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By Alameda County Environmental Health 1:50 pm, Dec 14, 2015

# E&B NATURAL RESOURCES MANAGEMENT CORPORATION

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Phone: (661) 679-1700 • Fax: (661) 679-1797

December 14, 2015

Mr. Jerry Wickham  
Alameda County Environmental Health  
Cleanup Oversight Program  
1131 Harbor Bay Parkway  
Alameda, CA 94502

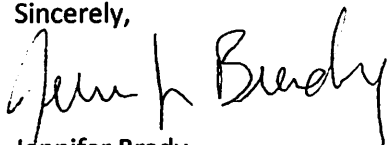
**RE: RO0003181 – G.I.G. Work Plan for Groundwater Monitoring**

Mr. Wickham:

Enclosed is a Work Plan for Groundwater Monitoring Well Installation and Sampling for E&B Natural Resources Management's (E&B) G.I.G. facility. The Work Plan will also be uploaded to the GeoTracker database for Site ID T10000007269. Please note that the 8467 Patterson Pass Road address is being utilized for conformity with Alameda County's and GeoTracker's site ID for G.I.G., and is synonymous with the 8477 Patterson Pass Road address as listed in E&B's Voluntary Cleanup Agreement documents for project RO3181.

*"I declare, under penalty of perjury, that the information and/or recommendations contained in the attached document or report is true and correct to the best of my knowledge."*

Sincerely,



Jennifer Brady  
Environmental Compliance Coordinator  
E&B Natural Resources Management Corp.

**WORK PLAN:**  
**GROUNDWATER MONITORING WELL**  
**INSTALLATION AND SAMPLING**

**G.I.G. OIL PRODUCTION FACILITY**  
**G.I.G. LEASE, LIVERMORE OIL FIELD**  
**Section 7, T3S, R3E, MDB&M**  
**8467 Patterson Pass Road, Livermore**  
**Alameda County, California**

*Prepared for:*

*E&B Natural Resources Management Corporation*  
*1600 Norris Road*  
*Bakersfield, CA 93308*

*Prepared by:*

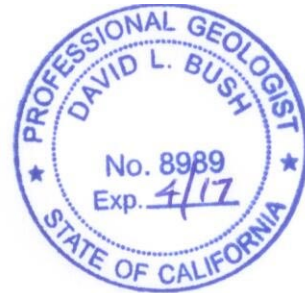
**ROBERT A. BOOHER CONSULTING**  
**Environmental Planning & Management**  
**3287 Congressional Court**  
**Fairfield, California 94534**  
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**[www.rabooherconsulting.com](http://www.rabooherconsulting.com)**



*Jeff L. Monroe*  
*Project Geologist*



*David L. Bush, PG 8989*  
*Professional Geologist*



*December 10, 2015*

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### **Figures:**

- Figure 1: Project Vicinity Map
- Figure 2: Project Monitoring Well Location Map
- Figure 3: Monitoring Well Construction Detail

### **Attachment**

- Attachment A: Site Health and Safety Plan

## **INTRODUCTION**

This Work Plan for Groundwater Monitoring Well Installation and Sampling (Work Plan) was prepared by Robert A. Booher Consulting (RAB Consulting) for E&B Natural Resources Management Corporation (E&B) as a continuation of the approved Soil Excavation and Groundwater Investigation Work Plan dated November 16, 2015. The project work is requested by Alameda County Environmental Health (ACEH), case number RO-0003181.

This Work Plan describes the proposed project activities to satisfy ACEH's and San Francisco Bay Regional Water Quality Control Board (SFBRWQCB) requirements to further assess the potential for groundwater impacts at the site. The site is located at E&B's Greenville Investment Group's (G.I.G.) oil well production facility located at 8467 Patterson Pass Road, Livermore, Alameda County, California, in Section 7, T3S, R3E, MDB&M, as shown on Figure 1 and Figure 2.

## **BACKGROUND**

In late March 2015, when E&B removed an unused 250 barrel stock tank which had been installed and operated by E&B's predecessor, they discovered dry, oil-stained soil beneath the unused tank. E&B removed the unused tank to improve the property and restore the facility. The former tank location was located near the southeast corner of the fenced facility at approximate latitude 37.693548, longitude -121.689431 (NAD 83, Figure 2). Since the removal of the stock tank, an above ground 300 barrel wash tank and 100 barrel produced water tank have also been decommissioned and removed from the property.

On October 29, 2015, upon receiving approval from ACEH for our September 16, 2015 Work Plan for Remedial Soil Excavation and Groundwater Investigation, and subsequent October 5, 2015 Addendum to Work Plan, RAB advanced a soil boring (B1) in the vicinity of the former western most tank. The boring was continuously logged to the depth of fifty feet below ground surface (bgs) and initial groundwater was encountered at 47 feet bgs. Grab groundwater samples were collected by use of a new disposable polyethylene bailer through the augers, and transmitted to a California State Certified analytical laboratory for analyses. On November 6, 2015, soil excavation activities commenced and have continued as analytical results are continually reviewed and onsite constraints are managed to allow continuation of these activities. The soil excavation activities, results of the initial soil boring, as well as the 2000 foot well canvas, as described in RAB's September 16, 2015 Work Plan and subsequent October 5, 2015 Addendum will be documented in a forthcoming report at the completion of those activities.

Based on inconclusive results of very low concentrations of diesel range constituents detected in the first encountered grab groundwater sample, RAB on behalf of E&B is proposing the installation of shallow groundwater monitoring wells to establish a groundwater gradient, and better assess shallow groundwater quality. Groundwater monitoring wells will allow for better quality groundwater samples to be collected representing formation water as opposed to a grab groundwater sample that contained a high amount of suspended sediments.

## **GEOLOGY AND HYDROLOGY**

The subject site is located in the eastern portion of Livermore Valley, elevation of the surrounding area is between 640 to 680 feet above mean sea level, along the western edge of the Diablo Range. Relatively shallow and surface soils are comprised of alluvial and fluvial deposits. Rock units exposed in the area are Tertiary to Quaternary age valley fill sediments, the Livermore Formation, the Tassajara Formation, as well as the Franciscan Formation and the Great Valley Sequence. These regional formations have been extensively folded and faulted. The Greenville Fault is the youngest tectonic feature in the area, truncating all other structures, and lies within a mile of the site to the east. The Las Positas fault is within a 1.2 miles to the southwest. The Corral Hollow Fault is located approximately 2 miles to the east of the site.

Initial groundwater or saturated zone is anticipated to be less than 60 feet bgs (groundwater encountered at B1 at a depth of 47 feet bgs), and there is a potential for shallower perched groundwater zones that most likely trend to the southwest. The entire floor of the Livermore Valley overlies groundwater bearing materials, including continental deposits from alluvial fans, valley fill deposits, and outwash plains. Domestic wells range in depths from 100-350 feet bgs, and municipal or irrigation wells range in depths of 315-810 feet bgs.

## **SCOPE OF WORK**

The purpose of this Work Plan is to present E&B's proposal to further assess and evaluate representative groundwater conditions. This Work Plan also describes installation and construction details of groundwater monitoring wells in accordance with the SFB-RWQCB and ACEH guidelines. RAB has recommended proceeding with installing shallow groundwater monitoring wells to test the water quality and representative formation conditions.

Our proposed Scope of Work for this Work Plan consists of the following tasks:

- Task I: Project Preparation, Review, Planning, and Permitting;
- Task II: Monitoring Well Installation;
- Task III: Monitoring Well Development, Surveying, and Sampling;
- Task IV: Laboratory analysis and analytical review of the groundwater samples;
- Task V: Report Preparation documenting the Monitoring Well Installation, Development, Surveying, and Sampling Event.

The following sections present a brief detail of the above Tasks.

## **TASK I: PROJECT PREPARATION, REVIEW, PLANNING AND PERMITTING**

Upon completion, this Work Plan will be submitted to the ACEH for review. If the ACEH responds with any comments or additional requirements, RAB will prepare necessary Work Plan Addendums to respond to those comments. Upon approval of the Work Plan by the ACEH we will proceed with the implementation of the Work Plan. The drilling has been scheduled for **December 21, 2015** with Gregg Drilling and Testing, Inc. (Gregg Drilling) in anticipation of moving forward in a timely manner.

RAB will review the locations and construction details of the monitoring wells associated with this site. RAB will observe and direct Gregg Drilling to drill exploratory borings and convert the borings into monitoring wells. Drilling permits will be prepared by RAB, and acquired from the Zone 7 Water Agency to drill three (3) soil borings followed by converting the borings into monitoring wells.

We will confirm scheduling of drilling activities and notify the Client, Zone 7, and the ACEH of dates of drilling. We will notify Underground Services Alert (USA) of drilling dates and gain utility clearance. We will consult with the ACEH and continually update their representatives as to the status of the project. We will also discuss the progress status of the project with Client.

## **TASK II: MONITORING WELL INSTALLATION**

### **Soil Borings**

RAB will observe and direct Gregg Drilling in the drilling of three (3) soil borings at the approximate locations shown on Figure 2 of this Work Plan. The final locations of borings may be revised based on the ACEH review and/or in the field as determined by utility locations, site constraints, and/or drill rig accessibility. We are proposing to place one monitoring well in the source area (area of soil boring B1), and two monitoring wells in the assumed down gradient direction from the source area (west), as site constraints allow.

The soil borings will be drilled using 8-inch diameter hollow stem augers to be used for monitoring well construction as described in a later section. The borings will be logged by driving split-spoon samplers into the undisturbed soil beneath the cutting bit of the augers at least every five feet bgs. Each sample core will be lithologically logged by or under the direction of a California State Professional Geologist, and a boring log will be prepared at each location.

The soil borings will extend into the upper, unconfined groundwater interface (estimated to be approximately 50 to 60 feet below the ground the surface) a sufficient distance to allow the collection of groundwater samples. We will attempt to identify the underlying aquitard and install the monitoring wells at the base of the upper unconfined aquifer, if possible. At minimum, the monitoring wells will be installed at least ten (10) feet into the first encountered aquifer.

Field and laboratory quality control (QC) procedures for the soil borings include the following:

- Sampling equipment will be decontaminated by steam cleaning and/or washing with phosphate-free detergent and rinsing with potable water between each location;
- Soil samples will be collected every five feet for collection of additional analytical data and to prepare a lithologic log of the borings;
- Soil samples will be retained in 2-inch brass or stainless steel sleeves, covered with Teflon sheets and plastic end caps;
- Retained soil samples will be labeled, logged onto a chain of custody form and placed into an ice chest for transport to the State Certified laboratory for analysis;
- Select unsaturated soil samples will be analyzed for TPH-D/MO by EPA test Method 8015 from the additional soil borings to the west of the source area, and from deeper soils (>50 ft) within the source area;
- Soil cuttings produced during drilling activities will be placed on the ground surface on visqueen sheeting, and covered with the same, until proper disposal;
- Lithologic logs will be prepared under the direction of and reviewed by a California State Professional Geologist.

### **Monitoring Well Construction**

Monitoring wells will be constructed as shown on Figure 3 (Well Construction Detail). The borings will be drilled with 8-inch hollow stem augers. Each well will be constructed using 2-inch diameter flush-threaded PVC pipe and well screen. A 0.02 slotted well screen is the minimum recommended, and will be placed from the bottom of the boring to approximately two (2) feet above the shallow groundwater interface.

The monitoring wells will be completed with a 2-inch diameter PVC cap placed on the bottom of the well screen. The well screen/casing will be inserted into the boring, and a clean 2/12 sand pack will be placed into the boring extending from the bottom of the borehole to approximately two feet above the top of the well screen. A bentonite cement slurry will then be placed above the sand pack through a tremmie pipe to within one foot of the surface. Each monitoring well will be completed with a well box set in cement, and the top of the well casing will be completed with a locking water-tight cap.

Groundwater samples will not be collected during monitoring well construction as these wells will be purge and developed first prior to sampling.

### **TASK III: MONITORING WELL DEVELOPMENT, SURVEYING, AND GROUNDWATER SAMPLING**

#### **Monitoring Well Development**

No sooner than 48 hours after completion of monitoring wells MW-1, MW-2 and MW-3, RAB will return to the site to develop each monitoring well. Depth to static water level will be measured, and the total amount of water to be purged to allow free water flow into the well will be calculated. A 2-inch diameter urge block will be used to surge the well to free the well screen of silts, fine sands or other material which inhibit free water flow. A low-flow electric purge pump will then be lowered into each well to purge silty water from the well. Water quality parameters including temperature, pH, TDS, and turbidity will be recorded during purging including the quantity of groundwater purged from the well and descriptions of water appearance. At least ten (10) well volumes will be purged from the monitoring wells, and a 50 NTU turbidity reading attempt to be achieved.

#### **Purged Water**

Well development water will be contained in 55-gallon DOT drums pending analytical results. The drums will be labeled and stored on site for a maximum of 90 days.

#### **Monitoring Well Elevation Survey**

We will subcontract a California State Licensed Land Surveyor to determine the elevation (top of casing or TOC) at each monitoring well using the elevations relative to mean sea level (MSL). The surveyor will also determine the GPS coordinates of each monitoring well. The elevation survey data will be used to determine the local groundwater gradient during the groundwater monitoring event. The well elevation and GPS data (x,y,z data) will be uploaded into the State Geotracker database.

#### **Groundwater Sampling**

At least 48 hours after completion of the monitoring well development procedure, RAB will return to the site to sample each monitoring well. Prior to purging each well, the static water level will be measured to the nearest 0.01 ft (relative to the TOC reference point on each monitoring well) with an electronic water level sounder. After calculating the well casing volume, at least 3 volumes will be purged from the well at low-flow, and water quality characteristics (temperature, pH, TDS, and turbidity) will be measured during purging, and recorded on sampling data sheets. After water quality parameters have stabilized, or at least 3 wells volumes have been evacuated from the each well, groundwater samples will be collected.

Groundwater samples will be decanted into laboratory supplied containers appropriate for the required analysis directly from the discharge point of the purge pump at low-flow to minimize degassing and collect representative formation groundwater (as opposed to using a bailer).



Field and laboratory quality control (QC) procedures for the groundwater monitoring include the following:

- Sampling equipment will be decontaminated by steam cleaning and/or washing with phosphate-free detergent and rinsing with potable water between each location;
- Gloves will be worn at all times during the monitoring well sampling, and changed prior to each sample collected;
- Groundwater samples will be decanted in pre-cleaned, certified laboratory provided containers appropriate for the required analysis;
- Groundwater samples will be labeled, logged onto a chain of custody form and placed into an ice chest for transport to the State Certified laboratory for analysis;

### **Purged Water**

Well purge water will be contained in 55-gallon DOT drums pending analytical results. The drums will be labeled and stored on site for a maximum of 90 days.

### **Groundwater Gradient**

After the installation of the monitoring wells, the monitoring wells' elevation and location will be surveyed by a Professional Licensed Land Surveyor, as described in a previous section of this Work Plan. The monitoring wells will be sampled and will include preparation of the local groundwater gradient based on the survey data.

### **TASK IV: LABORATORY ANALYSIS AND REVIEW**

Groundwater samples collected during the groundwater sampling event will be labeled, logged onto a chain of custody form and placed into an ice chest containing frozen "blue ice" for transport to our subcontracted California State Certified analytical laboratory. The groundwater samples will be analyzed for Total Petroleum Hydrocarbons (TPH) as gasoline, diesel and motor oil by EPA Test Method 8015, CAM 17 metals (EPA 6010), volatile organic compounds (EPA 8260B), semi-volatiles including PCBs (EPA 8270C), and for general minerals (electrical conductivity, chlorides, boron, sodium, sulfate, and pH). The results of the groundwater samples collected from the monitoring event will be reviewed by our California State Professional Geologist to be incorporated in our report.

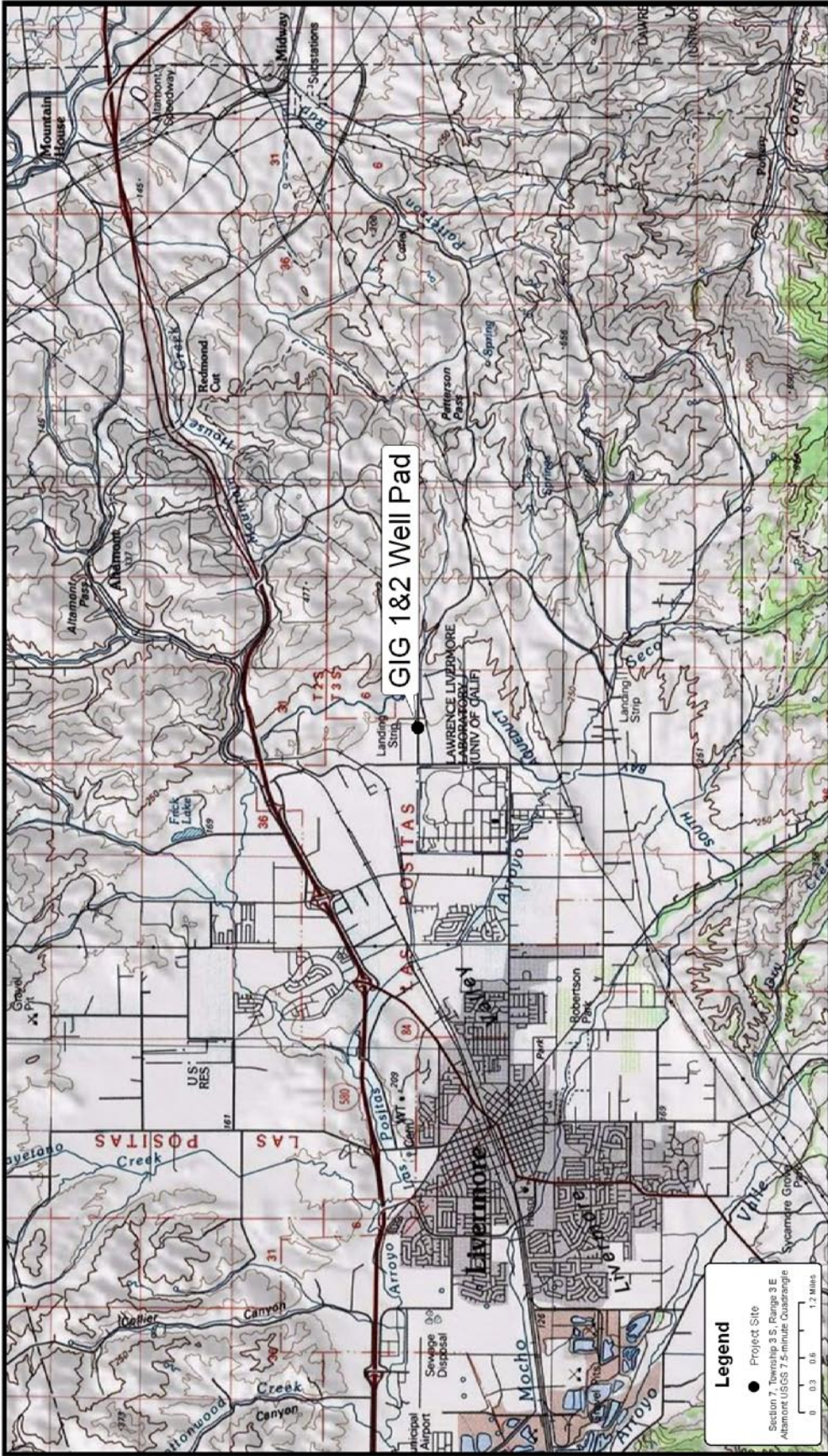
### **TASK V: REPORT PREPARATION**

Upon completion of field activities and receipt of the laboratory analysis from the groundwater sampling event RAB will review the results and include the information in our final Report. The report will

include a description of field procedures, results of analytical testing, a site map showing features relevant to the investigation and final monitoring well locations, groundwater gradient data, borings logs for soil borings including the well construction detail, and our conclusions and recommendations for this site.

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We trust this Work Plan will meet satisfy the ACEH requirements, and suffice to obtain a Zone 7 drilling permit. We will proceed with implementing the above scope of work, currently scheduled for December 21, 2015, after receipt of the Zone 7 drilling permit.



E&B Natural Resources Management Corporation  
 1600 Norris Road  
 Bakersfield, California 93308

**FIGURE 1**  
**Project Vicinity Map**

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 Environmental Planning & Management  
 3287 Congressional Court  
 Fairfield, California 94534  
 Telephone (707) 398-7835



**Legend**

● Proposed Monitoring Well Locations

Section 7, Township 3 S, Range 3 E  
 Alameda USGS 7.5-minute Quadrangle

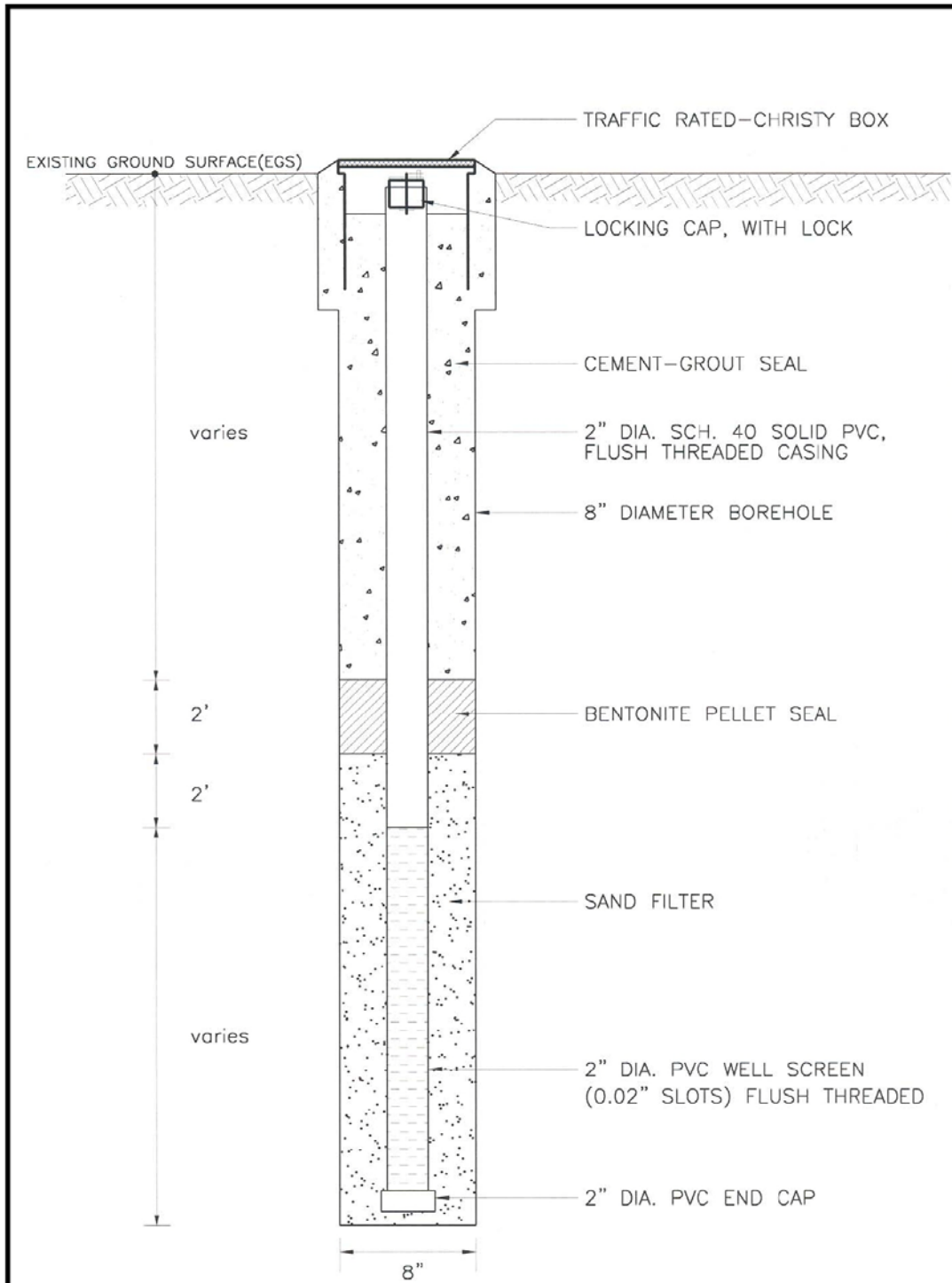
0 5 10 20 Feet

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 2377 Congressional Court  
 Fairfield, California 94534  
 Telephone (707) 398-7835

E&E Natural Resources Management Corporation  
 1600 North Point  
 Berkeley, California 94709

**FIGURE 2**  
**Proposed Monitoring Well Location Map**





NOT TO SCALE

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 Environmental Planning & Management  
 5287 Congressional Court  
 Fairfield, California 94534  
 Telephone (707) 399-7835

**FIGURE 3**  
**Monitoring Well Construction Detail**

E&B Natural Resources Management Corp  
 1600 Norris Road  
 Bakerfield, California 93308

**SITE HEALTH & SAFETY PLAN**  
**G.I.G. Oil Well Facility, 8467 Patterson Pass Road, Livermore, CA**

**GENERAL INFORMATION:**

SITE: G.I.G. Lease, Livermore Oil Field, 8467 Patterson Pass Road, Livermore, CA

CLIENT: E&B Natural Resources Management Corporation, 1600 Norris Road, Bakersfield, CA 93308

PREPARED BY: Robert A. Booher Consulting, Fairfield, CA (707) 399-7835

OBJECTIVES: To provide a Site Health & Safety Plan for the safe completion of excavation and possible drilling activities, and soil/water sample collection.

DOCUMENTATION/SUMMARY: Petroleum hydrocarbons, crude oil, fuels, heavy metals may be present in soils and groundwater at low to high concentrations. Site work includes drilling soil borings, well construction, and groundwater sampling activities.

**SITE/WASTE CHARACTERISTICS:**

POSSIBLE WASTE TYPES: Solid, fuels, VOC's, PCB's, metals at low to high concentration.

CHARACTERISTICS: Possible odors, staining.

FACILITY DESCRIPTION: Oil field and oil production facility.

**HAZARDOUS EVALUATION:**

PARAMETER: Level D - low hazard / low risk, minimal vapors.

HEALTH: Inhalation, Ingestion, do not ingest soils, wash hands before eating.

**SPECIAL PRECAUTIONS AND COMMENTS**

Correct safety procedures must be followed per Site Health and Safety Plan. Drill rig safety is primary concern, rotational operation, possible overhead conditions.

**SITE SAFETY WORK PLAN:**

PERIMETER ESTABLISHMENT: Use barricades and/or traffic cones to secure excavation area and identify work area as needed, if there is any nearby pedestrian or vehicle traffic. Site is currently fenced and locked and will continue to be fenced and locked.

PPE:           Level of Protection:           EPA Level D  
                  Modifications:            Hard Hats, Gloves, Respirator on site.  
                  Surveillance Equipment:       PID or OVM

**SITE ENTRY PROCEDURES:** Cone as necessary around excavation equipment and workers as needed. Barricades and caution tape to keep pedestrian traffic at a safe distance if needed.

**DECONTAMINATION:**            Personal:       Wash with detergent and water  
  Equipment:    Wash with phosphate-free detergent and water

**EQUIPMENT:**                    Drill rig, soil cuttings to be placed on plastic sheeting and covered

**FIRST AID:**                      First aid kit on site.

**WORKER LIMITATIONS:** Utilities to be identified & marked per owner consultation. USA notified at least 48 hours in advance.

**TEAM COMPOSITION:** Jeff Monroe, Project Geologist, David Bush, Professional Geologist. Driller operators and E&B personnel will have own Site Health and Safety Plan.

**EMERGENCY INFORMATION**

**LOCAL RESOURCES:**            Ambulance/Hospital            911  
  Police/Sheriff/Highway Patrol   911  
  Fire Department                911

**SITE RESOURCES:**            Fire Extinguisher, First Aid Kit,  
  Telephone and Water.

**EMERGENCY CONTACTS:**       Jeff Monroe, cell phone       (530) 237-6628  
  David Bush, cell phone       (707) 953-1020  
  Mike Smith, E&B           (661) 619-8675  
  Charlie Davis, E&B         (661) 619-9927

**EMERGENCY ROUTES:**

Medical Facility – Valley Memorial Hospital (925) 447-7000, 1111 E. Stanley Blvd., Livermore, CA. From project site drive 3.0 miles west on Patterson Pass Rd. Turn Right at Mines Road 0.5 mile. Turn Left on 1<sup>st</sup> Street 2.1 miles until 1<sup>st</sup> Street. Becomes Holmes Street, continue 0.2 mile. Turn Right on Murrieta Blvd. 0.5 mile to E. Stanley Blvd. Turn right 0.3 mile on E. Stanley to Hospital on right.

HASP: Monitoring Well Installation and Sampling  
G.I.G. Oil Production Facility, G.I.G. Lease  
Section 7, T3S, R3E, MDB&M  
8477 Patterson Pass Road, Livermore, Alameda County, California  
ACEH Case No. RO0003181

**SIGN OFF SHEET**

All personnel on site have read and understand the Site Health and Safety Plan. All personnel will comply with safety procedures.

<u>NAME (Print)</u>	<u>RESPONSIBILITY/COMPANY</u>	<u>SIGNATURE</u>