoring wells to investigate the impact of groundwater immediately downgradient from the source area.
- Installation of additional groundwater monitoring wells between the Valley Crest Tree Company property and Alameda Creek.
- Assessment of future remedial options.

No evaluation is thorough enough to preclude the presence of materials that currently or in the future may be considered hazardous at a site. Because regulatory evaluation criteria are constantly changing, concentrations of contaminants presently considered nonhazardous may, in the future, fall under different regulatory standards that require remediation. Opinions and judgments expressed herein, which are based on understanding and interpretation of current regulatory standards, should not be construed as legal opinions. This document and the information contained herein have been prepared solely for the use of Chevron Pipeline, and reliance on this report by third parties shall be at such party's sole risk.

California Division of Mines and Geology. 1966. *Geologic Map of California.* San Jose sheet.

Dibblee, T.W. 1980. United States Geological Survey Open File Report 80-533A, Preliminary Geologic Map of the La Costa Valley Quadrangle.

URS. 2005. Biological Impact Resource Assessment (included in Appendix A). Memorandum. Subtask 1 of Task 7. Prepared by Jason Pearson, Biologist, URS Corporation for Jeff Cosgray, Chevron Pipeline Company. October 10.

URS. 2005. Erosion Control and Revegetation Plan (included in Appendix B). Remediation of Sunol Release, Bay Area Product Line (BAPL), Chevron Pipe Line Company, Alameda County, CA. Prepared by Jason Pearson, Biologist, URS Corporation for Jeff Cosgray, Chevron Pipeline Company. December 2.

Table 1A
MW-1 Fluid Levels & Well Details
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

MW-1

Date	Time	Product Level	Water Level	Product Thickness	Total Depth	Product Elevation	Water Elevation	Comments
10/27/2005	14:45	NM	37.77	--	39.63	--	290.27	Prior to well development
11/10/2005	9:20	37.68	37.85	0.17	39.62	290.36	290.19	Well has been developed

Well Details:
Date Completed: October 20, 2005
The ground surface elevation as measured on October 31, 2005 is 328.49 feet above average mean sea level.
The top of casing-north (TOC-N) elevation as measured on October 31, 2005 is 328.04 feet above average mean sea level.
Well coordinates (California Coordinate System Zone 3 NAD83 Datum): Northing: 2025761.69 Easting: 6168139.39
Screen interval is 28.93-38.93 feet below TOC-N.

Notes:
All values are presented in feet
Product and groundwater levels measured from the TOC-N.
NM - Not measured

Table 1B
MW-2 Fluid Levels & Well Details
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA
MW-2

Date	Time	Product Level	Water Level	Product Thickness	Total Depth	Product Elevation	Water Elevation	Comments
10/27/2005	9:20	NM	33.81	--	38.75	--	290.34	Prior to well development
11/10/2005	9:35	--	33.77	--	38.75	--	290.38	Well has been developed

Well Details:
Date Completed: October 21, 2005
The ground surface elevation as measured on October 31, 2005 is 324.85 feet above average mean sea level.
The top of casing-north (TOC-N) elevation as measured on October 31, 2005 is 324.15 feet above average mean sea level.
Well coordinates (California Coordinate System Zone 3 NAD83 Datum): Northing: 2025712.03 Easting: 6168115.96
Screen interval is 23.05-38.05 feet below TOC-N.

Notes:
All values are presented in feet
Product and groundwater levels measured from the TOC-N.
NM - Not measured

Table 1C
MW-3 Fluid Levels & Well Details
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

MW-3

Date	Time	Product Level	Water Level	Product Thickness	Total Depth	Product Elevation	Water Elevation	Comments
10/27/2005	12:40	--	Dry	--	NM	--	--	
11/10/2005	9:30	36.335	36.34	0.005	37.54	289.315	289.31	Prior to development

Well Details:
Date Completed: October 21, 2005
The ground surface elevation as measured on October 31, 2005 is 326.05 feet above average mean sea level.
The top of casing-north (TOC-N) elevation as measured on October 31, 2005 is 325.65 feet above average mean sea level.
Well coordinates (California Coordinate System Zone 3 NAD83 Datum): Northing: 2025767.15 Easting: 6168083.90
Screen interval is 21.84-36.84 feet below TOC-N.

Notes:
All values are presented in feet
Product and groundwater levels measured from the TOC-N.
NM - Not measured

Table 2
Summary Soil Analytical Results
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

Sample ID	Sample Depth	TPH-g	Benzene	Toluene	Ethylbenzene	Xylene (Total)	MTBE	Lead
	ft bgs	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CP-SB-1	0.5-1	<1.0 R	<0.0005	**0.002**	**0.001**	**0.009**	<0.0005	**23.9**
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	**4.66**
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5.5-6	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15.5-16	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	30-30.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
CP-SB-2	0.5-1	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	**13.9**
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	**8.69**
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5-5.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	10-10.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	20-20.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	30-30.5	<1.0	<0.0005	<0.001	<0.001	**0.003**	<0.0005	NA
CP-SB-3	0.5-1	**3.0**	<0.0005	<0.001	<0.001	<0.001	<0.0005	**29.1**
	2-2.5	<1.0	<0.0005	**0.004**	<0.001	**0.002**	<0.0005	NA
	5-5.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	**1.7**	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	24.5-25	<1.0	<0.0005	<0.001	<0.001	**0.001**	<0.0005	NA
CP-SB-4	0.5-1	<1.0	<0.0005	**0.003**	<0.001	**0.001**	<0.0005	**11.9**
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	2-2.5	<1.0	<0.0005	**0.004**	<0.001	**0.002**	<0.0005	NA
	5-5.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	<1.0	<0.0005	<0.001	<0.001	**0.002**	<0.0005	NA
	14.5-15	<1.0	<0.0005	<0.001	<0.001	**0.002**	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	**0.001**	<0.0005	NA
	24.5-25	<1.0	<0.0005	<0.001	<0.001	**0.002**	<0.0005	NA
CP-SB-5	0.5-1	<1.0	<0.0005	<0.001	<0.001	**0.002**	<0.0005	**8.93**
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	**6.98**
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5.5-6	<1.0	<0.0005	<0.001	<0.001	**0.005**	<0.0005	NA
	9.5-10	<1.0	<0.0005	<0.001	<0.001	**0.003**	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	**0.001**	<0.0005	NA
	25-25.5	<1.0	<0.0005	**0.003**	<0.001	**0.005**	<0.0005	NA

Table 2
Summary Soil Analytical Results
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

Sample ID	Sample Depth ft bgs	TPH-g mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene (Total) mg/kg	MTBE mg/kg	Lead mg/kg
CP-SB-6	0.5-1	<1.0	<0.0005	**0.003**	<0.001	**0.001**	<0.0005	**5.74**
	1-1.5	<1.0	**0.0007**	**0.003**	<0.001	<0.001	<0.0005	**3.93**
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5.5-6	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
CP-SB-7	0.5-1	<1.0	<0.0005	**0.003**	<0.001	**0.001**	<0.0005	**12.1**
	1-1.5	<1.0	<0.0005	**0.004**	<0.001	**0.002**	<0.0005	**5.29**
	2-2.5	<1.0	<0.0005	**0.003**	<0.001	**0.002**	<0.0005	NA
	5.5-6	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
CP-SB-8	0.5-1	**180 J**	<0.0005	<0.001	**0.01**	**0.29**	<0.0005	**6.39**
	1-1.5	**4.8**	**0.001**	**0.001**	<0.001	**0.017**	<0.0005	**4.54**
	2-2.5	<1.0	**0.001**	**0.013**	<0.001	**0.004**	<0.0005	NA
	5.5-6	<1.0	<0.0005	**0.002**	<0.001	<0.001	<0.0005	NA
	9.5-10	<1.0	<0.0005	**0.002**	<0.001	**0.001**	<0.0005	NA
	15-15.5	<1.0	<0.0005	**0.002**	<0.001	**0.002**	<0.0005	NA
	19.5-20	**8.5**	**0.008**	**0.011**	**0.003**	**0.030**	<0.0005	NA
CP-SB-9	0.5-1	**1.4**	<0.0005	<0.001	<0.001	**0.003**	<0.0005	**6.4**
	1-1.5	<1.0	**0.0007**	**0.001**	<0.001	**0.004**	<0.0005	**5.25**
	2-2.5	<1.0	<0.005	**0.004**	<0.001	**0.009**	<0.0005	NA
	5.5-6	<1.0	**0.002**	**0.027**	<0.001	**0.01**	<0.0005	NA
	9.5-10	<1.0	**0.009**	**0.029**	<0.001	**0.001**	<0.0005	NA
	15.5-16	<1.0	**0.001**	**0.003**	<0.001	**0.001**	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25.5-26	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
CP-SB-10	0.5-1	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	**6.13**
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	**0.757**
	2.5-3	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5.5-6	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15.5-16	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	29.5-30	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	35-35.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	39-39.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA

Table 2
Summary Soil Analytical Results
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

Sample ID	Sample Depth ft bgs	TPH-g mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene (Total) mg/kg	MTBE mg/kg	Lead mg/kg
CP-SB-11	0.5-1	<1.0	<0.0005	<0.001	<0.001	0.015	<0.0005	NA
	1-1.5	<1.0	<0.0005	<0.001	<0.001	0.013	<0.0005	NA
	2.5-3	<1.0	<0.0005	<0.001	<0.001	0.013	<0.0005	NA
	5.5-6	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	10-10.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15.5-16	<1.0	0.0008	0.011	0.001	0.011	<0.0005	NA
	19.5-20	2.4	0.002	0.030	0.007	0.057	<0.0005	NA
CP-SB-12	0.5-1	<1.0	<0.0005	<0.001	<0.001	0.001	<0.0005	NA
	1-1.5	<1.0	<0.0005	<0.001	<0.001	0.001	<0.0005	NA
	2-2.5	<1.0	<0.0005	<0.001	<0.001	0.005	<0.0005	NA
	5-5.5	<1.0	<0.0005	<0.001	<0.001	0.002	<0.0005	NA
	10-10.5	<1.0	<0.0005	0.003	<0.001	0.008	<0.0005	NA
	15-15.5	3.7	0.001	0.017	0.003	0.069	<0.0005	NA
	19.5-20	1.0	<0.0005	<0.001	<0.001	0.005	<0.0005	NA
CP-SB-13	0.5-1	<1.0	<0.0005	<0.001	<0.001	0.003	<0.0005	NA
	1-1.5	<1.0	<0.0005	<0.001	<0.001	0.008	<0.0005	NA
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5-5.5	<1.0	<0.0005	0.006	<0.001	0.012	<0.0005	NA
	10-10.5	<1.0	<0.0005	0.008	<0.001	0.017	<0.0005	NA
CP-SB-14	0.5-1	<1.0	<0.0005	0.009	<0.001	0.016	<0.0005	NA
	1-1.5	<1.0	<0.0005	<0.001	<0.001	0.005	<0.0005	NA
	2-2.5	<1.0	<0.0005	0.01	0.001	0.028	<0.0005	NA
CP-SB-15	0.5-1	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	1-1.5	<1.0 UJ	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	2.5-3	<1.0	0.0005	0.009	<0.001	0.005	<0.0005	NA
	5-5.5	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	10-10.5	<1.0	<0.0005	0.005	<0.001	0.002	<0.0005	NA
CP-SB-16	0.5-1	<4.0 UJ	0.0006	0.01	0.001	0.005	<0.0005	NA
	1-1.5	<1.0	0.001	0.017	0.001	0.007	<0.0005	NA
	2-2.5	1.1	0.002	0.028	0.001	0.007	<0.0005	NA
	5-5.5	1.4	0.0007	0.011	<0.001	0.004	<0.0005	NA
	9-9.5	6.6	0.003	0.043	<0.001	0.017	<0.0005	NA
CP-SB-17	0.5-1	7.7	0.003	0.049	<0.001	0.4	<0.0005	NA
	1-1.5	16 J	0.002	0.075	0.002	1.7	<0.0005	NA
	2-2.5	17	0.002	0.059	<0.001	1.7	<0.0005	NA
	5-5.5	15	0.001	0.019	<0.001	0.22	<0.0005	NA
CP-SB-18	0.5-1	180 J	0.004	0.027	<0.005	0.47	<0.003	NA
	1-1.5	21 J	0.004	0.027	<0.005	0.81	<0.003	NA
	2-2.5	30 J	<0.063	0.45	<0.13	4.1	<0.063	NA
	5-5.5	25 J	0.001	0.006	0.001	0.071	<0.001	NA
	8.5-9	36 J	0.096	1.3	<0.13	2.9	<0.063	NA
CP-SB-19	0.5-1	11,000 J	3.9	420	250	950	<0.62	NA
	1-1.5	17,000 J	9.4 J	1200 J	350 J	2,700 J	<0.62	NA
	2-2.5	11,000 J	6	560	260	1,200	<0.62	NA

Table 2
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Sunol, CA

Sample ID	Sample Depth ft bgs	TPH-g mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene (Total) mg/kg	MTBE mg/kg	Lead mg/kg
CP-SB-20	0.5-1	5.8	<0.0005	0.004	<0.001	0.027	<0.0005	NA
	1-1.5	10	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	2-2.5	3.5	<0.0005	0.003	<0.001	0.008	<0.0005	NA
	5-5.5	8.3	<0.0005	0.003	<0.001	0.012	<0.0005	NA
	10-10.5	<1.0	<0.0005	0.001	<0.001	0.001	<0.0005	NA
	15-15.5	<1.0	0.0009	0.009	<0.001	0.003	<0.0005	NA
	19.5-20	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	0.001	<0.001	<0.001	<0.0005	NA
	30-30.5	<1.0	<0.0005	0.001	<0.001	<0.001	<0.0005	NA
CPSB-21	0.5-1	<1.0	<0.0005	0.009	0.001	0.006	<0.0005	NA
	1.5-2	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	2.5-3	<1.0	<0.0005	0.001	<0.001	<0.001	<0.0005	NA
	5-5.5	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	10-10.5	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	0.001	<0.001	<0.001	<0.0005	NA
	38-38.5	4.1	0.001	0.025	0.006	0.047	<0.0005	NA
CP-SB-22	05.-1	<1.0	0.0007	0.017	0.002	0.009	<0.0005	NA
	1-1.5	<1.0	0.0008	0.018	0.002	0.009	<0.0005	NA
	2-2.5	<1.0	<0.0005	0.006	<0.001	0.004	<0.0005	NA
	5.5-6	<1.0	<0.0005	0.001	<0.001	<0.001	<0.0005	NA
CPSB-23	0.5-1	<1.0	<0.0005	0.006	<0.001	0.002	<0.0005	NA
	1-1.5	<1.0	<0.0005	0.009	<0.001	0.005	<0.0005	NA
	2-2.5	<1.0	<0.0005	0.003	<0.001	0.001	<0.0005	NA
	5-5.5	<1.0	<0.0005	0.003	<0.001	0.002	<0.0005	NA
	8.5-9	<1.0	<0.0005	0.004	<0.001	0.002	<0.0005	NA
CP-SB-24	0.5-1	<1.0	0.002	0.052	0.007	0.046	<0.0005	NA
	1-1.5	<1.0	0.001	0.029	0.004	0.024	<0.0005	NA
	2-2.5	<1.0	0.0006	0.017	0.002	0.013	<0.0005	NA
CP-SB-25	0.5-1	<1.0	<0.0005	0.022	0.001	0.006	<0.0005	NA
	1.5-2	<1.0	<0.0005	0.02	0.002	0.008	<0.0005	NA
	2.5-3	<1.0	<0.0005	0.009	0.001	0.006	<0.0005	NA
	5-5.5	<1.0	<0.0005	0.002	<0.001	<0.001	<0.0005	NA
	10-10.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	19.5-20	<1.0	<0.0005	0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	35-35.5	<1.0	<0.0005	0.008	<0.001	0.003	<0.0005	NA

Table 2
Summary Soil Analytical Results
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Sample ID	Sample Depth ft bgs	TPH-g mg/kg	Benzene mg/kg	Toluene mg/kg	Ethylbenzene mg/kg	Xylene (Total) mg/kg	MTBE mg/kg	Lead mg/kg
CP-SB-26	0.5-1	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	1.5-2	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	2.5-3	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	5-5.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	10-10.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	15-15.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	20-20.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	25-25.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	30-30.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
CP-SB-27	37.5-38	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
HSA-1	0.5-1	<1.0	<0.0005	**0.001**	<0.001	**0.001**	<0.0005	NA
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.8-10.4	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	20-20.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
HSA-2	0.5-1	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	1-1.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	2-2.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	9.5-10	<4.0 UJ	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	20-20.5	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	45-45.5	<1.0	<0.0005	**0.002**	<0.001	**0.002**	<0.0005	NA
	50-50.5	<1.0	<0.0005 UJ	**0.003 J**	<0.001 UJ	**0.002 J**	<0.0005 UJ	NA
MW-1	38.5-39	<1.0	**0.003**	**0.025**	**0.003**	**0.017**	<0.0005	NA
CP-AR-2	18.5-19	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
	28.5-29	<1.0	<0.0005	**0.002**	<0.001	<0.001	<0.0005	NA

Notes On Qualifiers:

J - A "J" qualifier indicates that the analyte was positively identified, but that the associated numerical value is an approximate concentration of the analyte in the sample.

UJ - A "UJ" qualifier indicates that the analyte was not detected above the reported sample quantitation limit (i.e., the laboratory reporting limit), however, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.

R - An "R" qualifier indicates that the sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet quality control criteria, and therefore, the presence or absence of the analyte could not be verified.

Table 3
Summary Groundwater Analytical Results
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

Sample ID	Sample Depth	TPH-g	Benzene	Toluene	Ethylbenzene	Xylene (Total)	MTBE
	ft bgs	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
CP-SB-11-GW	--	**170,000**	**2,400**	**24,000**	**4,500**	**23,000**	<25
CP-SB-12-GW	--	**20,000**	**1,000**	**5,700**	**480**	**3,700**	<5
CP-SB-20-GW	--	**570,000**	**6,800**	**64,000**	**9,000**	**45,000**	<100
CP-SB-25-GW	--	**450**	**2**	**12**	**1**	**6**	<0.5
CP-MW-1-GW	39	**120,000**	**2,200**	**24,000**	**3,400**	**19,000**	<25
CP-MW-2-GW	--	**210**	**21**	**9**	**1**	**38**	<50
CP-MW-3-GW	--	<50	<0.5	<0.5	<0.5	<0.5	<0.5
CP-SW-Creek	0	<50	<0.5	<0.5	<0.5	<0.5	<0.5

Table 4A
Waste Profiling Soil Analytical Results
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

Sample ID	Sample Type	TPH-g	Benzene	Toluene	Ethylbenzene	Xylene (Total)	MTBE	Lead
		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
CP-Rancher1,2-WP	Composite	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA
CP-Nursery1,2,3,5,6,7,8,11-WP	Composite	<1.0	<0.0005	<0.001	<0.001	<0.001	<0.0005	NA

Notes:
Soil sample CP-Rancher1,2-WP is a composite sample of 2 discrete soil samples from 2 55-gallon drums stored on the rancher's property on the east side of Calaveras Rd:
1) CP-Rancher1-WP was collected from soil cuttings obtained during the subsurface investigation along Calaveras Rd on 8/25/05-8/29/05

2) CP-Rancher2-WP was collected from soil cuttings obtained during the subsurface investigation on the hillside above Calaveras Rd on 10/11/05-10/25/05.

Soil sample CP-Nursery1,2,3,5,6,7,8,11-WP is a composite sample of 8 discrete soil samples from 7 55-gallon drums and a roll-off box stored on the Valley Crest Tree Co. property on the west side of Calaveras Rd:
1) CP-Nursery1-WP was collected from soil cuttings derived from boring HSA-1 on 10/11/05.
2) CP-Nursery2-WP was collected from soil cuttings derived from boring HSA-1 on 10/11/05.
3) CP-Nursery3-WP was collected from soil cuttings derived from boring AR-2 on 10/19/05.
4) CP-Nursery5-WP was collected from soil cuttings derived from boring HSA-2 on 10/11/05.
5) CP-Nursery6-WP was collected from soil cuttings derived from boring HSA-2 on 10/11/05.
6) CP-Nursery7-WP was collected from soil cuttings derived from boring AR-2 on 10/19/05.
7) CP-Nursery8-WP was collected from soil cuttings derived from boring HSA-2 on 10/11/05.
8) CP-Nursery11-WP was collected from soil cuttings in a roll-off box derived from borings AR-1, AR-2, AR-3, and AR-4 on 10/19/05-10/21/05.

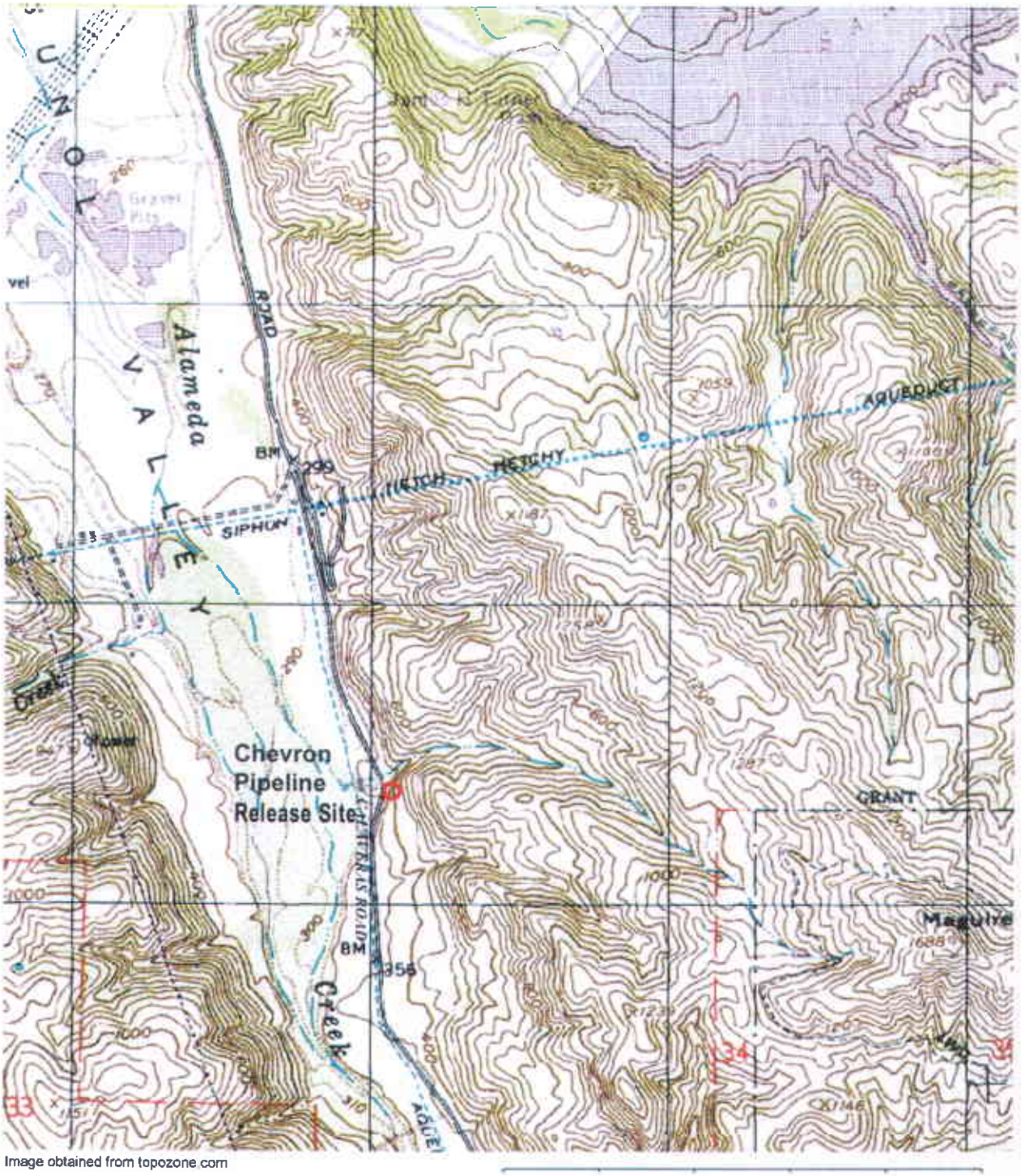
Table 4B
Waste Profiling Water Analytical Results
Subsurface Investigation Report
Chevron Pipeline Release
Sunol, CA

Sample ID	Sample Type	TPH-g	Benzene	Toluene	Ethylbenzene	Xylene (Total)	MTBE	Lead
		ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
CP-Rancher3-WP	Grab	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA
CP-Nursery9-WP	Grab	**190,000**	**1,900**	**30,000**	**5,000**	**35,000**	<25	NA
CP-Nursery4,10-WP	Composite	<50	<0.5	<0.5	<0.5	<0.5	<0.5	NA

Notes:
Water sample CP-Rancher3-WP is a discrete grab water sample from a 55-gallon drum containing decon water from the direct push investigation activities on the rancher's property and along the Calaveras Rd. ROW on 8/25/05-10/25/05.

Water sample CP-Nursery9-WP is a discrete grab water sample from a 55-gallon drum containing development water from MW-1 on 10/27/05.

Water sample CP-Nursery4,10-WP is a composite water sample from 2 55-gallon drums containing decon water from the augers used to drill HSA-2 on 10/11/05 and development water from MW-2 on 10/27/05 respectively.



MAP REFERENCE:

PORTION OF U.S.G.S. QUANDRANGLE MAP
7½ MINUTE SERIES (TOPOGRAPHIC)
LA COSTA VALLEY QUADRANGLE

URS	Chevron Pipeline Company Project No. 26815217	SITE VICINITY MAP	Figure 1

LEGEND:

- SURFACE WATER SAMPLE
- SOIL BORING
- MONITORING WELLS
- PIPELINE
- A — A' CROSS SECTION LINE

NORTH

UNNAMED CREEK

PROPERTY LINE/FENCE

SW-CREEK

SB-27

UNNAMED CREEK

SB-26

CALAVERAS RD.

DIRT ROAD

PIPELINE HILL SLOPE

HILL SLOPE

B

B'

SB-14

SB-13R

SB-13

SB-15

SB-16

SB-12

SB-17

SB-11

SB-18

SB-24

SB-19

RELEASE LOCATION

SB-22

SB-23

SB-20

A

A'

SB-21

SB-25

SB-1

SB-10

SB-2

SB-9

HSA-2

SB-3

SB-8

MW-3

MW-1

A

HSA-1

SB-4

SB-7

AR-2

MW-2

SB-5

SB-6

40' 0 40'

SCALE 1"= 40'

URS

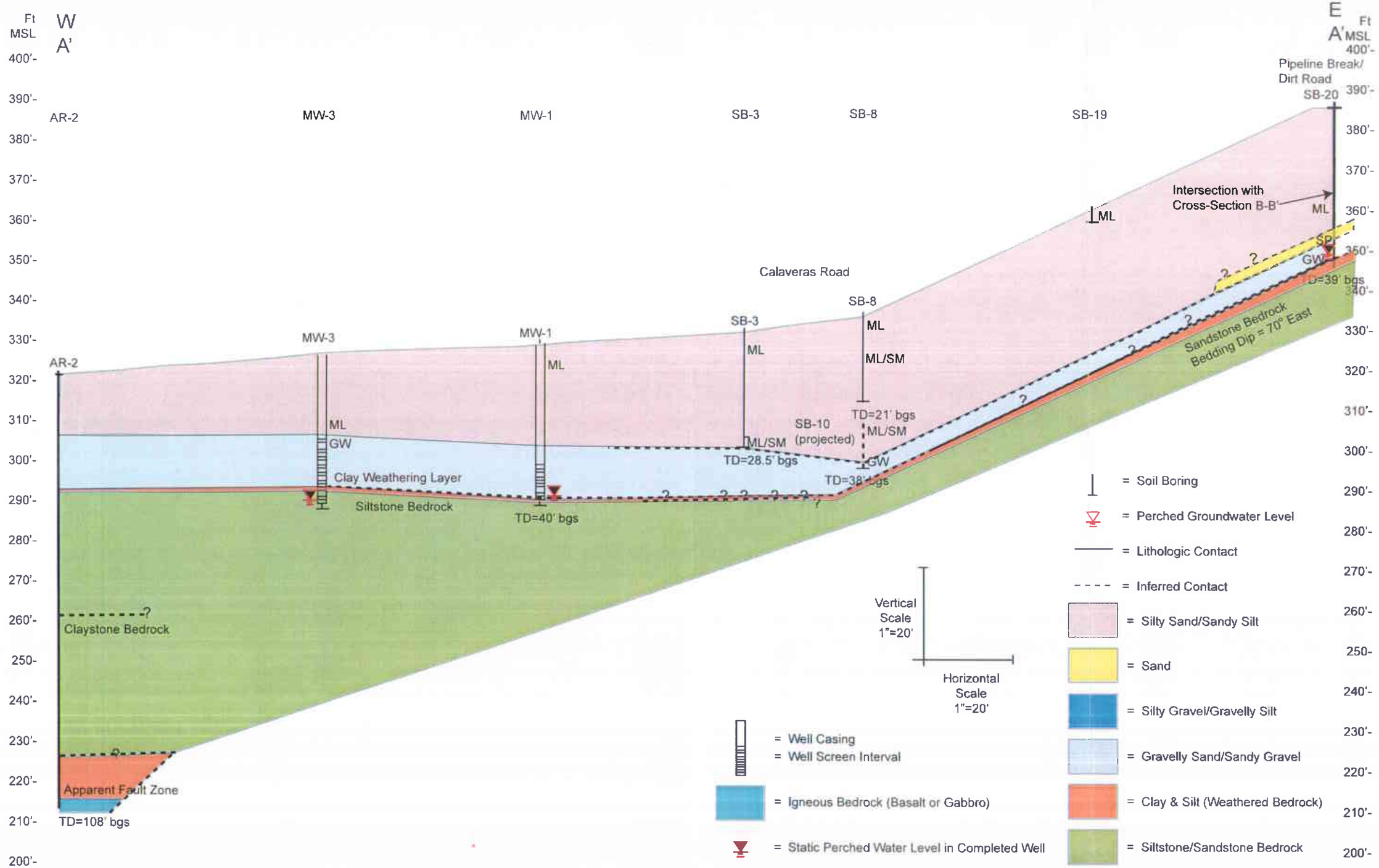
CHEVRON PIPELINE COMPANY

Project No. 26815217

SITE MAP & CROSS SECTION LINES

Figure 2

Dec 07, 2005 - 12:28pm
X:\x_env_waste\Chevron Pipe Line Company\Sunol Spill\Investigation Report\Figure 2_rev.dwg



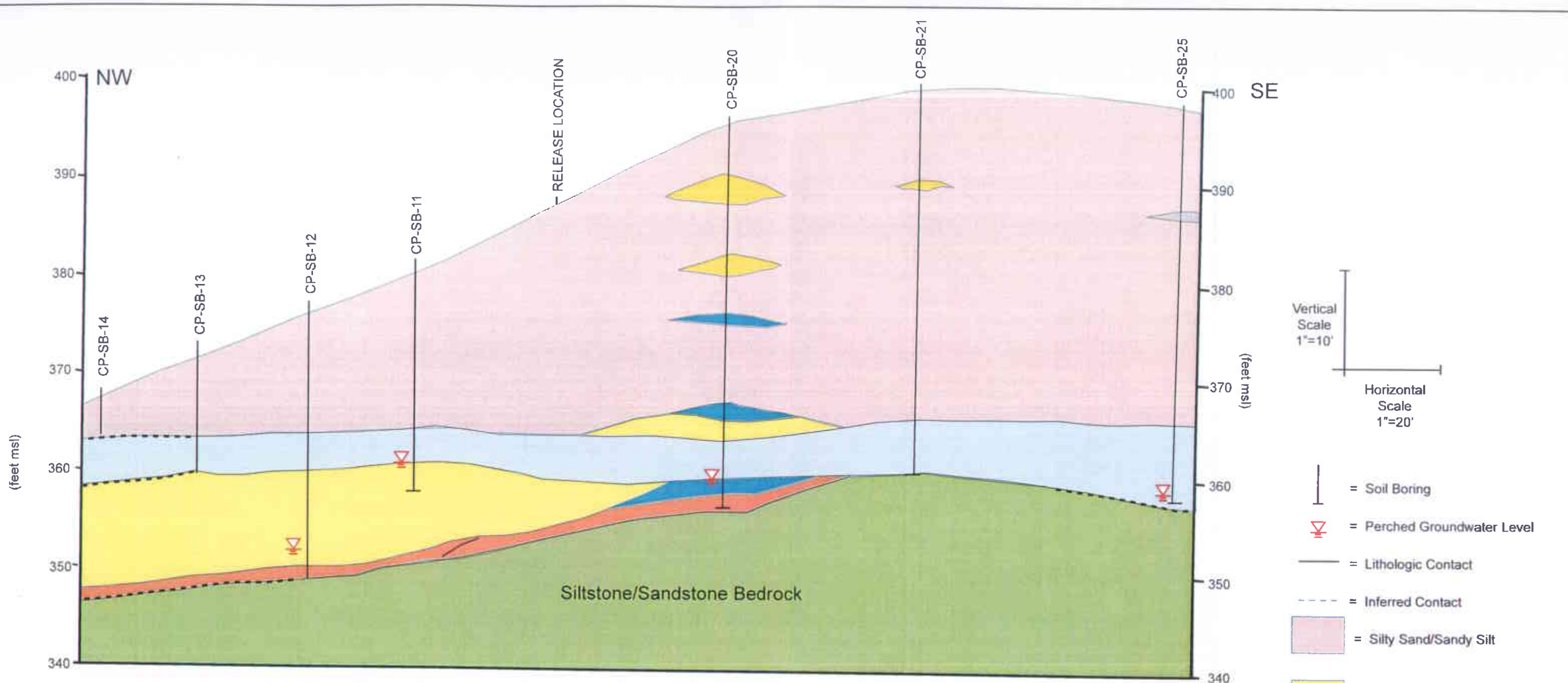
URS

Subsurface Investigation Report
Chevron Pipeline Release
Sunol, California

Project No. 26815217

CROSS SECTION A-A'

Figure 3



Notes
1) Elevation in feet above average mean sea level (msl).

	URS	Subsurface Investigation Report Chevron Pipeline Release Sunol, California Project No. 26815217	CROSS SECTION B-B'	Figure 4

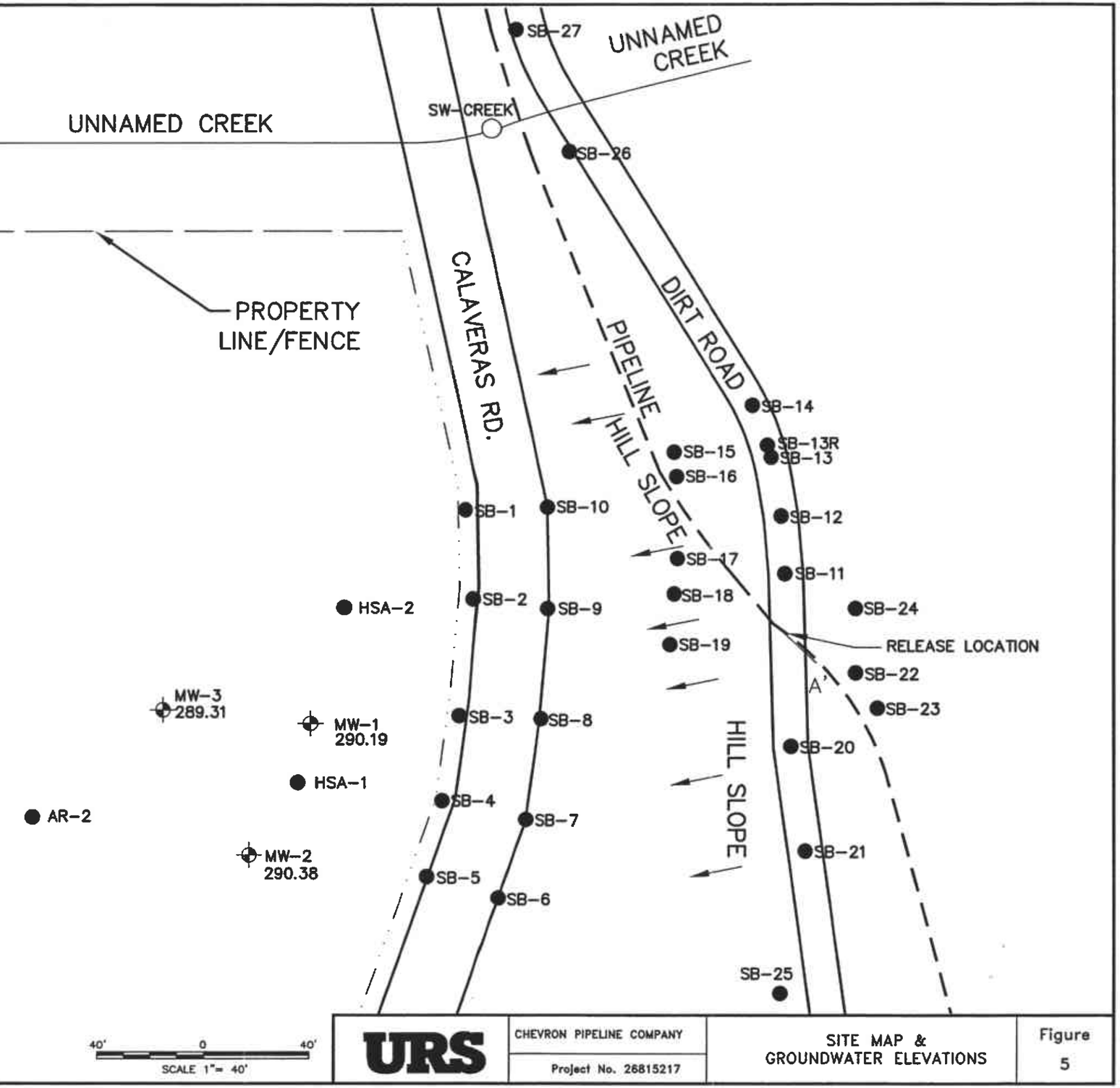
LEGEND:

- SURFACE WATER SAMPLE
- SOIL BORING
- MW-3 289.31 MONITORING WELLS WITH GROUNDWATER ELEVATION
- PIPELINE

NORTH

NOTES:

1. Groundwater elevations as measured on 11/10/05.
2. Monitoring well MW-3 has not been developed.
3. Water level not adjusted due to weight of product at MW-1.



URS	CHEVRON PIPELINE COMPANY	SITE MAP & GROUNDWATER ELEVATIONS	Figure 5
	Project No. 26815217		

Dec 05, 2005 - 6:31pm
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Appendix A
Biological Resource Impact Assessment

URS

Memorandum

Date: October 10, 2005

To: Mr. Jeff Cosgray
Chevron
Chevron Pipeline Company
2811 Hayes Road, Room 1366C
Houston, TX 77082-6696

From: Jason Pearson

Subject: ***Biological Resource Impact Assessment-Sub-Task 1 of Task 7***

Incident

A release of unleaded gasoline occurred on August 14, 2005 when a motor grader, that was grading a private dirt road, struck the Bay Area Product Line (BAPL). Approximately 700 barrels of gasoline were released onto the hill slope and roadway. The product sprayed into the air, coming into contact with a number of trees and affecting soils downslope and south of the pipeline break. The release was located east of the area between mileposts 2.7 and 2.8 of Calaveras Road, Sunol Valley, Valle de San Jose Mexican land grant (La Costa Valley Quadrangle) in Alameda County, California near Sunol, California.

Site Review Methods

On August 16, 2005, URS Biologist Kevin Fisher conducted an initial review of the release site. On August 25, 2005, URS Biologist Jason Pearson conducted a biological resource site assessment. The intent of the site assessment was to evaluate the effects of the spill on area vegetation, wildlife, and watercourses. Tree species were assessed by recording the diameter at breast height and estimating the percent of the canopy affected by the release. A database search of known locations of sensitive resources (e.g., special status species occurrences) was also conducted.

Site Description

The site is on a steep, west-facing slope with an 80 to 90 percent grade. Except for a plant nursery on the west side of Calaveras Road and downslope of the release, vegetation of the site is predominantly oak woodlands. Dominant tree species include coast live oak (*Quercus agrifolia*) which comprises 72 percent of the overstory cover, valley oak (*Quercus lobata*)-comprising 25 percent of the overstory, red willow (*Salix laevigata*)-comprising 1.5 percent of the overstory, and Mexican elderberry (*Sambucus mexicana*)-comprising 1.5% of the overstory. Understory vegetation in the vicinity east and north of the pipeline break consists mostly of ruderal grassland species including ripgut brome (*Bromus diandrus*), wild oats (*Avena* sp.), wild mustard (*Hirschfeldia incana*), yellow star thistle (*Centaurea solstitialis*), Italian thistle (*Carduus pycnocephalus*), and milk thistle (*Silybum marianum*). These understory species occur where active cattle grazing has occurred and the tree canopy is open. The southwestern portion of the project site (excluded from cattle grazing) has an understory predominately of poison oak (*Toxicodendron diversilobum*), California blackberry (*Rubus ursinus*), and ruderal grasses. A small ephemeral drainage which contained flow (less than 0.5 cubic feet per second) at the time of the release is located approximately 150 to 200 feet north of and downhill from the break location.

Findings
Potential impacts to trees were evaluated based on three criteria:

- signs of foliage chemical burn (i.e., leaf discoloration),
- defoliation, and
- proximity of less than 50 feet from the release (i.e., trees which may display impacts in the future).

Where tree foliage was directly contacted by product, chemical burns caused the leaf tissues to die within one week of exposure. Some of the trees had begun to defoliate within this time frame. A total of 35 trees ranging from 2 to 44.9 inches in diameter showed signs of burn. Of the trees affected, 21 trees showed signs of 1-25 percent of canopy exposure, 4 trees showed signs of 26-50 percent exposure, and 10 trees exhibited a 76-100 percent canopy exposure. Throughout the stand the exposure ranged from 1 to 100 percent with an average canopy exposure of 37 percent. While most of the ruderal grass species had already senesced for the season and thus showed no signs of chemical burning, other understory vegetation, particularly, poison oak exhibited the same chemical burning as the trees. In addition to the vegetation growing onsite, approximately 17 to 20 potted trees in the plant nursery across Calaveras Road appeared to have been partially affected by the release of the product.

Wildlife species observed in the near vicinity of the spill included wild turkey (*Meleagris gallopavo*), raccoon (*Procyon lotor*), red-tailed hawk (*Buteo jamaicensis*), turkey vulture (*Cathartes aura*), California ground squirrel (*Spermophilus beecheyi*), and dusky-footed woodrat (*Neotoma fuscipes*). There was no evidence (carcasses) of any wildlife mortality as a result of exposure to the petroleum product in the site vicinity. High levels of volatile organic compounds in or near the soil surface had the potential to harm smaller mammals, rodents, reptiles, or amphibians that live and find refuge in small burrows or other debris.

A search of the California Natural Diversity Database (CNDDB) indicates several special status species that or known from areas near the site. These species include: Coopers hawk (*Accipiter cooperii*), sharp-shinned hawk (*Accipiter striatus*), golden eagle (*Aquila chrysaetos*), American peregrine falcon (*Falco peregrinus anatum*), and Alameda whipsnake (*Masticophis lateralis euryxanthus*). Raptors (such as Coopers hawk, sharp-shinned hawk, golden eagle, and American peregrine falcon) may utilize the site for foraging for rodents and other small prey. No raptor nests were observed in the trees at the site of the spill, nor were any special status raptors seen during the site visit. The release occurred after the raptor-breeding season. Alameda whipsnakes are primarily associated with chaparral habitats, however may utilize oak woodland and grassland areas for foraging and thus, have potential to occur on site.

While no special status plant species were observed during the site visits, a search of local occurrences listed by the CNDDB indicate that two species have potential to occur on the site that are outside of their growing season. These special status plant species that may occur near the site of the spill include chaparral harebell (*Campanula exigua*) and Diablo helianthella (*Helianthella castanea*).

During the both site visits, no visible impacts to the nearby stream were observed. No burned foliage or dying vegetation was visible in the vicinity of the stream corridor. Most of the product released sprayed downslope and southwest of the break due to the position of the pipeline break and the prevailing southeasterly wind at the time of the release.

Expected Biological Effects

The trees in the vicinity of the spill will be assessed quarterly until Spring 2007 (December 2005, March 2006, June 2006, September 2006 and December 2006, and March 2007). It is expected that the tree foliage that was sprayed with the product will drop. Foliage may regenerate the following spring depending on the extent of the exposure. Trees that experienced high exposure may also suffer from root dieback. The combination of over exposure of foliage and roots to gasoline could reduce plant production and nutrient uptake, or possibly cause tree mortality.

Gasoline exposure on most understory vegetation that was burned or defoliated will in most cases kill the plants since these species lack sufficient energy stores and root systems or capabilities to re-sprout. Poison oak, however, is likely to loose its foliage and re-sprout the following spring unless exposure was very high in the root zone. Most of the understory vegetation were annuals that had completed their life cycle for the year. However, exposure of the seed bank to gasoline could reduce plant growth in Spring 2006. Following remediation of contaminated soils, revegetation of the understory with native grasses is recommended. If mortality of established oak trees is observed during the quarterly monitoring, a planting plan will be developed to mitigate for oak losses as required by the Alameda County Tree Ordinance, and the California Fish and Game Code.

Recommendations for erosion prevention and revegetation of the site will be provided in a separate erosion and revegetation plan.

Appendix B
Erosion Control and Revegetation Plan

Erosion Control and Revegetation Plan

Remediation of Sunol Release
Bay Area Product Line (BAPL)
Chevron Pipe Line Company
Alameda County, CA

December 2, 2005

Purpose

This report presents a plan for implementing erosion control and revegetation measures at the site of a gasoline release that occurred on August 14, 2005 on the Bay Area Product Line (BAPL).

In this erosion control plan, the Revised Universal Soil Loss Equation (RUSLE) is used to predict preexisting and post-construction erosional losses using various erosion control treatments. The plan describes revegetation procedures to replace herbaceous vegetation impacted by the release as well as woody vegetation. The California Fish and Game Code requires either off-site mitigation or on-site restoration of habitat losses, including habitat provided by oak woodlands. If tree mortality occurs as a result of the release or remediation efforts, the Alameda County Tree Ordinance and the California Fish and Game Code would require replacement of oak trees.

A monitoring and maintenance plan is also provided, which will evaluate the effectiveness of the erosion control and revegetation practices. This plan identifies a course of action if the goals and objectives of the erosion control and revegetation plan are not met.

Goals and Objectives

The goal of the erosion control plan is to avoid erosion so the post-remediation soil loss is equivalent to the estimated soil loss before the release. Minimal sediment deposition should occur at the base of the slope along Calaveras Road, or in the nearby stream channel. The plan should eliminate the formation of rills or gully erosion and slumping of the soil in the disturbed areas. Erosion control devices such as wattles should be correctly installed as per design criteria described in this plan. Erosion prevention measures should remain fixed in place as installed throughout the duration of the first year rainy season or until vegetation has become established.

The goal for revegetation of the disturbed site is to plant native seed that will provide at least 75 percent cover by the end of the first year rainy season. If tree mortality occurs as a result of the release, a sufficient number of native oak trees shall be planted to replace dead trees affected by the spill and site disturbance. These trees should be monitored periodically for survival and be replaced should they suffer mortality in the first year.

Site Description

The project area is adjacent to Calaveras Road on the east side of the road between mile markers 2.7 and 2.8 south of highway 680 in the Sunol Valley of the Valle de San Jose Mexican land grant (La Costa Valley Quadrangle) in Alameda County, California. The impact area consists mostly of a steep hill slope ranging between 80 and 90 percent grade (Figure 1). The western portion of the impact area includes a portion of Calaveras Road located on the footslope of the hill and Sunol Valley floor. An out-sloped graded dirt road cuts across the upper (eastern) portion of the project area. This road is sloped approximately 10 to 15 percent, draining towards the north.

Figure 1. The steep 84 percent slope immediately below the pipeline break (looking south and down slope towards Calaveras Road)

Vegetation

The vegetation prior to the pipeline break consisted mostly of oak woodland with a ruderal grasses in the understory. The northeastern portion of the project area has been grazed for some time. Grazing in this area has most likely prevented many oak seedlings or brush species from becoming established, thus the trees are larger and canopies are less dense than outside the fence line along the road right-of-way. Canopy closure is approximately 50 percent. The vegetative ground cover is approximately 60 percent and organic litter layer covers approximately 40 percent of the ground (Figure 1). The southwestern portion of the project located outside a fenced rangeland consists of smaller trees and a denser canopy cover (approximately 80 percent). The understory predominantly consists of ruderal grasses, poison oak (*Toxicodendron diversilobum*), and California blackberry (*Rubus ursinus*). This portion has an organic litter layer covering about 90 percent of the ground. Understory vegetative cover in this area is approximately 30 percent.

Figure 2. Photo showing a denser canopy of trees in the southern portion of the project area (looking north)

Soils Description

The U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) (formerly the Soil Conservation Service) soil survey for the Alameda County categorizes the soils as Danville silty clay loam on 3-10 percent slopes down to the footslope near Calaveras Road where the soil transitions to Yolo loam over gravel on 0-3 percent slopes (SCS 1966). The Danville silty clay loam is a well-drained soil with slow permeability. The Yolo loam over gravel is a well-drained soil with a moderate permeability. Onsite evaluation of the soil indicates that most of the soils found on the hillslope are Danville silty clay loam, a well-drained soil with a slow permeability and high runoff potential. The Yolo loam soil indicated in the soil survey more likely resides lower in the Sunol Valley floor or begins under Calaveras Road.

Site Remediation

Soil borings will be used to evaluate the level of contamination and to determine the extent of soil and/or ground water contamination. Analysis of the samples will indicate whether or not remediation will be necessary. If remediation requires disturbing the soil, care should be taken around existing trees to protect against root loss and soil compaction from equipment. These impacts may further stress the trees resulting in high mortality. Removed soils should be replaced with clean fill soil. It is suggested that at least the top

six inches of fill be clean topsoil that will not introduce a host of noxious weeds making revegetation more difficult and costly to achieve. Fill soils should be placed and compacted in no greater than eight inch lifts to prevent slope failure. Fill soil should be graded to the contour of the original slope. Surface soil should be roughened (not compacted or bladed smooth) to improve infiltration and revegetation.

Soil Loss Evaluation Using RUSLE

By using RUSLE, the type and amount of erosion and sedimentation control measures that meet or exceed the predicted pre-disturbance soil losses can be identified. RUSLE was developed in part by the Agricultural Research Service of the USDA is the primary erosion prediction tool used by the NRCS.

In order to assess the level of erosion control needed to protect the project area, the soils have been tested to predict preexisting erosional losses prior to the pipeline spill. Predicted preexisting losses are compared to losses following the implementation of erosion control practices. Revegetation measures are included in the analysis, however vegetative cover will not be present at the beginning of the rainy season and should not be relied upon in specifying the level of erosion control implemented. RUSLE is used to demonstrate that erosional loss rates following correct implementation of assigned erosion control practices are not greater than preexisting rates of soil loss.

Preexisting Soil Loss Calculation

RUSLE calculates total soil loss in tons per acre per year (A) using five factors including: soil erosivity (R), soil erodibility (K), length, and gradient of the slope (LS), cover management (C), and support practice (P). The general form of the equation is:

$$A = R \cdot K \cdot LS \cdot C \cdot P$$

Soil erosivity is a measure of potential soil particle detachment due to mechanical impact from raindrops. Soil erosivity is determined from an erosivity index map depicting isoerodent lines for California. The erosivity is based on a maximum storm intensity obtained in a 30-minute duration, 10-year frequency storm. The index map indicates that the general location has a soil erosivity of 30.

Soil erodibility is a measure of the soil particle susceptibility to detachment and transport by rainfall and runoff. Soil erodibility is a function of the amount of silt and very fine sand (less than 0.10 mm in diameter), sand (greater than 0.10 mm in diameter), and organic matter. These factors contribute to the structure, and permeability of the soil. Soil sampled in the immediate area of the pipeline break, below the graded road, consists of a silty clay loam. The soil contains approximately 38 percent clay, 5 percent sand, 57 percent silt, and a combined silt and very fine sand composition of 62 percent. The medium blocky soil has approximately one percent organic matter. The permeability as taken from the soil survey is slow. Together these soil characteristics equate to a soil erodibility factor of 0.372.

The length of the slope below the pipeline break to Calaveras Road is approximately 97 feet. The slope in the vicinity of the break is 84 percent. With a land use consisting of mostly rangeland grazing the dimensionless length and slope factor computes as 10.48.

The cover management factor applies to any measure cover measure applied to the soil to reduce the effects of raindrop or splash erosion. Such management practices may include vegetation, duff or leaf litter, planting a cover crop, or tilling which affect the susceptibility of the soil to direct rainfall impact. The initial cover of the site was estimated at 75 percent canopy cover that was provided by annual grasses and oak tree canopies. In addition a ground cover of leaf litter and rock fragments covered 62 percent of the site. These characteristics equate to a cover factor of 0.051.

The support practice includes any sediment control practices in place. These practices may include contour plowing, mulching, and erosion control fabric installation. The initial site did not have any erosion control practices in place so the factor is 1.0.

The product of these factors represents the total soil loss under the preexisting conditions prior to the pipeline spill. This loss equates to 5.9 tons per acre per year. The generally accepted loss rate for maintaining site productivity is 5 tons per acre per year. The higher lost rate at this location is predominately a factor of the high slope gradient.

Soil Loss Calculations Following Installation of Erosion Control Measures
The soil loss calculation provided in this section provides analysis for the worst-case scenario with bare soil and reduced canopy cover in the area of the steepest and longest slope. Areas of disturbed soil will require erosion control measures to prevent sedimentation on Calaveras Road and in nearby stream channels. The erosion control measure includes the use of a bonded fiber matrix (BFM) hydromulch applied to the soil surface at an application rate of 3,000 pounds per acre. Sediment reduction shall include the installation of 9-inch straw wattles spaced every 10 feet down the slope.

Several of the above preexisting site conditions will change as a result of the remediation practice and implementation of erosion control measures. The predicted values assume potential soil loss immediately following the installation of the erosion control measure when revegetation efforts have not been established and afford no protection from erosion.

The soil erosivity and erodibility values for the site remain the same as the pre-disturbance conditions. The length and slope factor is approximately the same (10.47), adjusted slightly for a land use of bare topsoil fill.

Application of a BFM would provide immediate soil cover of approximately 90 percent, protecting the soil from raindrop impact. The typical cover value for a hydromulch application is 0.1. Additional cover will result from the germination of native grass seed. Assuming a tree canopy of 25 percent and a grass cover of 60 results in a cover value of

0.41. Assuming a tree canopy of 25 percent and a grass cover of 80 percent results in a cover value of 0.013.

The installation of the straw wattles reduces sediment production by reducing the length of the open slope, reducing the likelihood of rill formation. The wattles reduce runoff velocities and collect sediment behind the structure, allowing water to percolate through the straw. Manufacturers claim a 58 percent reduction in sediment production when using the wattles spaced every 10 to 25 feet, depending on the slope (Earth Saver Erosion Control Products 2005). With slopes ranging 80 to 90 percent, a 10-foot spacing is expected to meet the sediment reduction rating (practice value of 0.58).

With these erosion and sediment control measures in place the expected soil loss should be approximately 6.7 tons per acre per year with no vegetative cover. With vegetative grass cover of 60 to 80 percent, erosional losses are expected to range between 0.1 and 2.8 tons per acre per year. If no erosion control measures (i.e., no vegetation cover or best management practices) were implemented the soil loss could be expected to attain 117 tons per acre per year. The use of erosion control measures represents a 94 percent improvement in preventing erosional losses as opposed to not using any erosion control measures.

Erosion Control

The steep slope of the site requires more protection than conventional construction sites where slopes are seldom above 2:1 or 50 percent. For this reason both a BFM hydromulch and wattles or straw bundles will be used on slopes greater than 50 percent to improve the soil cover and resistance to detachment and transport. Slopes less than 50 percent will only require the BFM hydromulch.

The EcoAgis® BFM consists of a blend of softwood fibers, natural guar gum tackifier, and crosslinking agents that react with the guar to bond the mixture firmly together (Canadian Forest Products, Ltd. 2005). The BFM is intended to provide cover from rainfall impact and to help reduce soil detachment and movement down slope. The binder in the BFM adheres to the soil particles, and cellulose wood fibers in the mulch provide a reinforced matrix. The BFM helps to hold soils in place on a steep slope and maintain structural form after rewetting. The fibers in the BFM make the mixture porous allowing seed to germinate through the mulch. Bonded fiber matrices are more superior to typical hydroseeding in that they provide a higher tensile strength and resistance to degrading from water impact on steep slopes and rewetting. The BFM is sprayed on the soil surface in a liquid form at a rate of 3,000 pounds per acre forming a protective crust on the soil 3-5 millimeters thick.

Straw wattles consist of a bundle of straw bound together to form a long cylindrical barrier laid horizontal across the slope. The 8 to 9-inch wattles are buried 3 to 5 inches deep in a trench contour to the slope (Appendix A). The trench should have been dug prior to installation of the matting described above. The wattle is staked down over the erosion matting with 1-inch by 1-inch wood stakes every 3 to 4 feet and at each end of

the roll. Stakes are pounded down until 2 inches remain above the wattle. Red willow cuttings can be used for some of the staking on the wattles installed lower on the slope near Calaveras Road. Guidelines for willow stake installation is provided in the following section on revegetation. The ends of the wattle should butt flush and firmly against each other to keep water or sediment from escaping through the seam. Wattles should be spaced every ten feet to reduce sediment deposition in the roadway and in the nearby stream channel. An illustration of the wattle installation is provided in Appendix A.

If the road is decommissioned, fill soils should be removed and placed back on the road cut bench. The road cut and fill soils should be graded to the contour of the slope and be mulched. Wattles should be installed at the top and bottom of the road cut to reduce run-on and sediment runoff from the loose fill soil.

Revegetation

Revegetation of the disturbed site is essential to the success of the remediation. Herbaceous vegetation will provide cover protection for the slope and fibrous root systems will help anchor the soil better than any erosion control product. A native seed mixture will be applied to the disturbed soils prior to any mulching. The seed mixture should consist of native grassland species such as California brome (*Bromus carinatus*), meadow barley (*Hordeum brachyantherum*), blue wild rye (*Elymus glaucus*), California fescue (*Festuca californica*), and California poppy (*Eschscholsia californica*). Seed should be applied at a rate of approximately 100 pounds per acre before application of the BFM to ensure seed contact with the soil. This high application rate of seed will promote good coverage of native grasses, which will help prevent non-native grasses from out-competing the natives. Application of a mycorrhizal soil inoculum (AM-120) applied at a rate of 60 pounds per acre will help native plants with nutrient absorption and uptake.

If replacement of oaks or other trees is necessary, plantings should be placed in the area where tree disturbance is the greatest. Theses areas include immediately below and southwest of the pipeline break down to Calaveras Road. Approximately nine coast live oaks (*Quercus agrifolia*), one Valley oak (*Quercus lobata*), one red willow, and one blue elderberry (*Sambucus mexicana*) had canopies that were 50 percent or more affected by the spill. If monitoring confirms that tree mortality occurred, trees should be planted at a ratio of ten trees replaced to one lost. Tree planting should occur in the fall to increase chances of survival. Seedlings should be planted at random spacing throughout the understory of the mature trees. Seedlings will be protected from herbivory using protector tubes.

If mortality of oak trees occurs, valley oak should be replanted from acorns. Oaks planted from acorns, rather than commercially available potted seedling, have higher survival in the low moisture conditions found in rangeland. Acorns should be locally collected and planted following the methods of McCreary (1995). Specifically, acorns will be collected from the tree, their viability confirmed by selecting only acorns that float in water, and

acorns will be cold stratified before planting. Planted acorns should be protected with a mesh coating to prevent predation by small mammals. Acorns should be planted in October or November prior to winter rains.

If mortality of red willow or elderberry occurs, these species should be replanted as cuttings. The red willow and elderberry should be planted at interspersed distances at the toe of the slope near Calaveras Road where water availability is greater. Willow trees can be revegetated using willow cuttings from trees near the site. Cuttings should be of two year or older woody cuttings. Cuttings greater than six feet long should be stripped of leafy vegetation and soaked in water at least 24 hours prior to planting. Holes should be probed in to the hillslope using a long rebar stake or other mechanical tool. Cuttings should be placed basal end first into the hole with approximately one foot of stem above ground. Cuttings not placed basal end in the soil will not survive. Soil should be tamped around to the cutting or mud slurry can be poured in the hole with the cutting to ensure soil contact with the stem. Success of the cuttings relies on the stems having sufficient access to groundwater. If possible cuttings should be placed to the depth of the water table. Cuttings should be planted during the winter months when soils are saturated and willows are dormant.

Monitoring and Maintenance

The success of the erosion prevention and revegetation efforts relies upon site evaluation and maintenance to ensure that objectives are met. The site should be monitored monthly during the first three months following implementation of this plan. The trees in the vicinity of the spill will be assessed quarterly until Spring 2007 (December 2005, March 2006, June 2006, September 2006 and December 2006, and March 2007).

Erosion control monitoring shall include a visual inspection of the effectiveness of the measures implemented. Evaluation of the effectiveness includes looking for areas of noticeable erosion, the extent of the erosion, and whether it will result in unnecessary sedimentation to the roadway or stream/drainage channels. A site visit should be conducted during the first major storm event of the year that generates runoff. Problematic areas will be addressed and adjustments or additional erosion control measures may be installed as necessary.

Monitoring on residual trees larger than 2 inches in diameter at breast height (measured at 4.5 feet) shall include estimates of canopy loss and foliar regrowth. Monitoring shall note any additional trees affected by the spill that were not initially identified in the first survey.

Monitoring of the revegetation success includes evaluation of the percent coverage by herbaceous species. If the vegetative cover does not reach a minimum of 75 percent, additional seeding of native seed may be required during the fall of 2006. Invasive weed species growth will be evaluated and corrective measures such as hand grubbing or herbicide application may be necessary. Monitoring of woody species shall evaluate growth success and mortality. If seedling mortality occurs, adaptive measures may need

to be implemented. The cause of mortality should be determined, if possible, and reduced. For example, if deer herbivory results in tree mortality, trees would be replanted and taller protective barriers would be installed to protect the seedlings. Trees that do not survive the first year would be replaced during the following rainy season.

References

Canadian Forest Products, Ltd. 2005. EcoAegis. http://www.canforpfd.com/erosion.php?product=ecoaegis

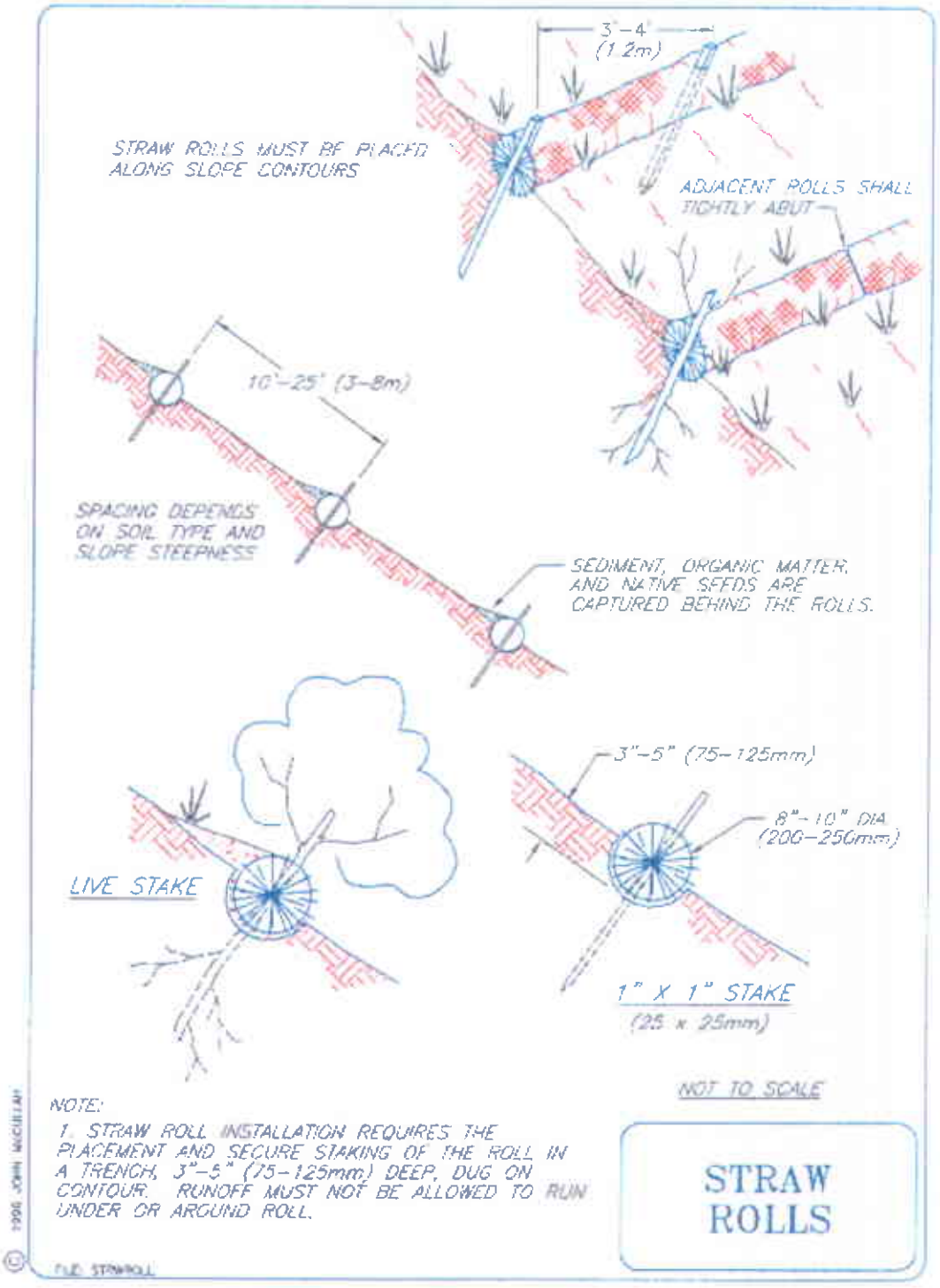
Earth Saver Erosion Control Products. 2005. R. H. Dyck, Inc. P.O. Box 310 Yolo County, CA 95697 http://www.earth-savers.com/pages/testrslts.html

McCreary, D.D. 1995. How to Grow California Oaks. Univeristy of California Division of Agriculture and Natural Resources. Leaflet 21540, 4 p.

Soil Conservation Service. 1966. Soil Survey-Alameda Area, California-Series 1961, No. 41. U.S. Government Printing Office, Washington. D.C.

APPENDIX A

STRAW WATTLE
INSTALLATION GUIDLINENES


3'-4'
(1.2m)
STRAW ROLLS MUST BE PLACED ALONG SLOPE CONTOURS
ADJACENT ROLLS SHALL TIGHTLY ABUT
10'-25' (3-8m)
SPACING DEPENDS ON SOIL TYPE AND SLOPE STEEPNESS
SEDIMENT, ORGANIC MATTER, AND NATIVE SEEDS ARE CAPTURED BEHIND THE ROLLS.
3"-5" (75-125mm)
8"-10" DIA (200-250mm)
LIVE STAKE
1" X 1" STAKE
(25 x 25mm)
NOT TO SCALE
NOTE:
1. STRAW ROLL INSTALLATION REQUIRES THE PLACEMENT AND SECURE STAKING OF THE ROLL IN A TRENCH, 3"-5" (75-125mm) DEEP, DUG ON CONTOUR. RUNOFF MUST NOT BE ALLOWED TO RUN UNDER OR AROUND ROLL.
STRAW ROLLS

Appendix C
Permits

ZONE 7 WATER AGENCY

100 NORTH CANYONS PARKWAY, LIVERMORE, CALIFORNIA 94551 VOICE (925) 454-5000 FAX (925) 454-5728

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

FOR OFFICE USE

LOCATION OF PROJECT Milepost 2.7 on Calaveras Road near Sunol, CA

PERMIT NUMBER 25141

WELL NUMBER

APN

California Coordinates Source ft Accuracy ft.

CCN ft. CCE ft.

APN

CLIENT
Name Chevron Pipeline Company
Address 2811 Hayes Rd. Phone
City Houston, TX Zip 77082

APPLICANT
Name URS Corporation
Steven Plunkett Fax (510) 874-3268
Address 1333 Broadway, Phone (510) 893-3600
City Oakland, CA Zip 94612
Ste. 800

TYPE OF PROJECT

Well Construction		Geotechnical Investigation	
Cathodic Protection		General	
Water Supply		Contamination	X
Monitoring		Well Destruction	

PROPOSED WELL USE

New Domestic		Irrigation	
Municipal		Remediation	
Industrial		Groundwater Monitoring	
Dewatering		Other	

DRILLING METHOD:

Mud Rotary		Air Rotary	
Cable Tool		Direct Push	X
Hollow Stem Auger			
Other			

DRILLING COMPANY Cregg Drilling
DRILLER'S LICENSE NO. 485165 Exp 7/31/06

WELL PROJECTS

Drill Hole Diameter	in.	Maximum Depth	ft.
Casing Diameter	in.	Number	
Surface Seal Depth	ft.		

SOIL BORINGS

Number of Borings	16	Maximum Depth	20' ft.
Hole Diameter	2" in.		

ESTIMATED STARTING DATE 8/24/05
ESTIMATED COMPLETION DATE 8/31/05

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE [signature] Date 8/15/05
for URS Corp.

ATTACH SITE PLAN OR SKETCH

PERMIT CONDITIONS

(Circled Permit Requirements Apply)

A. GENERAL
(1.) A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects or drilling logs and location sketch for geotechnical projects.
(3.) Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
3. An access port at least 0.5 inches in diameter is required on the wellhead for water level measurements.
4. A sample port is required on the discharge pipe near the wellhead.

C. GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal thickness is two inches of cement grout placed by tremie.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.

(D.) GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION. See attached.

(G.) SPECIAL CONDITIONS. Submit to Zone 7 within 60 days after the completion of permitted work the well installation report including all soil and water laboratory analysis results.

Approved Wyman Hong Date 8/25/05
Wyman Hong

Revised: April 27, 2005

ALAMEDA COUNTY FLOOD CONTROL AND WATER CONSERVATION DISTRICT
100 NORTH CANYONS PARKWAY, LIVERMORE, CA 94551 PHONE (925) 454-5000

October 24, 2005

Mr. Leonard Niles
URS Corporation
1333 Broadway, Suite 800
Oakland, CA 94612

Dear Mr. Niles:

Enclosed are drilling permits 25171 and 25172 for monitoring well construction projects near 8501 Calaveras Road in Sunol for Chevron Pipeline Company. Also enclosed are current drilling permit applications for your files.

Please note that permit conditions A-2 requires that a well construction report be submitted after completion of the work. The report should include drilling and completion logs, location sketch and permit number. Please submit the original of your completion report. We will forward your submittal to the California Department of Water Resources.

If you have any questions, please contact me at extension 5056 or Matt Katen at extension 5071.

Sincerely,

Wyman Hong

Wyman Hong
Water Resources Specialist

Enc.

P:\WRE\GPOs\GPO1\GPO1.MONITORING.wpd

ZONE 7 WATER AGENCY

100 NORTH CANYONS PARKWAY, LIVERMORE, CALIFORNIA 94551 VOICE (925) 454-5000 FAX (925) 454-5728

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 8501 Calaveras Avenue, Sunol, CA; Valley Crest Tree Company

California Coordinates Source _____ Accuracy± _____ ft.
CCN _____ ft. CCE _____ ft.
APN 37°33'02"N, 121°51'26"W

CLIENT
Name Chevron Pipeline Company
Address 2311 Hayes Road Phone (281)596-3564
City Houston, TX Zip 77082

APPLICANT
Name URS Corporation
Leonard Niles Fax (510)874-3268
Address 1333 Broadway, Suite 800 Phone (510)874-1720
City Oakland, CA Zip 94612

TYPE OF PROJECT:

Well Construction	☐	Geotechnical Investigation	☐
Well Destruction	☐	Contamination Investigation	☒
Cathodic Protection	☐	Other _____	☐

PROPOSED WELL USE:

Domestic	☐	Irrigation	☐
Municipal	☐	Remediation	☐
Industrial	☐	Groundwater Monitoring	☒
Dewatering	☐	Other _____	☐

DRILLING METHOD:

Mud Rotary	☐	Air Rotary	☒	Hollow Stem Auger	☐
Cable Tool	☐	Direct Push	☐	Other Casing Hammer	☒

DRILLING COMPANY West Hazmat Drilling / Test America
DRILLER'S LICENSE NO. C57-819548, exp. 5/31/07

WELL SPECIFICATIONS:
Drill Hole Diameter 6 in. Maximum Depth 100 ft.
Casing Diameter 2 in. Number 3
Surface Seal Depth 50 ft.

SOIL BORINGS:
Number of Borings _____ Maximum
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE 10/18/05
ESTIMATED COMPLETION DATE 10/20/05

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Leonard Niles, RG/CHG Date 10/17/05
URS Corporation

ATTACH SITE PLAN OR SKETCH

FOR OFFICE USE

PERMIT NUMBER 25171
WELL NUMBER 4S/1E-27N1 to 4S/1E-27N3
APN 096-0080-008-00

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal diameter is four inches greater than the well casing diameter.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
3. Grout placed by tremie.
4. An access port at least 0.5 inches in diameter is required on the wellhead for water level measurements.
5. A sample port is required on the discharge pipe near the wellhead.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal diameter is four inches greater than the well or piezometer casing diameter.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
3. Grout placed by tremie.

D. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION. See attached.

G. SPECIAL CONDITIONS. Submit to Zone 7 within 60 days after completion of permitted work the well installation report **Including all soil and water laboratory analysis results.**

Approved Wyman Hong Date 10/18/05
Wyman Hong

ZONE 7 WATER AGENCY

100 NORTH CANYONS PARKWAY, LIVERMORE, CALIFORNIA 94551 VOICE (925) 454-5000 FAX (925) 454-5728

DRILLING PERMIT APPLICATION

FOR APPLICANT TO COMPLETE

LOCATION OF PROJECT 8501 Calaveras Avenue, Sunol, CA; Valley Crest Tree Company

California Coordinates Source _____ Accuracy± _____ ft.
CCN _____ ft. CCE _____ ft.
APN _____
37°33'02"N, 121°51'26"W

CLIENT
Name Chevron Pipeline Company
Address 2811 Hayes Road Phone (281) 596-3564
City Houston, TX Zip 77082

APPLICANT
Name URS Corporation
Leonard Niles Fax (510) 874-3268
Address 1333 Broadway, Suite 800 Phone (510) 874-1720
City Oakland, CA Zip 94612

TYPE OF PROJECT:

Well Construction	☐	Geotechnical Investigation	☐
Well Destruction	☐	Contamination Investigation	☒
Cathodic Protection	☐	Other _____	☐

PROPOSED WELL USE:

Domestic	☐	Irrigation	☐
Municipal	☐	Remediation	☒
Industrial	☐	Groundwater Monitoring	☐
Dewatering	☐	Other _____	☐

DRILLING METHOD:

Mud Rotary	☐	Air Rotary	☒	Hollow Stem Auger	☐
Cable Tool	☐	Direct Push	☐	Other Casing Hammer	☒

DRILLING COMPANY West Hazmat Drilling / Test America
DRILLER'S LICENSE NO. C57-819548, exp. 5/31/07

WELL SPECIFICATIONS:
Drill Hole Diameter 9 in. Maximum
Casing Diameter 4 in. Depth 45 ft.
Surface Seal Depth 15 ft. Number 3

SOIL BORINGS:
Number of Borings _____ Maximum
Hole Diameter _____ in. Depth _____ ft.

ESTIMATED STARTING DATE 10/21/05
ESTIMATED COMPLETION DATE 10/25/05

I hereby agree to comply with all requirements of this permit and Alameda County Ordinance No. 73-68.

APPLICANT'S SIGNATURE Leonard Niles, PG/CHG Date 10/17/05
URS Corporation

ATTACH SITE PLAN OR SKETCH

FOR OFFICE USE

PERMIT NUMBER 25172
WELL NUMBER 4S/1E-27N4 to 4S/1E-27N6
APN 096-0080-008-00

PERMIT CONDITIONS

Circled Permit Requirements Apply

(A.) GENERAL
1. A permit application should be submitted so as to arrive at the Zone 7 office five days prior to proposed starting date.
2. Submit to Zone 7 within 60 days after completion of permitted work the original Department of Water Resources Water Well Drillers Report or equivalent for well projects, or drilling logs and location sketch for geotechnical projects.
3. Permit is void if project not begun within 90 days of approval date.

B. WATER SUPPLY WELLS
1. Minimum surface seal diameter is four inches greater than the well casing diameter.
2. Minimum seal depth is 50 feet for municipal and industrial wells or 20 feet for domestic and irrigation wells unless a lesser depth is specially approved.
3. Grout placed by tremie.
4. An access port at least 0.5 inches in diameter is required on the wellhead for water level measurements.
5. A sample port is required on the discharge pipe near the wellhead.

(C.) GROUNDWATER MONITORING WELLS INCLUDING PIEZOMETERS
1. Minimum surface seal diameter is four inches greater than the well or piezometer casing diameter.
2. Minimum seal depth for monitoring wells is the maximum depth practicable or 20 feet.
3. Grout placed by tremie.

D. GEOTECHNICAL. Backfill bore hole with compacted cuttings or heavy bentonite and upper two feet with compacted material. In areas of known or suspected contamination, tremied cement grout shall be used in place of compacted cuttings.

E. CATHODIC. Fill hole above anode zone with concrete placed by tremie.

F. WELL DESTRUCTION. See attached.

G. SPECIAL CONDITIONS. Submit to Zone 7 within 60 days after completion of permitted work the well installation report **including all soil and water laboratory analysis results.**

Approved Wyman Hong Date 10/21/05
Wyman Hong

Work Order Number:* 80001

*This WO is ___ / is not ✓ open for charges.

Permit Number: R05LD6800

Permit Issuance Date: 8-24-05

Permit Expiration Date: 8-23-06

COUNTY OF ALAMEDA PUBLIC WORKS AGENCY
ROADWAY ENCROACHMENT PERMIT

This Permit is issued in accordance with Chapter 12.08 of the Alameda County General Ordinance Code

Name & Address of Property Owner:
San Francisco Public Utilities Commission
525 Paloma Way, P.O. Box
Sunol, CA 94586-2550
Phone Number: (925) 862-2233

Name & Address of Contractor:
WLS Corporation Ste. 800
1333 Broadway
Oakland, CA 94612
Phone Number: (510) 893-3600

Job Site Address:
Milepost 2.7 on Calaveras Rd.
Alameda County

(This statement to be completed by the Agency)
This permit is issued to the owner ___ / contractor ✓;
if "owner" is checked, he/she is ___ / is not ___ exempt from the requirement that work in the roadway be performed by a licensed contractor.

The Applicant intends to perform the following work scope:
Soil and groundwater investigation along Calaveras Rd. with lane closure and traffic control.

Licensed Contractor Declaration:
I hereby affirm, under penalty of perjury, that I hold the following contractor's license, which is in full force and effect, under the applicable provisions of the State Business and Professions Code.

License Class and No:
Contractor's Signature:

Worker's Compensation Insurance Declaration:
I hereby affirm, under penalty of perjury, that I will, during the performance of any and all work authorized by this permit, satisfy the requirements of the State Labor Code with regard to Worker's Compensation Insurance, as declared below:
___ I will maintain a certificate of consent to self-insure.
___ I will maintain the following insurance policy:
Carrier's Name and Policy No.:
___ I will not employ any person in any manner so as to become subject to the worker's compensation laws of the State.
Owner's/Contractor's Signature:

All work and/or access shall be performed in accordance with the requirements of Chapter 12.08 and, unless otherwise specified below, shall be fully compliant with each of the terms and conditions of the attached General Provisions:

TOM RINGOT

CALL THIS NUMBER FOR INSPECTIONS: 670 5979

Bond Information:

BY: _____, Alameda County

Insp. Fee ✓ or Deposit ___ $ 74
250 ⁻⁻

Work Completed (Date): _____

Inspector:

I certify that the information that I have entered into this permit application is correct, and I agree to comply with all of the terms and conditions and other requirements of the issued Permit.

Signature of Applicant

8/23/05
Date

THIS PERMIT IS INCOMPLETE WITHOUT THE ATTACHED GENERAL PROVISIONS

Appendix D
Boring Logs

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-1
Total Depth: 34 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/25/05

BORING INFORMATION

Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth:	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SANDY SILT: Brown/black (2.5 YR 5/4), organic rich, 70% silt, 30% very fine sand, dry, non-plastic, soft, minor cobbles and gravel present <5%	ML	0.2	CP-SB-1 @ 0-1		Hand augered to 5' bgs
2					CP-SB-1 @ 1-1.5		
				0.8	CP-SB-1 @ 2-2.5		
4		Same as above					
6		Same as above except (2.5 YR 5/4) 80% silt, 20% very fine sand, dry, slightly firm, non-plastic			CP-SB-1 @ 5.5-6		
8							
10					CP-SB-1 @ 9.5-10		
12		Same as above except brown (10 YR 4/3), sand content increases 25%, very fine to medium sand wtih minor gravel, distinct calcite veining present					
14							
16		SANDY CLAYEY SILT: content of fines increasing, very fine, (10 YR 4/3), dry/slightly damp, non-plastic, 70% silt, 20% clay, 10% sand, minor calcite staining	ML		CP-SB-1 @ 15.5-16		
18							
20					CP-SB-1 @ 19.5-20		
22							

Borehole ID : CP-SB-1

URS

LOG OF BORING

Borehole ID: CP-SB-1

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		SANDY SILT: dry sandy silt, gray, dry to slightly damp	ML/S				
26					CP-SB-1 @ 25-25.5		
28		SILTY SAND: (10 YR 4/3), 60% fine to medium sand with minor gravel, 30% silt, quartz rich, subangular to subrounded	SM				
30					CP-SB-1 @ 30-30.5		
32							
34							Refusal at 34' bgs, end of boring
36							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-2

Total Depth: 31 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/25/05

BORING INFORMATION

Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		ROAD BASE: Road base material	ML		CP-SB-2 @ 0.5-1		Hand augered to 5' bgs
2		SANDY SILT: Brown (10 YR 4/3), very fine, dry, <20% sand, soil horizon organic material present			CP-SB-2 @ 1-1.5		
4		Dark brown (10 YR 2/2), 80% silt, 20% very fine sand, dry, non-plastic, moderately stiff			CP-SB-2 @ 2-2.5		
6					CP-SB-2 @ 5-5.5		
8		Caliche veining present, otherwise no change					
10					CP-SB-2 @ 10-10.5		
12		CLAYEY SILT: (10 YR 2/2), 70% silt, 20% clay, minor gravel, dry	ML/CL				
14							
16					CP-SB-2 @ 15-15.5		
18							
20					CP-SB-2 @ 20-20.5		
22							

URS

LOG OF BORING

Borehole ID: CP-SB-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24							
26					CP-SB-2 @ 25-25.5		
28		SILTY SAND: (10 YR 4/3), very fine, moist, soft, low plasticity	SM				
30					CP-SB-2 @ 30-30.5		End of boring at 31' bgs, dry
32							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-3

Total Depth: 28.5 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/25/05
BORING INFORMATION	
Groundwater Depth: not reached	**Boring Location:** NW of creek downhill from the leak
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		ROAD BASE: Road base material, gravel			CP-SB-3 @ 0.5-1		Hand augered to 5' bgs
2		SANDY SILT: Dark brown (10 YR 2/2), 80% silt, organic rich soil horizon, caliche veins throughout, moderately stiff, dry	ML				
4							
6					CP-SB-3 @ 5-5.5		
8							
10					CP-SB-3 @ 9.5-10		
12							
14		same as above except roots present and caliche veining throughout					
16					CP-SB-3 @ 15-15.5		
18							
20					CP-SB-3 @ 19.5-20		
22							

URS

LOG OF BORING

Borehole ID: CP-SB-3

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		CLAYEY SILT: content of fines increases, clayey silt	ML/ CL		CP-SB-3 @ 24.5-25		
26		SILTY SAND: silty very fine sand lense, 0.3' thick, subangular to subrounded, quartz rich	SM				
		CLAYEY SILT: slightly damp	ML/ CL				
28							Refusal at 28.5' bgs, end of boring
30							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-4

Total Depth: 28 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/25/05

BORING INFORMATION

Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		ROAD BASE	ML				Hand augered to 5' bgs.
2		SANDY SILT: Dark brown (10 YR 2/2), very fine, 80% silt, 20% sand, rich in organics, dry			CP-SB-4 @ 1-1.5		
4							
6		Caliche veining present, otherwise same as above			CP-SB-4 @ 5-5.5		
8							
10					CP-SB-4 @ 9.5-10		
12							
14							
16		Dry, otherwise same as above			CP-SB-4 @ 14.5-15		
18							
20					CP-SB-4 @ 19.5-20		
22		Tree roots present, otherwise same as above					

URS

LOG OF BORING

Borehole ID: CP-SB-4

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		SANDY GRAVELLY SILT: (2.5 YR 3/6), some gravel present, sand content increasing	ML/ SM		CP-SB-4 @ 24.5-25		
26		Light gray, 30% sand, 30% gravel, 40% silt, coarse content increasing, dry, sub angular to subrounded, quartz rich					
28							Refusal at 28' bgs, end of boring.

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-5

Total Depth: 27 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/25/05
BORING INFORMATION	
Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		ROAD BASE	ML/CL		CP-SB-5 @ 0.5-1		Hand augered to 5' bgs
2		CLAYEY SILT: Dark brown (10 YR 2/2), 80% silt, 20% clay, non-plastic, slightly damp, organic rich A horizon			CP-SB-5 @ 1-1.5		
4					CP-SB-5 @ 2-2.5		
6					CP-SB-5 @ 5.5-6		
8		Caliche veining present, minor gravel <5%, roots present, dry, otherwise no change					
10					CP-SB-5 @ 9.5-10		
12							
14							
16		Color change (10 YR 4/3) otherwise same as above			CP-SB-5 @ 15-15.5		
18							
20		SANDY SILT: (10 YR 6/8), 30% very fine sand, 80% silt, low strength, some oxidizer present, slightly damp	ML		CP-SB-5 @ 19.5-20		
22							

URS

LOG OF BORING

Borehole ID: CP-SB-5

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		Some coarse cobbles in sandy silt matrix			CP-SB-5 @ 25-25.5		Very hard to push
26							
28							Refusal, end of boring at 27' bgs

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-6

Total Depth: 27 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/26/05
BORING INFORMATION	
Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CLAYEY SILT: (10 YR 2/2), dry, firm roots throughout, organic rich	ML		CP-SB-6 @ 1-1.5		Hand augered to 5' bgs
2					CP-SB-6 @ 2-2.5		
4							
6					CP-SB-6 @ 5.5-6		
8							
10		minor gravel, otherwise same as above			CP-SB-6 @ 9.5-10		
12		SANDY SILT: Very fine, 60% silt, 40% sand, slightly damp	SM/ ML				
14							
16					CP-SB-6 @ 15-15.5		
18							
20					CP-SB-6 @ 19.5-20		
22							

URS

LOG OF BORING

Borehole ID: CP-SB-6

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24							
26		Color change- gray (5G 5/1), very fine			CP-SB-6 @ 25-25.5		
28							Refusal at 27' bgs, end of boring

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: CP-SB-7

Total Depth: 28 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
PG: Barbara Jakub	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/26/05
BORING INFORMATION	
Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CLAYEY SILT: (10 YR 2/2), medium dense, dry, caliche rich, some roots present	ML				Hand augered to 5' bgs
2							
4							
6					CP-SB-7 @ 5.5-6		
8							
10					CP-SB-7 @ 9.5-10		
12		same as above except sand content increasing					
14		SANDY SILT: Very fine sandy silt with < 10% clay	ML				
16		same as above except (2.5 YR 3/6), 70% silt, 20% sand, minor gravel <2%, dry, low density, loose, quartz rich			CP-SB-7 @ 15-15.5		
18		same as above except slightly moist					
20		same as above except (2 5 YR 3/6), oxidation staining present			CP-SB-7 @ 19.5-20		
22							

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LOG OF BORING

Borehole ID: CP-SB-7

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24 26 28					CP-SB-7 @ 25-25.5		Refusal at 28' bgs, end of boring

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LOG OF BORING

Borehole ID: CP-SB-8

Total Depth: 21 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/26/05

BORING INFORMATION

Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CLAYEY SILT: (10 YR 2/2), slightly damp, organic rich, roots	ML		CP-SB-8 @ 0.5-1		Hand augered to 5' bgs
2					CP-SB-8 @ 1-1.5		
4					CP-SB-8 @ 2-2.5		
6		SANDY SILT: (10 YR 4/3), dry, soft, caliche rich, some roots, minor gravel	ML		CP-SB-8 @ 5.5-6		
8							
10		same as above except (10 YR 6/8), 40% very fine sand, 60% silt, dry, non-plastic, low strength			CP-SB-8 @ 9.5-10		
12							
14							
16					CP-SB-8 @ 15-15.5		
18		same as above except some oxidation staining present					very strong hydrocarbon odor
20					CP-SB-8 @ 19.5-20		Refusal at 21' bgs, end of boring
22							

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LOG OF BORING

Borehole ID: CP-SB-9

Total Depth: 28 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/29/05

BORING INFORMATION

Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILT: (10 YR 2/2), slightly damp, low strength, organic rich A horizon	ML		CP-SB-9 @ 0.5-1		Hand augered to 5' bgs
2					CP-SB-9 @ 1-1.5		
4							
6					CP-SB-9 @ 5.5-6		
8		SANDY SILT: sand content increasing, dry, low strength, calcite veining throughout	ML				
10					CP-SB-9 @ 9.5-10		
12		Same as above except (10 YR 6/8), 30% very fine sand, 70% silt, <5% clay, slightly damp					
14							
16					CP-SB-9 @ 15.5-16		
18							
20					CP-SB-9 @ 19.5-20		
22							

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LOG OF BORING

Borehole ID: CP-SB-9

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24							becoming harder
26					CP-SB-9 @ 25.5-26		
28							Refusal at 28' bgs, end of boring

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LOG OF BORING

Borehole ID: CP-SB-10

Total Depth: 38 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline, Sunol	**Drilling Company:** Gregg Drilling and Testing, Inc.
Site Location: Calaveras Ave., Sunol, CA	**Driller:** Vince
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe
RG: Leonard Niles	**Drilling Method:** Direct Push
Geologist: Steven Plunkett	**Sampling Method:** Micro Core
Job Number: 26815217.00500	**Date(s) Drilled:** 8/29/05
BORING INFORMATION	
Groundwater Depth: not reached	**Boring Location:** Adjacent to Calaveras Ave.
Air Knife or Hand Auger Depth: 5.0 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		CLAYEY SILT: (10 YR 2/2), dry, medium strength, calcite/caliche veining, some gravel, organic rich soil horizon A	ML		CP-SB-10 @ 0.5-1		Hand augered to 5' bgs
2					CP-SB-10 @ 1-1.5		
4					CP-SB-10 @ 2.5-3		
6					CP-SB-10 @ 5.5-6		
8							
10					CP-SB-10 @ 9.5-10		
12							
14							
16		SANDY SILT: (10 YR 6/8), dry, medium strength, caliche, very fine	ML/SM		CP-SB-10 @ 15.5-16		
18							
20		CLAYEY SILT: (10 YR 4/3), <10% very fine sand, medium strength, non-plastic, dry	ML		CP-SB-10 @ 19.5-20		
22							

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LOG OF BORING

Borehole ID: CP-SB-10

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24					CP-SB-10 @ 25-25.5		
26							
28		SANDY SILT: 70% silt, 30% very fine sand, dry	ML				
30					CP-SB-10 @ 29.5-30		
32		SILTY CLAY: (10 YR 4/3), <10% very fine sand, slightly damp, soft, low plasticity	ML/ CL				
34							
36		SILTY SAND: moist, quartz rich, subangular to subrounded, medium density	SM/ MK		CP-SB-10 @ 35-35.5		
38					CP-SB-10 @ 39-39.5		Note: interval sample ID is incorrect, was 37.5'-38' Refusal on coarse cobbles at 38' bgs, end of boring.
40							

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LOG OF BORING

Borehole ID: CP-SB-11

Total Depth: 22.5 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:** Power Probe 9630 Pro-D
RG: Leonard Niles	**Drilling Method:** Hand Auger and Direct Push
Geologist: Greg White	**Sampling Method:** 6" brass sleeve/4' acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/11/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Dirt road on steep hillside
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, dry, loose, silty fine sand with some fine gravel and roots.	SM		10:00 CP-SB-11 @ 0.5 - 1		Hand auger from 0 - 5'
2					10:05 CP-SB-11 @ 1 - 1.5		
4					10:10 CP-SB-11 @ 2.5 - 3		Begin direct push drilling at 5'
6				0.0	10:30 CP-SB-11 @ 5.5 - 6		
8							
10					10:42 CP-SB-11 @ 10-10.5		Driller switched from dual tube to macro sleeve due to poor recovery
12		SANDY SILT: Brown, moist, loose fine sandy silt with fine gravel.	ML	0.0			Drilling resumes with macro sampler at 12' bgs
14		SAND: Light brown, dry, loose, very fine sand with a slight odor.	SP	21			
16		GRAVELLY SAND: Light brown, dry to wet (at 20 ft), loose, fine to coarse gravelly fine sand, some rock fragments.	SP/ GP		11:05 CP-SB-11 @ 15.5 - 16		
18				705			
20		SAND: Gray, moist, very dense, fine sand.	SP		11:16 CP-SB-11 @ 19.5 - 20		
22				0.0			Refusal at 22.5' bgs. Install 3/4" PVC to see if any groundwater will enter borehole.

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LOG OF BORING

Borehole ID: CP-SB-12

Total Depth: 27 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:** Power Probe 9630 Pro-D
RG: Leonard Niles	**Drilling Method:** Direct push/hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeve/4' acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/11/05

BORING INFORMATION

Groundwater Depth: 24 feet bgs during drilling	**Boring Location:** Dirt road on steep hillside
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, dry, loose, silty fine sand with some fine gravel and roots.	SM		13:50 CP-SB-12 @ 0.5 - 1		Hand auger from 0 - 5'
2					13:57 CP-SB-12 @ 1 - 1.5		
4					14:00 CP-SB-12 @ 2 -2.5		
6				0			Begin advancing borings with Geoprobe at 5'
8					14:25 CP-SB-12 @ 5 - 5.5		
10		SILTY SAND: Light brown, moist, loose, silty very fine sand with some medium gravel.	SM	16	14:30 CP-SB-12 @ 10 - 10.5		
12		GRAVELLY SAND: Light brown, moist, loose, fine to coarse gravelly fine to medium sand that contains rock fragments. Gravel and rock fragments are increasing with depth.	GP/ SP				
14				3.0			
16		SAND: Light brown to gray, moist, dense, medium sand with trace amounts of gravel and some iron staining.	SP		14:38 CP-SB-12 @ 15 - 15.5		
18		same as above		0			
20				5.4	16:05 CP-SB-12 @ 19.5 - 20		Only able to recover 2' samples at a time due to sluff in borehole after removing micro sampler
22							

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LOG OF BORING

Borehole ID: CP-SB-12

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24				0			▼
26		GRAVELLY CLAY: Brown, moist to wet, coarse gravelly, fine sandy clay.	GC/ CL				End borehole at 27' bgs. Groundwater encountered at ~24' bgs.
28							
30							

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LOG OF BORING

Borehole ID: CP-SB-13

Total Depth: 12 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:** Power Probe 9630 Pro-D
RG: Leonard Niles	**Drilling Method:** Direct push/hand auger
Geologist: Greg White	**Sampling Method:** 6" brass tubes/4' acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/12/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** Dirt road on steep hillside
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, moist, loose, silty fine sand with roots and trace amounts of gravel.	SM	0	08:30 CP-SB-13 @ 0.5 - 1 08:35 CP-SB-13 @ 1 - 1.5		Hand auger from 0 - 5'.
4					08:40 CP-SB-13 @ 2 - 2.5		
6		SANDY SILT: Yellow brown, moist, loose, fine sandy silt with roots. Large root at 7'.	ML	5.7			Begin advancing boring with Direct Push method at 5' bgs.
8		GRAVELLY SAND: Brown grading to gray, moist, fine to coase gravelly fine sand. Gravel content increasing with depth.	GP/SP		08:50 CP-SB-13 @ 5 - 5.5		
10				2.7	09:00 CP-SB-13 @ 10 - 10.5		
12							Refusal at 12' on rock.
14							

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LOG OF BORING

Borehole ID: CP-SB-13R

Total Depth: 10 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:** Power Probe 9630 Pro-D
RG: Leonard Niles	**Drilling Method:** Direct push/hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves/4' acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/12/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** 5' downhill step-out boring of CP-SB-13
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		Blind drill to 10' bgs.			10:00 CP-SB-14 @ 0.5 - 1		Begin hand augering from 0 - 5'
2		(0 - 5' bgs with hand auger)			10:02 CP-SB-14@ 1 - 1.5		
4		(See CP-SB-13 log for Geology)			10:05 CP-SB-14 @ 2 - 2.5		Begin drilling with Geoprobe at 5'
6							
8							Refusal at 10' bgs on same rock obstruction at 12' as at CP-SB-13
10							End of boring at 10' bgs
12							

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LOG OF BORING

Borehole ID: CP-SB-14

Total Depth: 3.5 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:** Power Probe 9630 Pro-D
RG: Leonard Niles	**Drilling Method:** Direct push/hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves/4' acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/12/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Dirt road on steep hillside
Air Knife or Hand Auger Depth: 3.5 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, moist, loose, silty fine sand with roots and some gravel	SM		10:00 CP-SB-14 @ 0.5 - 1		Begin hand augering from 0 - 5'
2					10:02 CP-SB-14@ 1 - 1.5		Refusal at 3.5' with hand auger on coarse gravel and cobbles. The hole continues to collapse after pulling out the hand auger.
4					10:05 CP-SB-14 @ 2 - 2.5		Begin hand augering again approximately 2' up the dirt road and try to advance hand auger to 5'. Again refusal occurs on cobbles at 3.5'.
6							
8							
10							

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LOG OF BORING

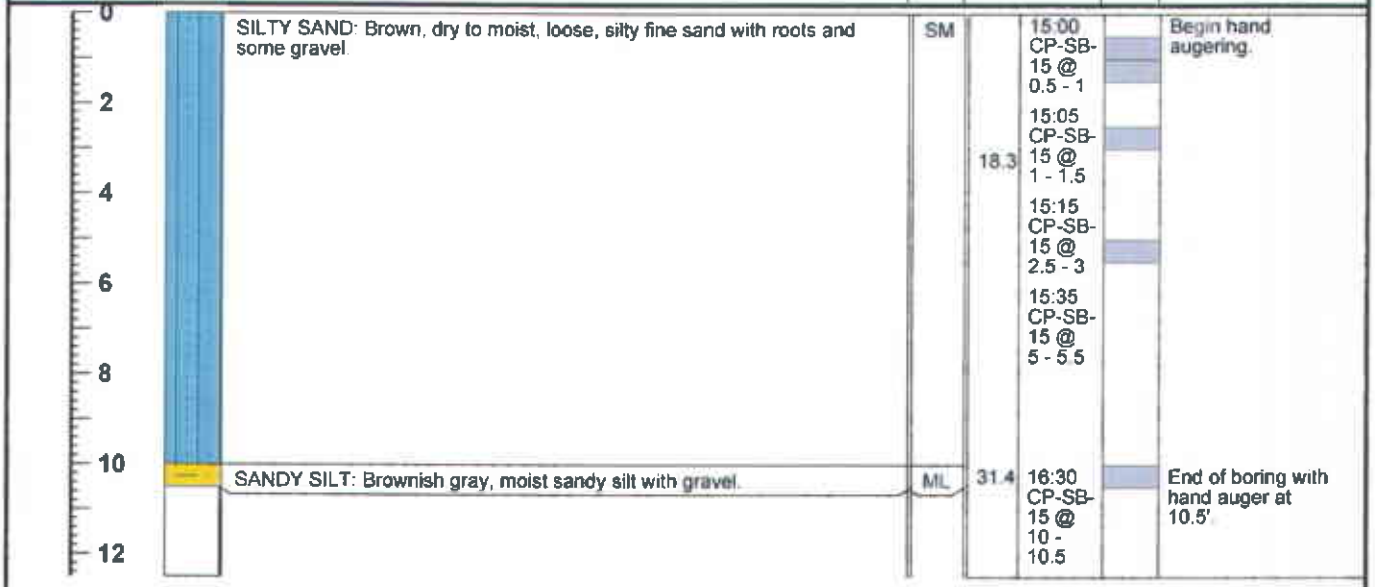
Borehole ID: CP-SB-15

Total Depth: 10.5 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/12/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Steep hillside below dirt road
Air Knife or Hand Auger Depth: 10.5 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil



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LOG OF BORING

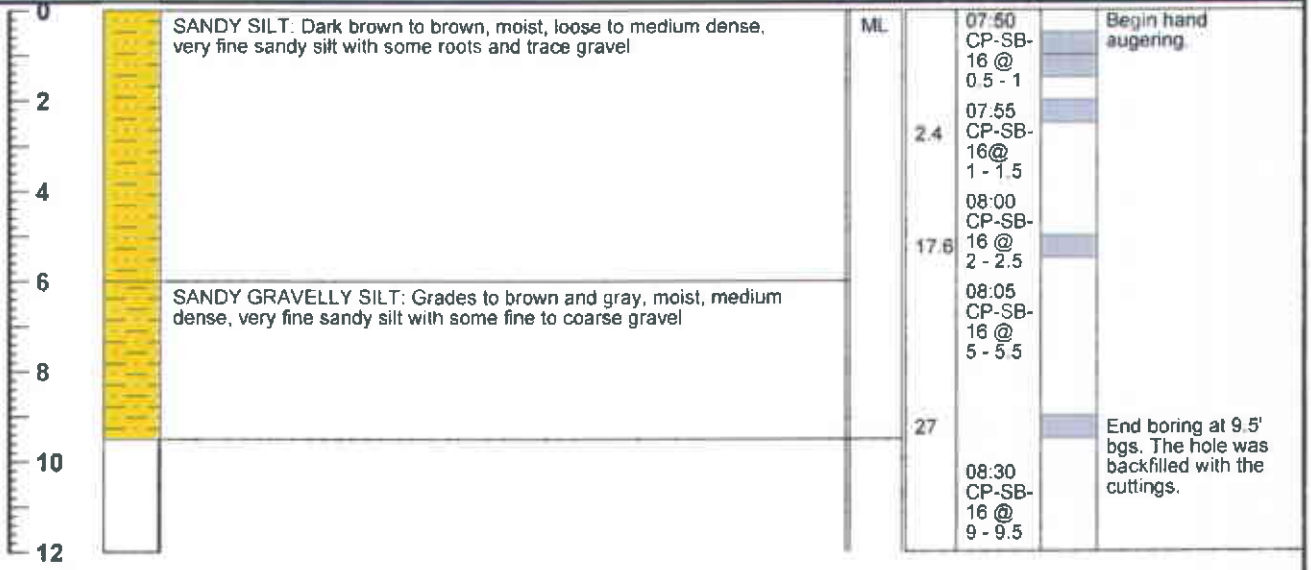
Borehole ID: CP-SB-16

Total Depth: 9.5 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass tubes
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Steep hillside below dirt road
Air Knife or Hand Auger Depth: 9.5 feet bgs	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil



Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
	SANDY SILT: Dark brown to brown, moist, loose to medium dense, very fine sandy silt with some roots and trace gravel	ML		07:50 CP-SB-16 @ 0.5 - 1		Begin hand augering.
			2.4	07:55 CP-SB-16@ 1 - 1.5		
			17.6	08:00 CP-SB-16 @ 2 - 2.5		
	SANDY GRAVELLY SILT: Grades to brown and gray, moist, medium dense, very fine sandy silt with some fine to coarse gravel			08:05 CP-SB-16 @ 5 - 5.5		
			27	08:30 CP-SB-16 @ 9 - 9.5		End boring at 9.5' bgs. The hole was backfilled with the cuttings.

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LOG OF BORING

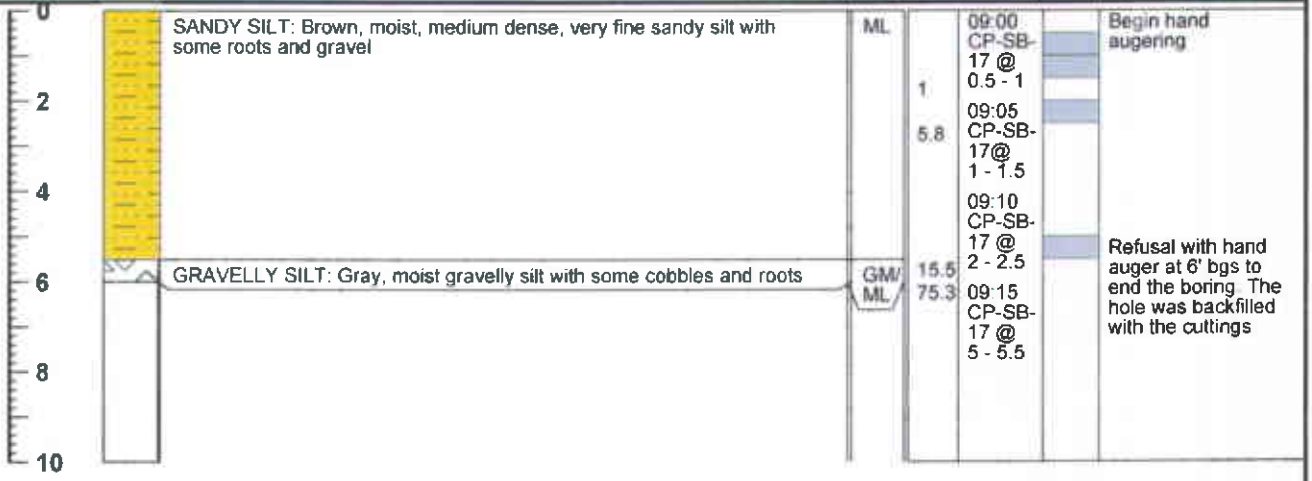
Borehole ID: CP-SB-17

Total Depth: 6 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Steep hillside below dirt road
Air Knife or Hand Auger Depth: 6.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil



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LOG OF BORING

Borehole ID: CP-SB-18

Total Depth: 9 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** Steep hillside below dirt road
Air Knife or Hand Auger Depth: 9.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SANDY SILT: Brown, moist, loose to medium dense, very fine sandy silt with trace rocks and gravel. The rock content increases at 3', odor present	ML	5.0	10:05 CP-SB-18 @ 0.5 - 1		Begin hand augering
2				13.7	10:10 CP-SB-18@ 1 - 1.5		odor present
4		SAND: Light brown, moist, loose, fine sand with some coarse gravel and cobbles	SP	5.8	10:25 CP-SB-18 @ 2 - 2.5		
6		SILT: Gray moist silt with some gravel	ML	4.5			
		SANDY SILT: Gray with some brown mottling, moist, medium dense sandy silt with some coarse gravel, odor present	ML	149	10:40 CP-SB-18 @ 5 - 5.5		odor present
8		SILT: Gray with some light brown mottling, moist, silt with some gravel and sand	ML	381	11:15 CP-SB-18 @ 8.5 - 9		End of boring at 9' bgs.
10							

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LOG OF BORING

Borehole ID: CP-SB-19

Total Depth: 3 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Steep hillside below dirt road
Air Knife or Hand Auger Depth: 3.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, moist, loose, silty fine sand with trace gravel and some roots	SM	478	11:40 CP-SB-19 @ 0.5 - 1		Begin hand augering
2		SANDY SILT: Light brown to gray, loose, fine sandy silt, gravel increasing with depth	ML	1085			Strong odor in soil
				1178	11:45 CP-SB-19 @ 1 - 1.5		Strong odor in soil
4					11:55 CP-SB-19 @ 2 - 2.5		Refusal of hand auger at 3' bgs on rock or large cobble. The steep slope conditions and high PID readings will end the boring. The hole was backfilled with the soil
6							
8							

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LOG OF BORING

Borehole ID: CP-SB-20

Total Depth: 39 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Jose
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe 6620 DT
RG: Leonard Niles	**Drilling Method:** Hand auger and direct push
Geologist: Greg White	**Sampling Method:** 6" brass tube and 4" acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/17/05

BORING INFORMATION

Groundwater Depth: 36' during driilling, 34.6' static	**Boring Location:** dirt road
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, dry to moist, silty fine sand	SM		09:40 CPSB20 @ 0.5-1		Begin hand augering to 5 feet bgs
2					09:45 CPSB20 @ 1.5-2		
4					09:50 CPSB20 @ 2.5-3		
6		GRAVELLY SAND: Brown, moist, loose fine sand with gravel and trace roots	SP	22.6	10:25 CPSB20 @ 5-5.5		Begin direct push method
8		SILTY SAND: Gray, moist, fine to coarse gravelly silt	ML				
10		GRAVELLY SILTY SAND: Brown, moist, silty fine sand with gravel	GM	8.6	10:35 CPSB20 @ 10-10.5		
12		SILTY GRAVELLY SAND: Light brown, moist, loose, silty gravelly fine sand	SM				
14		SAND: Light brown, moist, loose, fine sand	SP	18.6			
16		SILT: Brown, moist, friable, silt as above with trace sand and gravel	ML		11:00 CPSB20 @ 15-15.5		
18				2.5			
20		SILTY SAND: Brown, dry to moist, friable, silty fine sand with some gravel	SM		11:15 CPSB20 @ 19.5-20		
22				5.7			

URS

LOG OF BORING

Borehole ID: CP-SB-20

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		as above except light brown			12:00 CPSB20 @ 25-25.5		
26							
28		SANDY SILT: Brown with some yellow mottling, moist, very stiff, fine sandy silt with some calcite veins	ML				
		GRAVELLY SANDY SILT: Brownish gray, moist, very stiff, gravelly fine sandy silt	GM/ ML				
30		SAND: Light brown, moist, fine sand	SP				
32		GRAVELLY SAND: Light brown, moist, gravelly fine sand	GP/ SP				
34		SANDY GRAVEL: Brown, moist, sandy gravel with cobbles	SP/ GP	1236	12:15 CPSB20 @ 30-30.5		▼
36		GRAVELLY SILT: Brown and gray with some red staining, wet, stiff, gravelly silt	GM/ ML				Sample is wet at 36' bgs. No standing water in borehole. Will try to advance borehole in order to get a good groundwater sample.
38		SILT: Gray, moist, very hard silt	ML	1420			End of boring because groundwater was encountered. Set 3/4" PVC pipe well and take groundwater level with a WL meter. Groundwater level is 34.6' bgs.
40							
42							
44							
46							

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LOG OF BORING

Borehole ID: CP-SB-21

Total Depth: 39 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Jose
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe 6620 DT
PG: Barbara Jakub	**Drilling Method:** Hand auger and direct push
Geologist: Greg White	**Sampling Method:** 6" brass tube and acetate sleeve
Job Number: 26815217.00300	**Date(s) Drilled:** 10/17/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** Dirt road on steep hillside
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, dry to moist, silty fine sand with trace gravel and roots	SM		10:05 CPSB21 @ 0.5-1		Begin hand augering to 5 feet bgs
2					10:10 CPSB21 @ 1.5-2		
4					10:15 CPSB21 @ 2-2.5		Begin direct push method
6				1.4	14:10 CPSB21 @ 5-5.5		
8							
10		SAND: Grades to brown, moist, fine sand as above except light brown	SP	1.8	14:15 CPSB21 @ 10-10.5		
12							
14		SILTY SAND: Grades to brown, moist, silty fine sand	SM	2.8			
16					14:20 CPSB21 @ 15-15.5		
18				2.4			
20					14:25 CPSB21 @ 19.5-20		
22				1.5			

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LOG OF BORING

Borehole ID: CP-SB-21

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D	Recovery	Comments
24		SANDY SILT: Brown, moist, very stiff to hard, fine sandy silt	ML	6.1	14:30 CPSB21 @ 25-25.5		
26							
28		SILTY SAND: Brown, moist, medium dense, silty fine sand	SM	1.4			
30							
32		as above except, light brown, medium stiff, with gravel					
34		GRAVELLY SAND: Gray and brown, moist, fine to coarse gravelly sand, some cobbles	SP/ GP	9.9	15:15 CPSB21 @ 38-38.5		
36							
38				316			Refusal on rock at 39' bgs. Insert 3/4" PVC well to see if groundwater enters the borehole
40							
42							

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LOG OF BORING

Borehole ID: CP-SB-22

Total Depth: 9 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Above dirt road on steep hillside
Air Knife or Hand Auger Depth: 9.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, dry to moist, loose, silty fine sand with some gravel	SM	0.4	15:05 CPSB22 0.5 - 1		Begin hand augering
2				0.7			
				2.1	15:10 CPSB22 1 - 1.5		
4					15:30 CPSB22 2 - 2.5		Soil will not stay in sampler at 5' bgs. Will try sampling 5.5-6' in more coherent soil.
6					15:35 CPSB22 5.5 - 6		
8				0.3			Attempt to collect sample from 8.5-9' bgs. Soil was too loose and kept falling out of sleeve.
10							Terminate boring at 9' bgs. Backfill with cuttings.
12							

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LOG OF BORING

Borehole ID: CP-SB-23

Total Depth: 9 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan and Jorge
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Above dirt road on steep hillside
Air Knife or Hand Auger Depth: 9.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, moist, silty very fine sand with some gravel and roots	SM	1.3	16:20 CP-SB-23 @ 0.5 - 1		Begin hand augering
2				0.1			
					16:25 CP-SB-23 @ 1 - 1.5		
				0.0			
4		As above except slightly moist (almost no cohesion)			16:35 CP-SB-23 @ 2 - 2.5		
6				0.0			
					16:45 CP-SB-23 @ 5 - 5.5		
8							End of borind at 9' bgs. Downhole PID: 1ppm. Backfill borehole with cuttings.
					17:00 CP-SB-23 @ 8.5 - 9		
10				1.0			

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LOG OF BORING

Borehole ID: CP-SB-24

Total Depth: 6 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Juan and Jorge
Project Manager: Joe Morgan	**Type of Drilling Rig:**
RG: Leonard Niles	**Drilling Method:** Hand auger
Geologist: Greg White	**Sampling Method:** 6" brass sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/13/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** hillside above dirt road
Air Knife or Hand Auger Depth: 6.0	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, moist, loose, silty fine sand with gravel	SM	2.5	14:25 CPSB24 @ 0.5 - 1		Begin hand augering
2				2.5			
				3.1	14:30 CPSB24 @ 1 - 1.5		
4					14:35 CPSB24 @ 2 - 2.5		
		As above except an increased gravel content from 0-5' bgs					Cannot collect sample at 5-5.5' because soil is too loose to stay in sampling sleeve. Will try and advance past loose sediment
6				0.9			
8							
10							Refusal on rock at 6' bgs so end of boring. Backfill hole with cuttings.
12							

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LOG OF BORING

Borehole ID: CP-SB-25

Total Depth: 40 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Jose
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe 6620
RG: Leonard Niles	**Drilling Method:** Hand auger and direct push
Geologist: Greg White	**Sampling Method:** 6" brass tubes and 4' acetate liners
Job Number: 26815217.00300	**Date(s) Drilled:** 10/17/05

BORING INFORMATION

Groundwater Depth: 39' bgs during drilling	**Boring Location:** Tog of dirt road above steep hillside
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Brown, moist, silty fine sand with roots and some gravel	SM		15:25 CP-SB-25 @ 0.5-1		Begin hand augering to 5 feet bgs
2					15:30 CP-SB-25 @ 1.5-2		
4					15:35 CP-SB-25 @ 2.5-3		Begin direct push method from 5' bgs 09:45.
6				0	15:50 CP-SB-25 @ 5-5.5		
8							
10		GRAVELLY SAND: Grades to light brown, moist, loose, gravelly fine sand	GP/ SP	1.8	16:00 CP-SB-25 @ 10-10.5		
12		SAND: Grades to light brown, moist, loose to medium dense, fine sand As above except with some gravel	SP				
14				1.3			
16					16:05 CP-SB-25 @ 15-15.5		
18				0.7			
20		As above except brown			16:08 CP-SB-25 @ 19.5-20		
22				1.6			

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LOG OF BORING

Borehole ID: CP-SB-25

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D	Recovery	Comments
24							
26				2.2	16:50 CP-SB-25 @ 25-25.5		
28		SILTY SAND: Brown, moist, very dense grading to medium dense, silty fine sand	SM				
30				4.2			
32		GRAVELLY SAND: Brown and gray, dry to moist, loose, fine to coarse gravelly sand with some cobbles	GP/ SP				
34				14.5			
36					17:10 CP-SB-25 @ 35-35.5		
38							
40		SANDY GRAVEL: Brown, wet, loose, sandy gravel; red soil horizon at 39.5-39.8' bgs	GP				▼ End of boring at 40' bgs. Groundwater encountered at 39' bgs and a 3/4" PVC well was set for groundwater sampling.
42							
44							

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LOG OF BORING

Borehole ID: CP-SB-26

Total Depth: 39 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Jose
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe 6600 - Truck Mounted
RG: Leonard Niles	**Drilling Method:** Hand auger and direct push
Geologist: Greg White	**Sampling Method:** 6" brass tubes and acetate sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/25/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** Tog of dirt road above steep hillside
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Dark grayish brown (10 YR 4/2), fine, loose, moist, with gravel, roots, adn caliche veining	SM		09:20 CP-SB-26 @ 0.5-1		Begin hand augering to 5 feet bgs
2					09:25 CP-SB-26 @ 1.5-2		
4				0.0	09:30 CP-SB-26 @ 2.5-3		
6							Begin direct push method from 5' bgs 09:45.
8		Same as above but becoming medium dense		0.0	09:55 CP-SB-26 @ 5-5.5		
10				0.0			
12					10:00 CP-SB-26 @ 10-10.5		
14				0.0			
16		Same as above but brown (10 YR 4/3) and very dense		0.0	10:05 CP-SB-26 @ 15-15.5		
18				0.0			
20		GRAVELLY SAND: Brown (10 YR 4/3), medium dense, moist, fine to coarse gravel, fine sand, some chert and sandstone fragments	SP		10:20 CP-SB-26 @ 20-20.5		
22		SILTY SAND: Brown (10 YR 4/3), medium dense, moist, silty fine sand with some fine gravel	SM	0.0			

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LOG OF BORING

Borehole ID: CP-SB-26

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		SANDSTONE: Sandstone fragment, poorly cemented, medium to coarse grained sandstone	SS				
		SILTY SAND: Brown (10 YR 4/3), very dense to dense, moist, silty fine sand with some fine gravel	SM				
26		SAND: Brown (10 YR 4/3), medium dense, moist, fine	SP		10:45 CP-SB-26 @ 25-25.5		
		SANDY SILT: Dark brown (10 YR 3/2), medium stiff, moist, fine sandy silt with some fine gravel	ML	0.0			
28		SILTY SAND: Olive brown (2.5 YR 4/3), dense, moist, some gavel, fine sand	SM				
30		SANDY CLAY: Dark olive brown (2.5 Y 3/3), stiff, moist, fine sandy clay, with gravel and some cobbles	CL	0.0			
32							
34		SAND: Pale olive and light gray mottled (5 Y 6/4 - 7/1), very dense, moist, fine sand with some fine gravel. Some large sandstone clasts in sample sleeve from 36-39' bgs.	SP	0.0			
36				0.0	10:50 CP-SB-26 @ 30-30.5		
38							
		SILTSTONE: Siltstone bedrock, gray (5 Y 6/1)					
40							End of boring at 39' bgs on siltstone bedrock at 11:20. Will install a temporary 3/4" PVC well to see if a groundwater sample can be taken.
42							
44							

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LOG OF BORING

Borehole ID: CP-SB-27

Total Depth: 38 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Resonant Sonic
Site Location: Calaveras Rd., Sunol, CA	**Driller:** Jose
Project Manager: Joe Morgan	**Type of Drilling Rig:** Geoprobe 6600 - Truck Mounted
RG: Leonard Niles	**Drilling Method:** Hand auger and direct push
Geologist: Greg White	**Sampling Method:** Dual tube with 1.5" acetate sleeves
Job Number: 26815217.00300	**Date(s) Drilled:** 10/25/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** NW of creek downhill from the leak
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Soil

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		SILTY SAND: Black (5 Y 2.5/2), loose, moist to dry, silty fine sand with some gravel and roots	SM	0.0			Begin hand augering to 5 feet bgs at 11:45.
6		SANDY SILT: Black (5 Y 2.5/2), medium stiff, moist, fine sandy silt with some gravel and caliche veining	ML	0.0			Begin direct push method from 5' bgs 13:00.
8		SILTY SAND: Dark brown (10 YR 3/2), medium dense, moist, fine, some gravel, roots, and caliche veining	SM	0.0			
12		SANDY SILT: Grades to sandy silt, dark brown (10 YR 3/2), medium stiff, moist, fine sandy silt with some gravel and caliche veining	ML	0.0			
16		SILTY SAND: Grades to silty sand, olive brown (2.5 Y 4/3), medium dense, moist, fine, caliche veining	SM	0.0			
20		SANDY CLAY: Olive brown (2.5 Y 4/3), medium stiff, moist, fine, caliche veins	CL				
22		SANDY SILT: Grades to sandy silt, olive brown (2.5 Y 4/3), medium stiff, moist, fine caliche veins	ML	0.0			

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LOG OF BORING

Borehole ID: CP-SB-27

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		SILTY SAND: Grades to silty sand, olive brown (2.5 Y 4/4), medium dense, moist, fine	SM	0.0			
26							
28		SANDY SILT: Grades to sandy silt, olive brown (2.5 Y 4/4), medium stiff, moist, fine	ML				
		SANDY SILT: Sa,e as above but with some clayey sandy zones	SM	0.0			
30							
32		GRAVELLY SAND: Olive brown (2.5 Y 4/4), loose, moist, fine to coarse gravelly fine sand	SP				
		SAND: Light olive brown (2.5 Y 5/4), with some light gray (2.5 Y 7/1) mottling, very dense, moist, fine sand, fine to coarse gravel	SP	0.0			
34							
36		SAND: Same as above with trace gravel	SP	0.0			
38		SILTSTONE: Siltstone bedrock			13:55 CP-SB-27 @ 37.5-38		End of boring at 38' bgs on siltstone bedrock.
40							

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LOG OF BORING

Borehole ID: HSA-1

Total Depth: 37 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Clear Heart Drilling, Inc.
Site Location: 8501 Calaveras Rd., Sunol, CA	**Driller:** Rick Schneider
Project Manager: Joe Morgan	**Type of Drilling Rig:** CME-75
PG: Barbara Jakub	**Drilling Method:** Hollow Stem Auger
Geologist: Leonard Niles	**Sampling Method:** Slide hammer to 2.5', split spoon (1.5 and 2" ID) below
Job Number: 26815217.00500	**Date(s) Drilled:** 10/11/05

BORING INFORMATION

Groundwater Depth:	**Boring Location:** Valley Crest Tree Company
Air Knife or Hand Auger Depth: 4.5 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Exploratory, grouted to surface with bentonite/cement

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		FILL: Thin layer of gravel fill at the surface	ML		10:30 HSA-1-0.5-1		Begin hand augering to 4.5 feet.
2		SANDY SILT: Dark grayish brown, 15-20% fine grained sand, 60% silt, 20% clay, very low plasitcity, damp, root material, no odor		0	10:35 HSA-1-1-1.5		Collected samples with slide hammer to 2.5' bgs.
4					10:40 HSA-1-2-2.5		
6		as above except no root material, caliche veins		0			Grouted boring from 15 feet bgs to surface with cement slurry, and from 37' to 15' bgs with bentonite slurry.
8							
10		SANDY SILT: as above except dark yellowish brown, increasing fine grained sand, no odor	ML	0	11:03 HSA-1-9.8-10.4		
12							
14							
16				0			
18		SILTY GRAVEL: yellowish brown, 15-20% silt, 20-30% fine to coarse grained sand, 50-65% fine to coarse gravel, damp, no odor	GM				
20		SANDY GRAVEL: Sandy gravel with silt, olive gray, 10-15% silt, 25-35% fine to coarse sand, 50-65% fine to coarse gravel, dry no odor	GW/GM	0	11:24 HSA-1-20-20.5		
22							

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LOG OF BORING

Borehole ID: HSA-1

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24							
26							
28							
30		as above except 20-30% fine to coarse grained sand, 55-70% fine to coarse gravel		0			
32							
34							
36		Encountered cobbles at 35 feet bgs, sandstone clasts to 2-3" diameter in cuttings, strong gasoline odor	GW				
				305			▼
38							Encounter refusal at total depth of 37' bgs, 2" of water/mud at bottom measured at 12:45 with WLP. Not enough water to sample.
40							
42							

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LOG OF BORING

Borehole ID: HSA-2

Total Depth: 50.5 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Clear Heart Drilling, Inc.
Site Location: 8501 Calaveras Rd., Sunol, CA	**Driller:** Rick Schneider
Project Manager: Joe Morgan	**Type of Drilling Rig:** CME-75
RG: Leonard Niles	**Drilling Method:** Hollow Stem Auger
Geologist: Leonard Niles	**Sampling Method:** 2" slide hammer/core barrel to 2.5', 2"and 1.5" split spoon
Job Number: 26815217.00500	**Date(s) Drilled:** 10/11/05

BORING INFORMATION

Groundwater Depth:	**Boring Location:** Valley Crest Tree Company
Air Knife or Hand Auger Depth: 4.5 feet	**Boring Diameter:** 2"
Coordinates: X Y	**Boring Type:** Exploratory, grouted to surface with bentonite/cement

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		**FILL: Thin layer of gravel fill at the surface**	ML		14:55 HSA-2-0.5-1		Hand augered to 4.5 feet. Collected samples with a slide hammer to 2.5 feet bgs.
2		SANDY SILT: Dark grayish brown, 15-20% fine sand, 20% clay, 60-65% silt, caliche veins, damp		0	15:00 HSA-2-1-1.5		
4					15:05 HSA-2-2-2.5		
6							Grouted boring with bentonite slurry to 15' bgs, then with cement slurry from 15' bgs to the surface.
8		as above with minor, <2%, coarse sand					
10				0	15:20 HSA-2-9.5-10		
12							
14		SANDY SILT: as above except color change to olive brown, increasing fine sand to 20-30%, 60-70% silt, 10-20% clay	ML	0			
16							
18							
20		as above, olive brown to yellowish brown, minor coarse sand to fine gravel		0	15:45 HSA-2-20-20.5		
22		Contact at 23' bgs, from drill rig behavior					
		SANDY GRAVEL: with silt, olive gray, 10-15% silt, 25-35% fine to	GW/				Driller encounters

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LOG OF BORING

Borehole ID: HSA-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		coarse sand, fine to coarse gravel, dry, no odor, logged from cuttings	GM				gravel at 23' bgs.
26							
28							
30							
32							
34							
36							
38							
40							
42		Contact at 43' bgs - drill rig behavior					
44		SANDY CLAY: Dark greenish gray, highly weathered sandstone bedrock, dry, hard, no odor	CL				Accordingt to driller, out of gravel zone at 43' bgs, highly weathered bedrock below. No groundwater encountered.
46		SANDY SILT: Grades to sandy siltstone to silty sandstone at 45.2' bgs. Light bluish-green gray, weathered, soft, dry, no odor			16:25 HSA-2-45-45.5		
48		Grades to less weathered siltstone, approximate contact at 47' bgs from cuttings.					Weathered dark greenish gray siltstone in cuttings, dry
50		dark bluish-green gray, 20-30% very fine to fine sand, 70-80% silt and clay, weathered, soft, dry, no noticeable odor		189	16:55 HSA-2-50-50.5		Auger encountered refusal at 50' bgs, total depth is 50.5' bgs from split spoon sampler. PID reading downhole from top of auger is 189 ppm.
52							
54							

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LOG OF BORING

Borehole ID: AR-1 (MW-1)

Total Depth: 41 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Test America Drilling
Site Location: 8501 Calaveras Rd., Sunol, CA	**Driller:** Mike Thomas
Project Manager: Joe Morgan	**Type of Drilling Rig:** Schramm T660W Rotadrill
RG: Leonard Niles	**Drilling Method:** Air Rotary Casing Hammer
Geologist: Leonard Niles	**Sampling Method:** 1.5" Standard Penetrometer, 2" Split Spoon
Job Number: 26815217.00500	**Date(s) Drilled:** 10/18/05, 10/20/05
BORING INFORMATION	
Groundwater Depth: 37.9 feet bgs (initial), 38.2 feet bgs (static)	**Boring Location:** Valley Crest Tree Company
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 9"
Coordinates: X Y	**Boring Type:** Completed as groundwater monitoring well MW-1

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		FILL: Thin gravel fill layer, 1" thick at surface	ML				Hand augered to 5 feet bgs.
2		SANDY SILT: Very dark gray (2.5 Y 3/1), 5% clay, 75% silt, 20% fine sand, very low plasticity, very stiff, damp, white caliche fragments					Well completion: 4" ID sch 40 PVC, screened at 29.3-39.3' bgs, see well diagram for details
4							
6				0			Begin rotary drilling at 5', drove 6" casing behind bit
8							
10		SANDY SILT: Dark grayish brown (10 YR 4/2), 10-20% clay, 15-20% fine grained sand, 60-75% silt, hard, damp to dry, <5% coarse grained sand	ML	0			
12							
14							
16							
18		as above, brown (10 YR 4/3)		0			
20							
22							

URS

LOG OF BORING

Borehole ID: AR-1 (MW-1)

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		contact at 25' bgs, from cuttings					
26		SANDY GRAVEL: Grayish brown (10 YR 5/2), 10% silt, 30% fine to coarse sand, fine to coarse sub rounded gravel to 2" diameter, dry - logged from cuttings	GW				
28				0			
30		as above, subrounded to angular sandstone, chert and greenstone clasts					
32							
34							
36							PID reading collected from top of drive casing in open borehole
38				3	MW-1-38.5 -39 on 10/18/05		▽
40		SILTSTONE: very dark greenish gray (10 YR 3/1), 80-85% silt and clay, 15-20% very fine sand, soft, moist, hydrocarbon odor, weathered		1.6 70 650	Ground-water sample MW-1-GW @ 15:00 on 10/20/05		Depth to water = 37.9' @ 14:16, 0.6" water in the hole. 10/18/05 - drilled to 38 ft bgs with 6" casing. 10/20/05 overdrilled with 9" casing to 41 ft bgs, total depth of boring at 10:15.
42							
44							
46							
48							
50							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: AR-2

Total Depth: 108 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Test America Drilling
Site Location: 8501 Calaveras Rd., Sunol, CA	**Driller:** Mike Thomas
Project Manager: Joe Morgan	**Type of Drilling Rig:** Schramm T660W Rotadrill
RG: Leonard Niles	**Drilling Method:** Air Rotary Casing Hammer
Geologist: Leonard Niles	**Sampling Method:** 1.5" Standard Penetrometer, 2" Split Spoon
Job Number: 26815217.00500	**Date(s) Drilled:** 10/18/05, 10/19/05

BORING INFORMATION

Groundwater Depth: Not Encountered	**Boring Location:** Valley Crest Tree Company
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 6"
Coordinates: X Y	**Boring Type:** Exploratory, grouted to surface with cement/ 5% bentonite

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		FILL: Thin layer of gravel fill at the surface.	ML				Hand augered to 5 feet bgs.
2		SANDY SILT: Very dark gray (10 YR 3/1), 10% clay, 60-70% silt, 20-30% fine grained sand, very low plasticity, damp, caliche gragments and veins					Grouted boring to surface with cement/ 5% bentonite grout slurry on 10/19/05.
4							
6							Drilled with 6" rotary and drove casing to 8.5'
8							
10		SANDY SILT: as above except grayish brown (10 YR 5/2), 5-10% clay, 50-60% silt, 35-50% fine grained sand, hard, dry, no hydrocarbon odor, high estimated permeability	ML	0			
12							
14							
16		SANDY GRAVEL: Very dark gray (2.5 Y 3/1), 10% silt and clay, 25-30% fine to coarse sand, 60-65% fine to coarse, sub-rounded to sub-angular gravel, very dense, dry, sandstone and chert gravel clasts to 2" diameter, no hydrocarbon odor	GW				
18				0	CP-AR-2-18.5-19		
20							
22							

URS

LOG OF BORING

Borehole ID: AR-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
58		grading to silty claystone, contact approximate from cuttings					
60		SILTY CLAY: Very dark greenish gray (10 Y 3/1), 50-60% clay, 40-50% silt, <10% very fine grained sand, low estimated permeability, soft, dry-logged from cuttings	CL				
62							
64							
66							
68							
70							
72							
74							
76							
78		Silty claystone as above except dark greenish gray (10 Y 3/1), 50-60% clay, 40-50% silt, 5-10% fine grained sand, soft, damp, moderate plasticity (when wet), no hydrocarbon odor, low-very low est. k		0			
80							Drilled to 79' with tri-cone rotary bit, drove standard penetrometer to 79.5'.
82							
84							
86							
88							
90							

URS

LOG OF BORING

Borehole ID: AR-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24							
26							
28		as above but moist (not wet)					
30		CLAYEY SILT: Very dark greenish gray (10 Y 3/1), 20-30% clay, 60-70% silt, 10% very fine grained sand, soft, dry, no hydrocarbon odor, low estimated permeability	ML	0	CP-AR-2-28.5-29		Drove 6" casing to 28.5'. Bedrock encountered at 29', no water found.
32		as above except numerous sandstone adn chert clasts in cuttings-slough falling from above?					Drilled below 30' with tri-cone rotary bit, 6" casing at 29'.
34							
36							
38							
40		Very dark greenish gray (10 Y 3/1), as above except increasing clay to 30-40%, 50-60% silt, 10-15% fine grained sand; about 2" of gravel slough at top of sampler; siltstone appears to be grading to claystone, no hydrocarbon odor		0			
42							
44							
46							
48							
50							
52							
54							
56							

URS

LOG OF BORING

Borehole ID: AR-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
92							
94		Contact approximately 95' bgs					
96		SILTY CLAY: dark greenish gray (10 Y 3/1) 50-60% clay, 40-50% silt, 10% very fine grained sand, hard, damp to moist, very low estimated permeability; appears to be highly weathered claystone, possibly fault gauge, disturbed structure	CL	0			Rotary bit at 97', drove standard penetrometer 97-97.5'.
98							
100							
102							
104		Contact approximately 105 ft bgs from drill rig behavior					
106		ULTRABASIC IGNEOUS ROCK. Basalt or Gabbro, very dark gray (2.5 Y 3/1), minor quartz, mostly dark minerals, hard, damp to dry, very low estimated permeability.	BAS or GAB				More difficult drilling at 105'
108							Borehole ends, no sample recovery at 108' bgs, total depth of borehole @ 14:45, 10/19/05.
110							
112							
114							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: AR-3 (MW-2)

Total Depth: 39 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Test America Drilling
Site Location: 8501 Calaveras Rd., Sunol, CA	**Driller:** Mike Thomas
Project Manager: Joe Morgan	**Type of Drilling Rig:** Schramm T660W Rotadrill
RG: Leonard Niles	**Drilling Method:** Air Rotary Casing Hammer
Geologist: Leonard Niles and Greg White	**Sampling Method:** 1.5" Standard Penetration Split Spoon
Job Number: 26815217.00500	**Date(s) Drilled:** 10/20/05 - 10/21/05
BORING INFORMATION	
Groundwater Depth: 38.7 feet bgs (initial), 34.5 feet bgs (static)	**Boring Location:** Valley Crest Tree Company
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 9"
Coordinates: X Y	**Boring Type:** Completed as groundwater monitoring well MW-2

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		FILL: Thin gravel fill layer, 1" thick at surface	ML				Hand augered to 5' bgs.
2		SANDY SILT: Very dark gray to black (10 YR 3/1 - 2/1), < 10% clay, 50-60% silt, 40-50% fine to coarse grained sand, <5% gravel, damp, caliche fragments and veins					Moved location 2 ft after obstruction (gravel) encountered at 4.5 ft bgs. Encountered obstruction again at 4.5 ft but hand augered through to 5' bgs.
4		Encountered gravel clasts at 4.5' bgs					
6							Well completion: 4" ID sch 40 PVC, screened at 23.3-38.3 ft bgs, see well diagram for details.
8		Same as above except very dark grayish brown (10 YR 3/2), increased plasticity, hard, friable, damp, caliche veins, some fine to coarse gravel, trace roots		0.0			
10		same as above, color change to brown (10 YR 4/3) from cuttings					
12							
14							
16		same as above, dark grayish brown (10 YR 4/2), increasing coarse sand and fine gravel, damp					
18							drove 9" casing to 18.5'
20		SANDY GRAVEL: Dark grayish brown (10 YR 4/2) to dark gray (10 YR 4/1), 10-15% silt, 20-30% fine to coarse sand, 45-55% fine to coarse gravel, dry	GW/GM				Resumed drilling on 10/21/05 from 10/20/05.
22							

URS

LOG OF BORING

Borehole ID: AR-3 (MW-2)

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24							
26		SANDY GRAVEL: Dark greenish gray (Y 4/1) to light olive brown (2.5 Y 5/3), fine to coarse gravel, moist	GW				
28							
30				0.0			Moisture content in cuttings is increasing at 32' bgs. Collect cuttings.
32		Color as above, fine to coarse sand and gravel, little fines, moist, logged from cuttings		0.0			Cuttings change color to a darker gray and become fined at ~34' bgs.
34		Bedrock contact at 34' bgs, from cuttings SILTSTONE: Dark greenish gray (5 G 4/1), moist					{Water level is 34.5 ' bgs at 09:20 on 10/27/05.}
36							
38							▼
40				0.0			Bedrock encountered in splitspoon collected from 39' bgs.
42							Brought casing up to ~34' and checked water level. Borehole open to total depth of 39' bgs and the water level is at 38.7' bgs, at 9:00 on 10/21/05.
44							
46							
48							

URS

1333 Broadway, Suite 800
Oakland, California 94612

LOG OF BORING

Borehole ID: AR-4 (MW-3)

Total Depth: 38 feet bgs

PROJECT INFORMATION	DRILLING INFORMATION
Project: Chevron Pipeline	**Drilling Company:** Test America
Site Location: 8501 Calaveras Rd., Sunol, CA	**Driller:** Mike Thomas
Project Manager: Joe Morgan	**Type of Drilling Rig:** Schramm T660W Rotadrill
RG: Leonard Niles	**Drilling Method:** Air Rotary Casing Hammer
Geologist: Greg White	**Sampling Method:** 18" standard split spoon
Job Number: 26815217.00500	**Date(s) Drilled:** 10/21/05
BORING INFORMATION	
Groundwater Depth: Not Encountered	**Boring Location:** Valley Crest Tree Company
Air Knife or Hand Auger Depth: 5.0 feet	**Boring Diameter:** 9"
Coordinates: X Y	**Boring Type:** Completed as groundwater monitoring well MW-3.

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample ID	Recovery	Comments
0		FILL	ML				Hand augered to 5' bgs.
2		SANDY SILT: Black (10 YR 2/1), soft, moist, track gravel, caliche veins, fine					Well completion: 4" ID sch 40 PVC screened at 21.3-36.3 ft bgs, see well diagram for details.
4							
6							
8		Very dark grayish brown (10 YR 3/2), increased fine sand content, stiff, moist, some gravel, chert nodules, caliche veins, poorly cemented sandstone fragments.					
10							
12							
14							
16							
18		Dark yellowish brown (10 YR 4/4), fine to medium sand, gravel and rock fragments increasing with depth					
20		SANDY GRAVEL: Gray to yellowish brown (10 YR 5/1 - 5/3), some fines, fine to coarse sand and gravel, moist	GW				
22							

URS

LOG OF BORING

Borehole ID: AR-4 (MW-3)

Depth (ft bgs)	Symbol	Lithologic Description	USCS	PID (ppm)	Sample I.D.	Recovery	Comments
24		SANDY GRAVEL as above, logged from cuttings					
26							
28							
30		as above except increased moisture content in cuttings		0.0			Logged cuttings from hopper at 29' bgs because split spoon recovery has been very poor in the gravel layer.
32							
34		SILTSTONE: Bedrock contact at 33' bgs, from cuttings					At 32' bgs moisture content in soil increased. Cuttings changed to gray fines - bedrock contact at 33' bgs.
36							
38							End of boring in siltstone layer at 38' bgs. Checked water level after pulling casing up to 33' bgs. No groundwater was encountered. Completed as monitoring well to 38' bgs in case groundwater rises into the well.
40							
42							
44							

URS

Well Construction Details

(monitoring well)

Project: Chevron Pipeline - Sunol

Project Number: 26815217.02400

Well Name: MW-1 (boring AR-1)

Well Type: Groundwater Monitoring

Supervised by: G. White / L. Niles

Installation Date: 10 /20 / 2005

Drilling Company: Test America

Construction Method: Air Rotary Casing Hammer

Drilling Method (if different): Air Rotary Casing Hammer

Well Owner: Chevron Pipeline Company

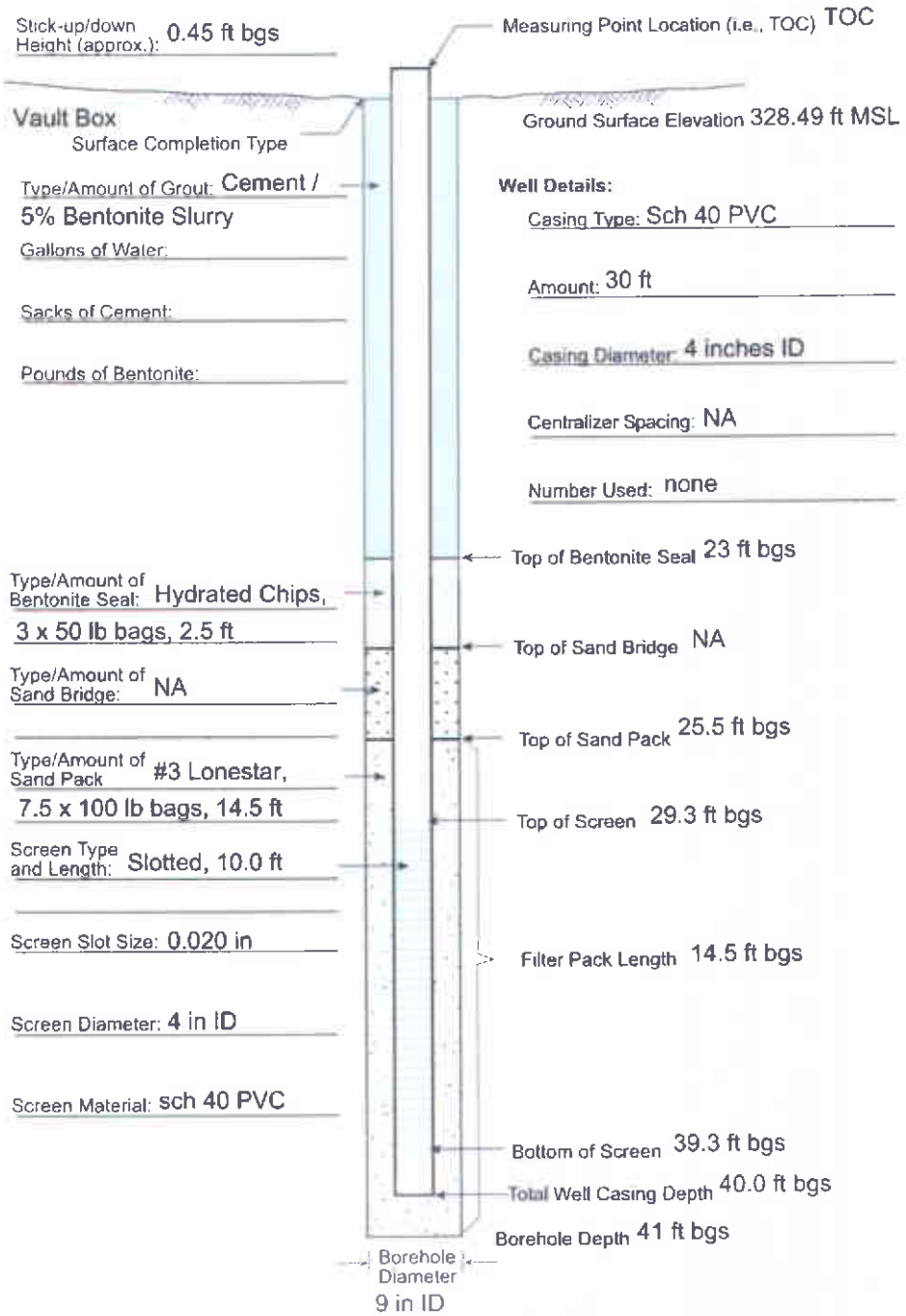
Address: 2811 Hayes Rd., Houston, TX 77082

Phone (281) 596-3564

Location Description:

Valley Crest Tree Co.

8501 Calaveras Rd., Sunol, CA



URS

Well Construction Details

(monitoring well)

Project: Chevron Pipeline - Sunol

Project Number: 26815217.02400

Well Name: MW-2 (boring AR-3)

Well Type: Groundwater Monitoring

Supervised by: G. White

Installation Date: 10 /21 / 2005

Drilling Company: Test America

Construction Method: Air Rotary Casing Hammer

Drilling Method (if different): Air Rotary Casing Hammer

Well Owner: Chevron Pipeline Company

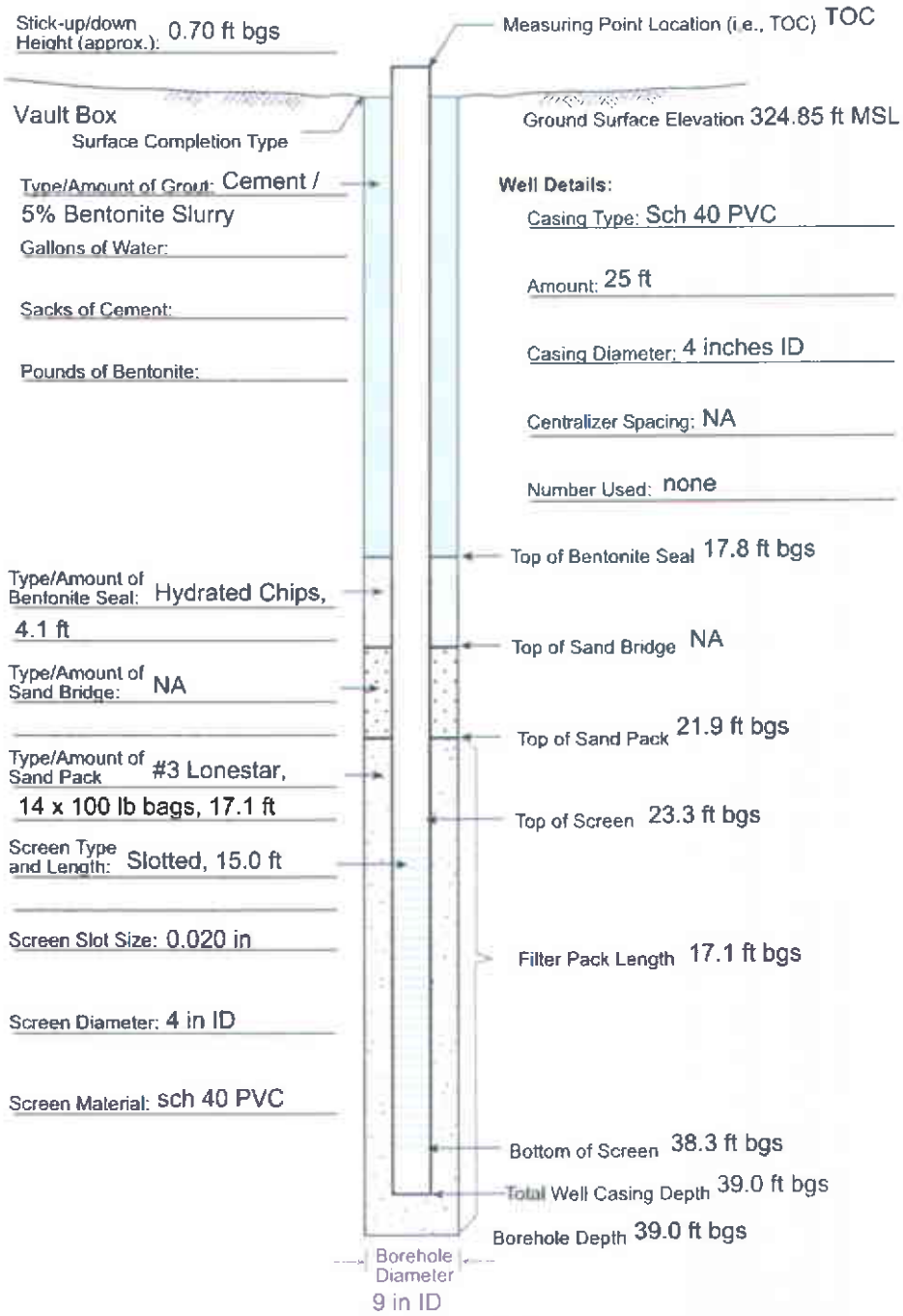
Address: 2811 Hayes Rd., Houston, TX 77082

Phone (281) 596-3564

Location Description:

Valley Crest Tree Co.

8501 Calaveras Rd., Sunol, CA



URS

Well Construction Details

(monitoring well)

Project: Chevron Pipeline - Sunol

Project Number: 26815217.02400

Well Name: MW-3 (boring AR-4)

Well Type: Groundwater Monitoring

Supervised by: G. White

Installation Date: 10 /21 / 2005

Drilling Company: Test America

Construction Method: Air Rotary Casing Hammer

Drilling Method (if different): Air Rotary Casing Hammer

Well Owner: Chevron Pipeline Company

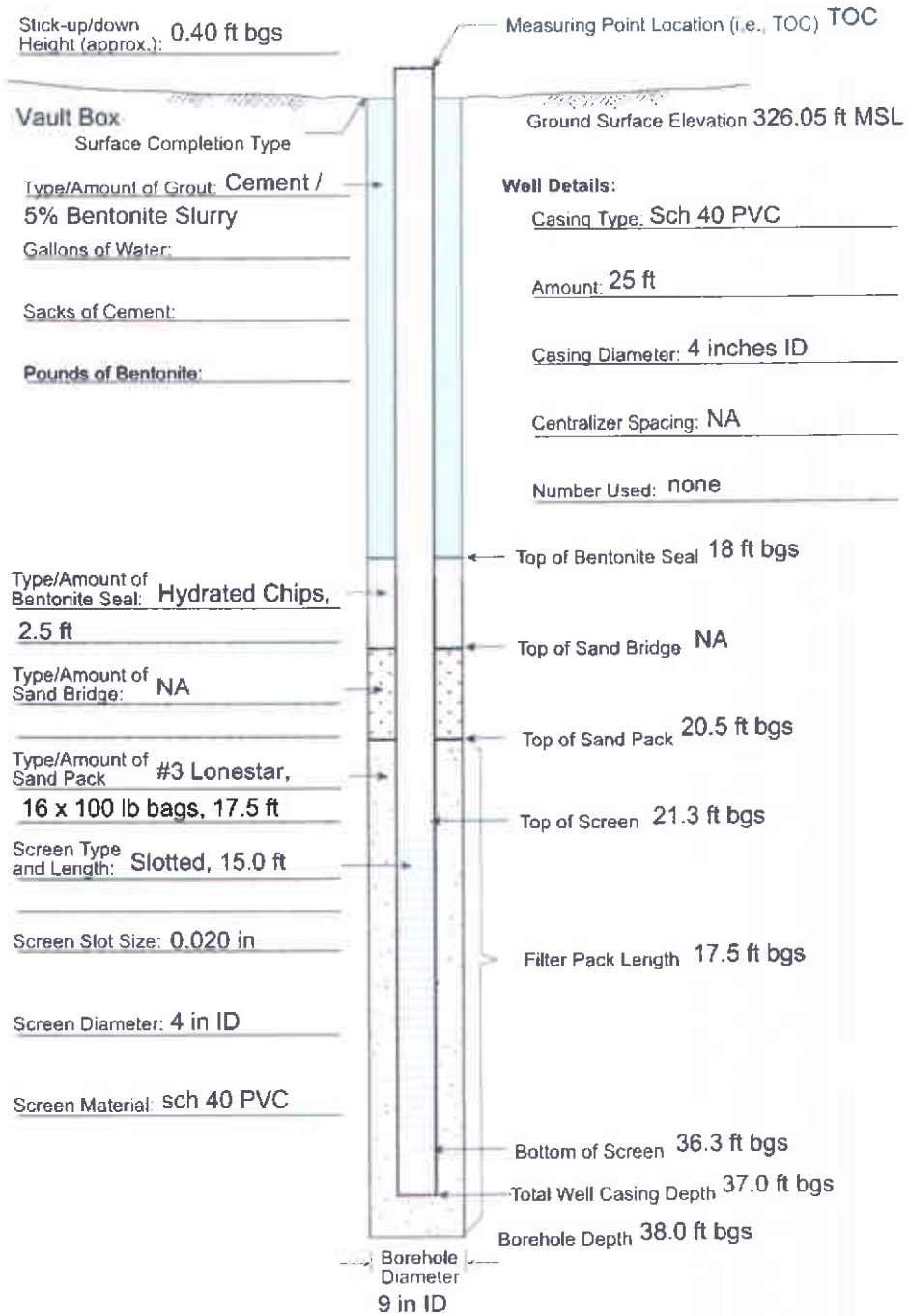
Address: 2811 Hayes Rd., Houston, TX 77082

Phone (281) 596-3564

Location Description:

Valley Crest Tree Co.

8501 Calaveras Rd., Sunol, CA



Appendix E
Laboratory Analytical Results

Appendix F
Well Development Forms

URS

WELL DEVELOPMENT FORM

Well Identifier: MW-1

Date Developed: 10/27/2005

Project Name: Chevron Pipeline

Project Number: 26815217

Personnel: Greg White (URS) & Junior (Resonant Sonic)

Time (Initial WL): 12:45

Initial Water Level (WL): 37.77 ft.

Depth to Product: -- ft.

Total Well Depth (T.D.): 39.63 ft.

Casing Diameter (D): 4 in.

Casing Volume (A): 1.21 gal.

Saturated Sandpack Volume (B): 1.48 gal.

Total Well Volume (A + B): 2.69 gal.

Total Volume to be Removed: ~10-15 gal.

PURGE METHOD: BAILER X PUMP _____ OTHER: Mechanical Surge Block

Pump / Bailer Type: Mechanical surge block and 10' x 3.5" Stainless Steel Bailer

Time	Volume Removed (gal)	Depth to Water (ft.)	Depth to Bottom (ft.)	Temp. (°C)	pH	Cond. (mS/cm)	Turb. (NTU)	Odor	Color	Comments
13:10	3			17.9	7.29	1.71	1000	Gasoline-Strong	Gray-Brown	Sheen on water
13:15	6			17.2	7.26	1.53	1000	Gasoline-Strong	Gray-Brown	Sheen on water
13:25	16			17	7.1	1.31	999	Gasoline-Strong	Light Brown	Sheen on water
13:45	24			16.9	7.04	1.28	999	Gasoline-Strong	Light Brown	Sheen on water
14:00	28			17	7.05	1.27	933	Gasoline-Strong	Light Brown	Sheen on water

Comments: 12:50 Strong odor coming from well

13:25 Some product accumulation on purge water in drum. Ambient PID: Ranging from 1.5-7.5ppm -- Dreger Tube ~5ppm

14:30 Strong gasoline odor from drum and well, some free product has accumulated in drum. End development.

Surge Time: 12:50-13:00

Start Purge Time: 13:05

End Purge Time: 14:30

Total Volume Purged: 32 gal.

Purged Dry? No

Final Water Level: 38.07 (Rising) ft.

Final Depth: 39.63 ft.

Time: 14:45

Formula for Calculating Casing Volume

$$[A] = \frac{\pi D^2 h}{4} * 7.48 \frac{gal}{ft^3}$$

D = Well diameter (feet)
h = Height of water column (feet)

Formula for Calculating Volume of Water within the Filter Pack

$$[B] = \left[\frac{\pi D_b^2}{4} h_{sat} - \frac{\pi D_a^2}{4} h_{sat} \right] * [f_p] * 7.48 \frac{gal}{ft^3}$$

D_a = Well diameter (feet)
D_b = Boring diameter (feet)
h_{sat} = saturated filter pack length (ft)
f_p = filter pack porosity = 30%

URS

WELL DEVELOPMENT FORM

Well Identifier: MW-2 | Date Developed: 10/27/2005

Project Name: Chevron Pipeline | Project Number: 26815217

Personnel: Greg White (URS) & Junior (Resonant Sonic) | Time (Initial WL): 9:20

Initial Water Level (WL): 33.81 ft. | Depth to Product: -- ft.

Total Well Depth (T.D.): 38.75 ft. | Casing Diameter (D): 4 in.

Casing Volume (A): 3.22 gal. | Saturated Sandpack Volume (B): 3.92 gal.

Total Well Volume (A + B): 7.14 gal. | Total Volume to be Removed: ~30-35 gal.

PURGE METHOD: BAILER X PUMP _____ OTHER: Mechanical Surge Block

Pump / Bailer Type: Mechanical surge block and 10' x 3.5" Stainless Steel Bailer

Time	Volume Removed (gal)	Depth to Water (ft.)	Depth to Bottom (ft.)	Temp. (°C)	pH	Cond. (mS/cm)	Turb. (NTU)	Odor	Color	Comments
9:40	3			16.1	7.12	2.14	1000	None	Gray-Brown	
9:45	6			15.9	7.08	1.7	1000	None	Gray-Brown	
9:50	12			16	6.97	1.49	1000	None	Gray-Brown	
9:53	15			16.1	6.97	1.27	999	None	Light Gr/Brn	
9:57	16			16	6.92	1.22	653	None	Light Brown	
10:00	18	37.40 (Rising)	38.79	16	6.86	1.2	313	None	Very Lt Brn	
10:05	20			16.1	6.89	1.19	288	None	Pale Brown	
10:13	21			16.1	6.88	1.18	259	None	Pale Brown	
10:22	26			15.9	6.85	1.16	91	None	Cloudy	
10:32	30			15.9	6.88	1.16	88	None	Clear/Cloudy	
10:40	32			16	6.87	1.16	80	None	Clear/Cloudy	
10:50	36			16.2	6.94	1.16	65	None	Clear/Cloudy	
11:20	53			16.2	7.04	1.16	76	None	Clear/Cloudy	

Comments: 10:05 Very slight sheen observed on drummed purge water (~18 gallons removed so far)

Surge Time: 9:25-9:35

Start Purge Time: 9:35 | End Purge Time: 11:25

Total Volume Purged: 54 gal. | Purged Dry? No

Final Water Level: 34.90 (Rising) ft. | Final Depth: 38.79 ft. | Time: 11:35

Formula for Calculating Casing Volume

$$[A] = \frac{\pi D^2 h}{4} * 7.48 \frac{gal}{ft^3}$$

D = Well diameter (feet)
h = Height of water column (feet)

Formula for Calculating Volume of Water within the Filter Pack

$$[B] = \left[\frac{\pi D_b^2}{4} h_{sat} - \frac{\pi D_a^2}{4} h_{sat} \right] * [f_p] * 7.48 \frac{gal}{ft^3}$$

D_a = Well diameter (feet)
D_b = Boring diameter (feet)
h_{sat} = saturated filter pack length (ft)
f_p = filter pack porosity = 30%