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November 20, 2002

Alameda County
NOV 22 2002
Environmental Health

Mr. Amir Gholami
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502

Subject: *Proposed Dual-Phase High Vacuum Pilot Test and Temporary Well Installation Work Plan*
Former Chevron Service Station No. 9-0260
21995 Foothill Boulevard
Hayward, California
Delta Project No. DG90-260

Dear Mr. Gholami:

Delta Environmental Consultants Inc. (Delta) has been authorized by Chevron Products Company (Chevron) to perform a three-day (72-hour) high vacuum dual-phase extraction (DPE) pilot test at the subject site (Figures 1 and 2). The purpose of the pilot test is to assess whether saturated subsurface soils at the site can be effectively dewatered to expose the hydrocarbon "smear zone" for soil vapor extraction. The data collected from this event will be used to modify or redesign the current multi phase extraction (MPE) system at the subject site. In an effort to collect the necessary data for design, two temporary wells are proposed to be installed.

Soil Borings and Sampling

Two soil borings will be completed as temporary groundwater monitoring wells TMP-1 and TMP-2. These wells will be used to facilitate the collection of vacuum and groundwater elevation data during the pilot test. The proposed locations of the monitoring wells are shown on Figure 2. Field methods and procedures used by Delta during installation of these wells are summarized in Enclosure A.

Soil samples will be collected from each soil boring at a minimum of 5-foot intervals and at changes in lithology to the total depth of the boring. The soil samples from each boring will be logged using visual and manual methods, and field-analyzed for the presence of organic vapors using a photoionization detector (PID). Soil samples will be submitted for chemical analysis based on field screening results, depth of the soil samples, and soil lithology.

Soil Sample Analytical Results

Selected soil samples will be submitted from each boring to Lancaster Laboratories (Lancaster) of Lancaster, Pennsylvania for analysis of benzene, toluene, ethylbenzene, and total xylenes (BTEX) and methyl tertiary butyl ether (MTBE) using EPA Method 8260B, total petroleum hydrocarbons as gasoline range organics (TPH-GRO) using Northern California LUFT Method. Soil samples will be collected using the procedures described in Enclosure A.

Temporary Monitoring Well Installation

Temporary groundwater monitoring wells TMP-1 and TMP-2 will be advanced for pilot test purposes. The wells will be installed 5 feet upgradient and 10 feet downgradient of monitoring well MW-4. The wells will be constructed of 3/4-inch diameter, Schedule 40 PVC casing to approximately 25 feet bsg. The well annulus of each well will be filled with #3 Lonestar sand to 1 foot above the top of the well screen. The wells will be screened over the lower-most 20 feet using 0.020-inch wide slotted casing. A 6-inch thick bentonite seal will be emplaced above the filter pack, and the remaining annular space will be filled with cement grout containing approximately five percent bentonite powder to approximately 1-foot bsg. The top of each well will be completed with a flush grade traffic rated well cover set in concrete. The wells will be surveyed in using existing wells as benchmarks. The wells are tentatively scheduled to be installed on December 6, 2002. The temporary wells will be properly abandoned by pressure grouting within 90-days after the pilot test. Field methods and procedures for proposed well installations are summarized in Enclosure A. Proposed well construction details are included in Enclosure B.

Pilot Test Description

The pilot test will consist of installing a 1/3 horsepower electric frequency controlled submersible pump in monitoring well MW-4 and connecting the well head to a mobile high vacuum MPE unit with a minimum of 2-inch diameter piping. The submersible pump will be lowered into the well approximately within one foot of the bottom. Prior to applying a vacuum to the well, the submersible pump will be started in an effort to achieve a maximum sustainable drawdown in the well. After maximum drawdown has been achieved, the actual DPE test will begin. Groundwater will be extracted from monitoring well MW-4 and discharged into a minimum of one 21,000-gallon holding tank prior to being treated by granular activated carbon (GAC) and discharged through a flow totalizer and then to the Oro Loma Sanitary Sewer under permitted conditions. Soil vapors will be extracted from monitoring well MW-4 by a high vacuum 150 to 350 standard cubic feet per minute 25 horsepower liquid ring pump blower and treated by a catalytic/thermal oxidizer prior to being discharged to the atmosphere under the approval of the Bay Area Air Quality Management District (BAAQMD). Figure 3 presents the process flow diagram for the MPE pilot-testing event.

Pilot Test Monitoring Parameters

Prior to test, the following tasks will be performed:

- Measure and record depth to water in temporary wells TMP-1 and TMP-2, all monitoring wells and dual phase vapor extraction wells DVE-5, DVE-6, DVE-9, DVE-10, DVE-17, and DVE-18.

- Measure and record static well pressures/vacuums in inches of water in temporary wells TMP-1 and TMP-2, monitoring wells MW-4, MW-7 and MW-11 and dual phase vapor extraction wells DVE-5, DVE-6, DVE-9, DVE-10, DVE-17, and DVE-18.

During the pilot test the following tasks will be performed:

- Measure and record depth to water, and well casing pressures/vacuums, in temporary wells TMP-1 and TMP-2, monitoring wells MW-4, MW-7 and MW-11 and dual phase vapor extraction wells DVE-5, DVE-6, DVE-9, DVE-10, DVE-17, and DVE-18 within the first hour of the test and then every two hours for the remainder of the test.

- Collect influent groundwater and soil vapor samples within the first hour of the test; 8 hours after startup; and then daily at approximately 10 AM every day thereafter for analyses of BTEX and MTBE by EPA Method 8020 and TPHg by EPA Method 8015M. If present, MTBE will be confirmed by EPA Method 8260.

- Measure and record influent groundwater and soil vapor flow rates; influent soil vapor non-methane hydrocarbon concentrations with a flame ionization detector (FID); and vacuums/pressures at test equipment and test wellhead (well casing) within the first hour of the test; then every two hours for the remainder of the test.

- Measure catalytic/thermal oxidizer effluent concentrations with FID at startup and once daily at approximately 10 AM thereafter (if the MPE unit is permitted through BAAQMD as mobile testing equipment, this may not be necessary).

- Approximately one hour prior to test shutdown collect depth to water measurements from TMP-1 and TMP-2, and all monitoring wells and dual phase vapor extraction wells DVE-5, DVE-6, DVE-9, DVE-10, DVE-17, and DVE-18.

Enclosure C contains sample pilot test field data collection sheets.

Treatment and Disposal of Extracted Groundwater

Extracted groundwater will be pumped into a temporary 21,000-gallon holding tank and then discharged through two 1,000-pound GAC vessels placed in series and a flow-totalizing meter prior to sanitary sewer discharge. At a minimum, a groundwater effluent sample will be collected during the first day of sewer discharge. The sample will be sent to a California–Certified laboratory where it will be analyzed for BTEX, MTBE by EPA Method 8020 and TPHg by EPA Method 8015 Modified. Reported concentrations of MTBE by EPA Method 8020 will be confirmed by EPA Method 8260. The discharge will comply with the permit requirements as set forth by the Oro Loma Sanitary Sewer Department.

Schedule and Findings

The three-day pilot test is tentatively scheduled for week of December 9, 2002. The actual dates may vary depending upon equipment and vendor availability and permits. The test is scheduled to last approximately 72 hours; however, if prior to the 72-hour testing period, the test proves to yield no additional useful data, the test may be terminated early.

At the termination of the pilot test, the data will be compiled and evaluated to assess whether a modified MPE system can effectively remediate the remaining hydrocarbon impacts at the site. The findings, conclusions and recommendations will be presented in a Pilot Test Results Report within 60 days of the conclusion of the test.

Remarks and Signatures

The interpretations contained in this document represent our professional opinions are based, in part, on information supplied by the client. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydro-geologic and engineering practices at this time and location. Other than this, no warranty is implied or intended.

If you have any questions concerning this project, please contact Ben Heningburg at (916) 536-2623 or Steven Meeks at (916) 536-2613.

Sincerely,

DELTA ENVIRONMENTAL CONSULTANTS, INC.

for

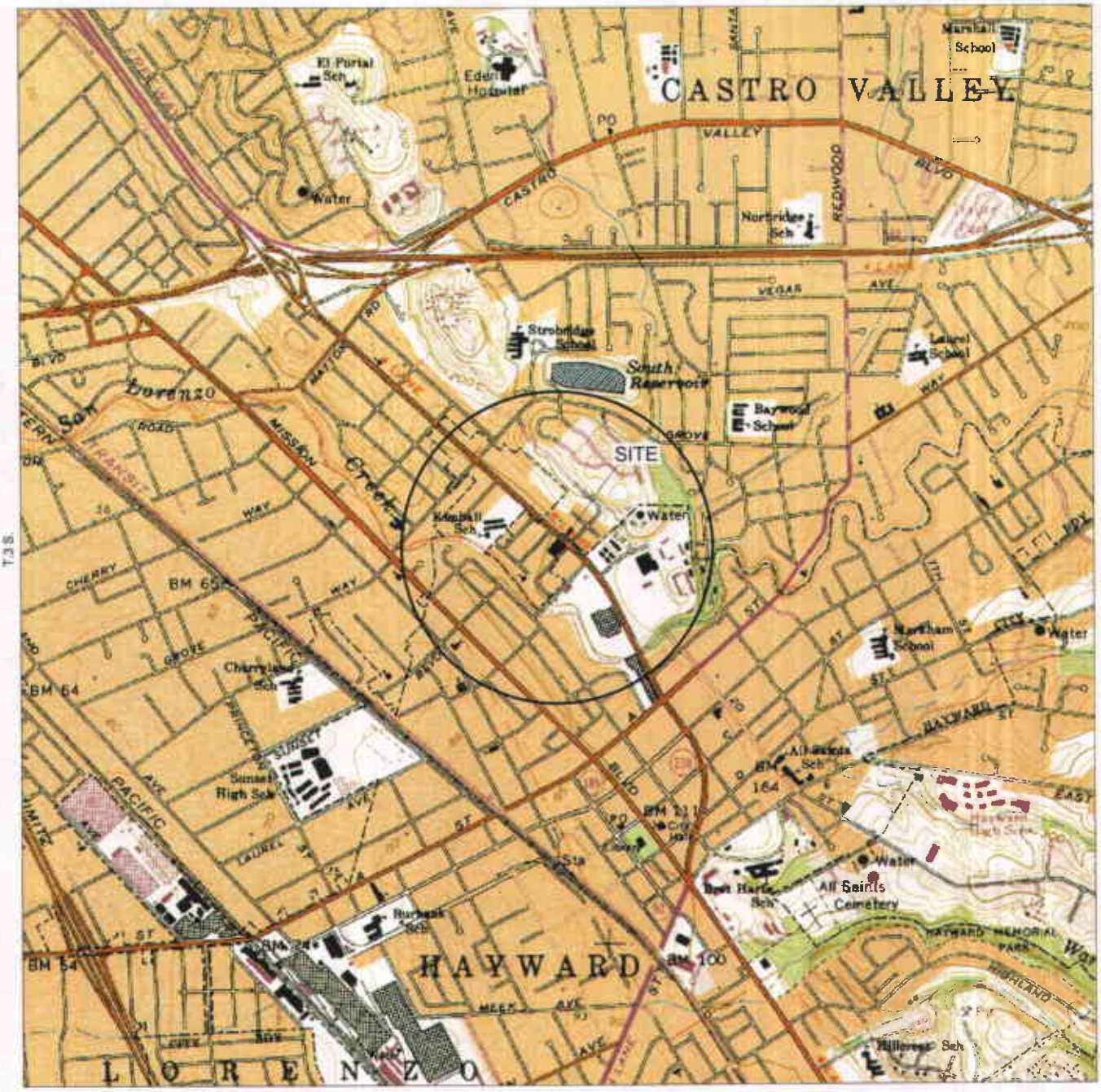
Benjamin I. Heningburg
Project Manager

11/26/02

Steven W. Meeks, P.E.
Senior Engineer
California Registered Civil Engineer No. C057461

SWM (Lrp002.9-0260 Pilot Testing)
Enclosures

cc: Ms. Karen Streich – Chevron Products Company
Mr. Hugh Murphy – City of Hayward Fire Dept. Department - HAZMAT Division
Mr. James Brownell – Delta Environmental Consultants, Inc.



GENERAL NOTES:
BASE MAP FROM U.S.G.S.
HAYWARD, CA.
7.5 MINUTE TOPOGRAPHIC
PHOTOREVISED 1980

QUADRANGLE LOCATION

N

0 2000 FT

SCALE 1:24,000

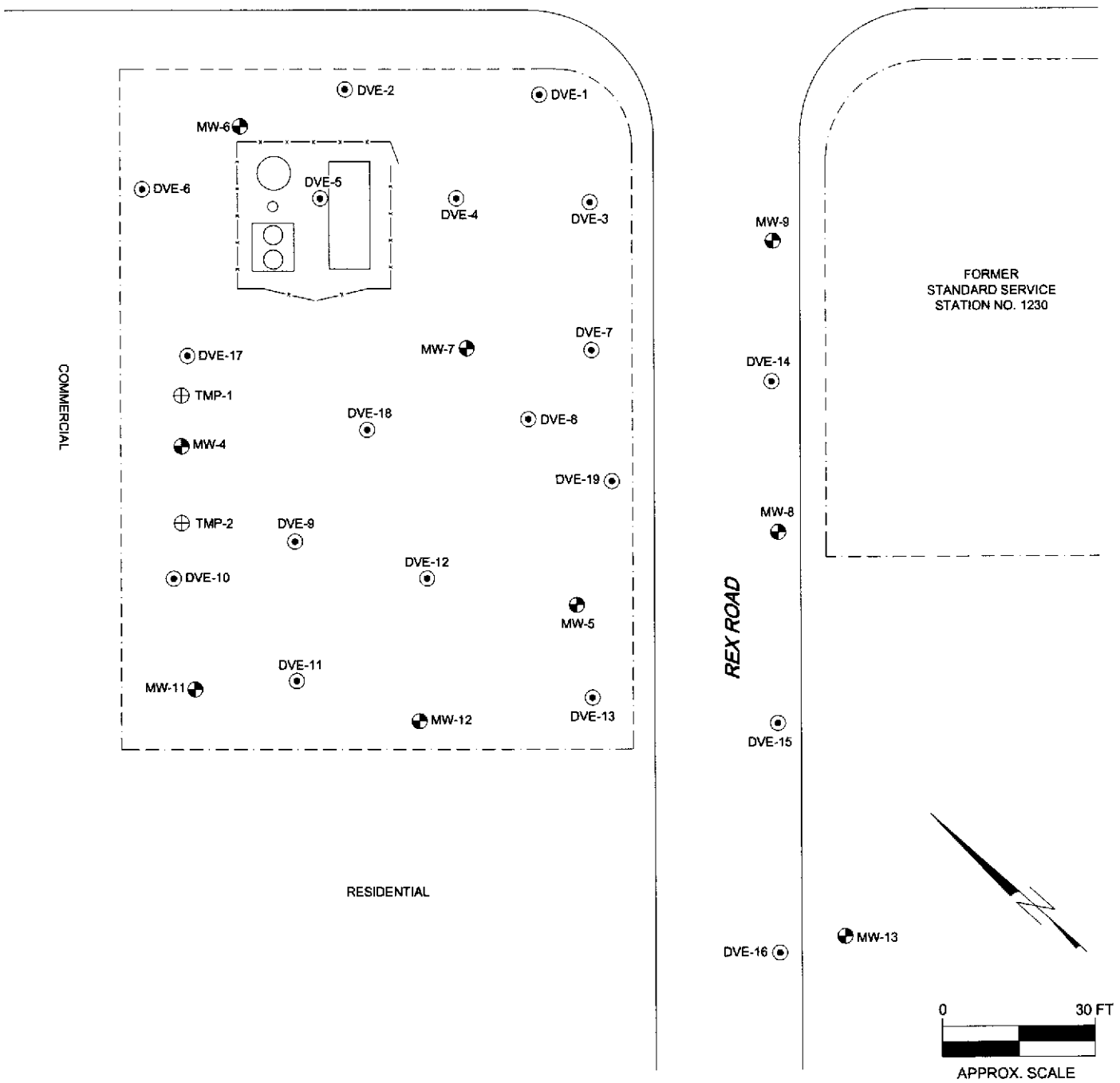
FIGURE 1

SITE LOCATION MAP

FORMER CHEVRON STATION NO. 9-0260
21995 FOOTHILL BOULEVARD
HAYWARD, CA.

PROJECT NO. DG90-260	DRAWN BY M.L. 9/17/02
FILE NO. DG90260A	PREPARED BY W.S.
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.



LEGEND:

- MW-17 MONITORING WELL LOCATION
- DVE-16 DUAL VACUUM EXTRACTION WELL LOCATION
- TMP-1 TEMPORARY MONITORING WELL LOCATION

FIGURE 2

SITE MAP

FORMER CHEVRON STATION NO. 9-0260
21995 FOOTHILL BOULEVARD
HAYWARD, CA.

PROJECT NO. DG90-260	DRAWN BY M.L. 11/6/02
FILE NO. DG90260D	PREPARED BY W.S.
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.

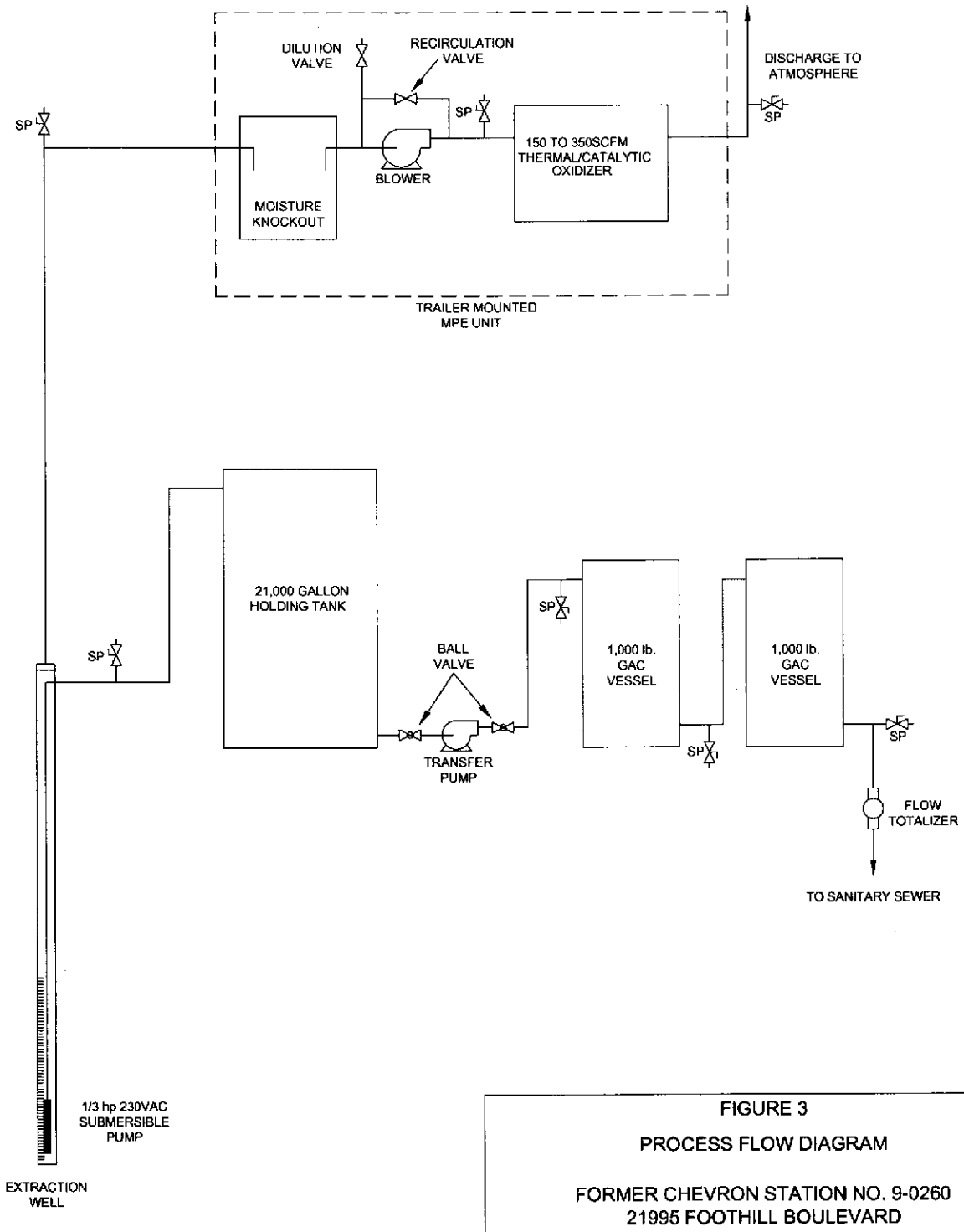


FIGURE 3

PROCESS FLOW DIAGRAM

FORMER CHEVRON STATION NO. 9-0260
21995 FOOTHILL BOULEVARD
HAYWARD, CA.

PROJECT NO. DG90-260	DRAWN BY M.L. 11/6/02
FILE NO. DG90260C	PREPARED BY W.S.
REVISION NO. 1	REVIEWED BY

Delta Environmental Consultants, Inc.

1.0 METHODS AND PROCEDURES

1.1 Health and Safety Plan

Field work performed by Delta and Delta's subcontractors at the site is conducted according to guidelines established in a Site Health and Safety Plan (SHSP). The SHSP is a document which describes the hazards that may be encountered in the field and specifies protective equipment, work procedures, and emergency information. A copy of the SHSP is at the site and available for reference by appropriate parties during work at the site.

1.2 Locating Underground Utilities

Prior to commencement of work on-site, Delta researches the location of all underground utilities with the assistance of Underground Service Alert (USA). USA contacts the owners of the various utilities in the vicinity of the site to have the utility owners mark the locations of their underground utilities. Work associated with the boring and monitoring well installation is preceded by manual hand augering to a minimum depth of 5 feet below surface grade (bsg) to avoid contact with underground utilities.

1.3 Soil Sampling and Contamination Reduction

Soil borings and soil sampling will be performed under the direction of a Delta geologist. The soil borings will be advanced using a truck-mounted Geoprobe™ drill rig.

To reduce the chances of cross-contamination between boreholes, all downhole drilling equipment will be steam-cleaned between each boring. To reduce cross-contamination between samples, the barrel sampler is washed in a soap solution and double-rinsed between each sampling event.

Macro-Core Soil Sampler - Soil sampling beyond 5 feet bsg will be conducted using a Macro-Core Soil Sampler that is advanced using a truck-mounted Geoprobe™ rig. The Geoprobe™ rig is a hydraulically powered machine that utilizes both static force and percussion to advance sampling tools into the subsurface. The Macro-Core Soil Sampler consists of a solid core barrel that has an assembled length of 52 inches and an outside diameter of 2.2 inches. The Macro-Core Soil Sampler is lined with a 1.7-inch diameter by 46-inch long clear acetate, thin-walled liner. The sample barrel and drive casing is pushed, pounded or vibrated four feet into the soil. The core barrel is then retrieved and the clear acetate liner containing the sample is removed. A six-inch portion of the soil sample to be submitted for laboratory analysis is cut from the acetate liner using a hand saw. The sample barrel is then washed

1.4 Soil Classification

As the samples are obtained in the field, they will be classified by the geologist in accordance with the Unified Soil Classification System (USCS). Representative portions of the samples will then be retained for further examination and for verification of the field classification. Logs of the borings indicating the depth and identification of the various strata, the N value, and pertinent information regarding the method of maintaining and advancing the borehole will be made.

1.5 Soil Sample Screening/hNu Portable Photoionization Detector Method

After the soil sample plastic bags have been brought to ambient temperature, the headspace vapors of the soil sample in the bag will be screened with a PID equipped with a 10.2 eV lamp. The sample corner of the bag will be opened and the detector probe immediately placed within the headspace. The highest observed reading will be recorded.

1.6 Monitoring Well Gravel Pack and Slot Size Selection

The gravel pack will be selected such that it will permit the development of a zone of higher hydraulic conductivity adjacent to the well screen but will reduce piping of the finer-grained formation materials into the well. The slot size of the well screen will be selected such that it will retain a minimum of 95 percent of the gravel pack material.

1.7 Monitoring Well Development

After monitoring wells have been installed, each monitoring well will be developed with a surge block and bailer (or pump) until the water produced is relatively sediment-free and until the conductivity, pH, and temperature stabilize. If the well is pumped dry during the development process, recharge rates will be recorded. No water or chemicals will be introduced into the monitoring wells during well development. All developed water will be placed in drums on-site for later disposal.

1.8 Groundwater Sampling

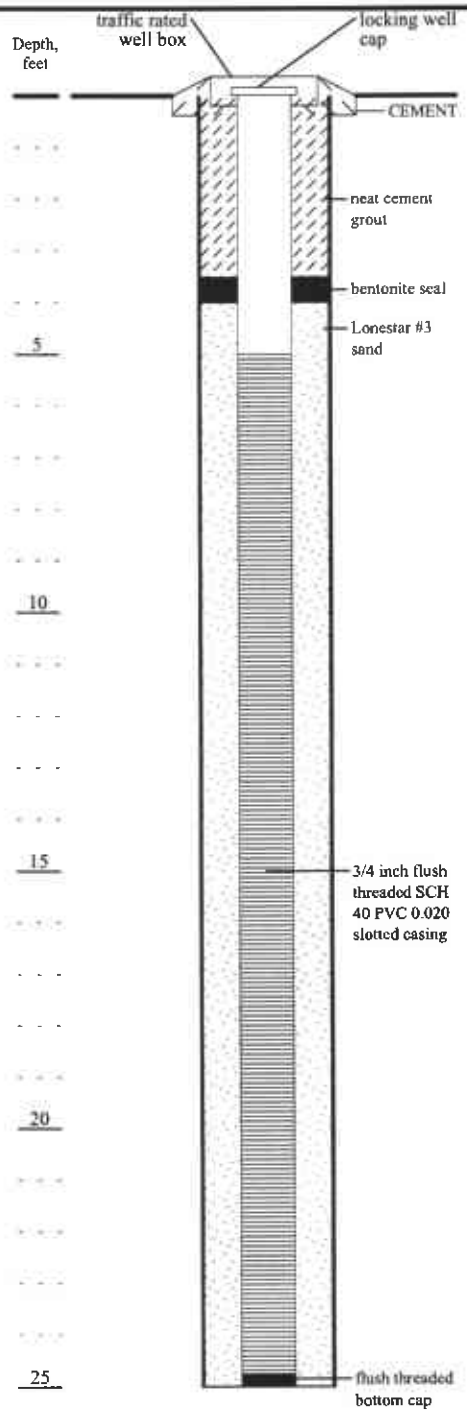
At least three wetted casing volumes of liquid will be removed from each well by bailing with a clean disposable bailer. A liquid sample will then be collected from each well with a clean disposable bailer

with phosphate-free soap and double-rinsed with deionized water, and a new sample liner is installed in the core barrel. The cleaned sample barrel is then lowered to the bottom of the boring. This process is repeated until the desired total depth is reached. The soil samples are labeled and handled according to the Quality Assurance Plan (below).

Upon recovery, a portion of the soil sample will be placed into a plastic bag and sealed for later screening with a photoionization detector (PID). Another portion of the soil sample will be used for classification and description. That part of the soil sample collected in the leading brass tube within the California-type sampler will be stored at approximately 4°C for transport to the laboratory.

Dual Wall Sampler - The Dual Wall split spoon or window sheath sampler consists of an outer casing that is 3.25-inch outside diameter (OD) and a 2-inch inside diameter (ID). The window sheath sampler is 2 feet in length with a 2-inch OD and 1.75 ID. Each window sheath sampler houses four 1.75-inch X 6-inch long brass or stainless steel liners, or one 1.75-inch X 2-foot clear acetate liner. Window sheath is loaded with the desired sample liner/liners and installed inside the outer casing. Simultaneously, the outer drive casing and inner split spoon sample barrel are advanced 2, 4, or 5 feet, depending on sampling system application. As these tools are advanced, the inner sampling barrel collects the soil core sample. This sampler is then retrieved while the outer casing remains in place, protecting the integrity of the hole. A new sampler is lowered into place, and advanced further to collect the next soil sample. This process continues until a desired depth has been reached. The dual wall sampling system also provides discrete depth soil and groundwater sampling. Using a locked drive point, the dual wall sampling system is advanced, displacing the soils until a desired depth has been reached. The soil samples are collected and the Dual Wall Sampler cleaned as described for the Macro-Core Sampler described above.

Delta Environmental Consultants, Inc.	Street Address **21995 Foothill Boulevard**	Project ID **Chevron Station No. 9-0260**	
	City & State **Hayward, California**	Surface Elev. **NA**	Well / Boring ID **PMW**
	Delta Project # **DG90-260**	Casing Elev. **NA**	Total Depth **25'**



PROPOSED WELL CONSTRUCTION

PROPOSED WELL CONSTRUCTION

Dates and Times	Logger **Delta Geologist**	Sampling Method & Diameter **NA**	Permitting Agency **Alameda County Health Care Services Agency**
Start	Drilling Company & Driller **NA, TBA**	Bore Hole Diameter **4-inches**	Permit # **NA**
Total Depth	Drillers C-57#	Diameter, Type & Slot Size of Casing **3/4-inch SCH 40 PVC/0.020 slot**	
Completion or backfill	Drilling Equipment and method **Geoprobe 6600, NA**		**Page 1 of 1**

PROPOSED 90260.GPJ 11/5/02

ENCLOSURE C

Sample Pilot Test Field Data Collection Sheets

Pilot Test on MW-4 Chevron No. 9-0260

Date	Time	Total System FID readings pressure side (ppmv)	Carbon Filter FID readings (ppmv)	Total System FID - Carbon Filtered FID Readings or Non Methane (ppmv)	Total System Blower Air Flow Vacuum (in Hg)	Total System Blower Air Flow Temp (°F)	Total System Blower Air Flow Rate (ACFM)	System Dilution Air Vacuum (in H2O)	System Air Dilution Air Temp (°F)	System Air Dilution Flow Rate (ACFM)	Well Casing Vacuum (in Hg)	Moisture Separator ground water flow totalizer reading (gallons)	Notes

Pumping Data at Chevron No. 9-0260 Test Well: MW-4

Date	Time	Submersible Pump Flow Rate (gpm)	Submersible Pump Flow Totalizer Reading (gallons)	Pump Depth Setting (feet bsg)	Notes

Pilot Test Data Sheet for Chevron 9-0260

Vacuum and DTW Readings in Wells

Dist to Wells (feet):																	
Well Names:		MW-4															
Date	Time	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum	DTW	Vacuum