**ABF FREIGHT SYSTEM, INC.**
P.O. Box 10048
Fort Smith, AR 72917-0048
479-785-8700

abf.com



March 6, 2012

Mr. Mark Detterman, RG, CEG
Senior Hazardous Materials Specialist
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: **Perjury Statement-**
***Soil and Groundwater Investigation Work Plan Addendum***
ABF Freight System Facility (SLIC Case No. RO#0003033)
4575 Tidewater Avenue
Oakland, California

Dear Mr. Detterman:

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

Sincerely,

Michael K. Rogers
Director, Real Estate
Arkansas Best Corporation

TRINITY
source group, inc.
Environmental Consultants

March 6, 2012
Project 154.004.001

Mr. Mark Detterman, RG, CEG
Senior Hazardous Materials Specialist
Alameda County Environmental Health Department
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

Re: *Soil and Groundwater Investigation Work Plan Addendum*
ABF Freight System Facility
4575 Tidewater Avenue
Oakland, California

Dear Mr. Detterman:

This letter, prepared by Trinity Source Group, Inc. (Trinity) on behalf of ABF Freight System, Inc. (ABF), presents a *Soil and Groundwater Investigation Work Plan Addendum (Work Plan Addendum)* for the referenced site (Figures 1 and 2). This *Work Plan Addendum* was requested by Alameda County Environmental Health Department (ACEH) in a letter dated January 27, 2012. The ACEH letter is included in Attachment A of this *Work Plan Addendum*. The ACEH letter provided review and comments on the November 4, 2011 *Soil and Groundwater Investigation Work Plan (Work Plan)* for the site.

As requested by ACEH, this *Work Plan Addendum* includes a preferential pathway study and various modifications to the proposed scope of work. This *Work Plan Addendum* does not reiterate the site background information or site conceptual model, which were presented in the original *Work Plan*. The proposed scope of work presented herein is a complete replacement to that presented in the original *Work Plan*.

## PREFERENTIAL PATHWAY STUDY

Upon request of the ACEH, Trinity completed a preferential pathway study to evaluate the probability of the groundwater plume entering potential migration pathways and conduits and spreading contamination to the nearby tidal estuary. Trinity completed a survey of underground utilities and examined historical watershed maps as described below. Proposed soil boring and sub-slab vapor probe locations take the preferential pathways into account.

**Utility Survey**

Trinity completed a utility survey on February 21 and 23, 2012 at the referenced site with a private utility location company, Cruz Brothers Locators, Inc. The inside of the maintenance building and the area of the former diesel underground storage tanks (USTs) and waste oil UST were swept for utilities using metal detection and radio frequency to determine the locations of high voltage electric, telephone line, water line, gas line and any other underground metal debris. The locations of the underground utilities around the UST area are shown on Figure 3 and the utilities beneath the maintenance building are shown on Figure 4. A cross-section of the underground utilities in the former UST area is presented in Figure 5.

As indicated on Figure 5, groundwater currently is at a depth greater than the deepest utility trench. However, historical water levels are not known. The presence of utility trenches will continue to be considered during the course of this assessment.

This *Work Plan Addendum* proposes boring locations and sub-slab vapor probe locations in the vicinity of possible preferential pathways (utility trenches), while maintaining safe work practices of drilling at least 5 feet away from any underground utilities.

**In-Filled Estuary Channels**

Upon recommendation by ACEH, Trinity reviewed the *Creek & Watershed Map of Oakland & Berkeley*[1]*.* The maintenance building and former UST area appear to be situated largely within a former slough channel. The materials utilized to fill the slough are not known at this time. During the proposed drilling activities, the presence of granular fill placement will be noted and evaluated as a potential preferential pathway, particularly if the granular fill appears to intersect existing underground utility trenches. The historical creek bed boundaries are shown on Figure 1. Trinity will carefully log the borings with consideration that the soils may be granular fill with the potential for preferential pathways within the former channel.

## SCOPE OF WORK

The scope of work herein is designed to determine the extent of hydrocarbons in shallow soil and groundwater, the groundwater flow direction at the site, and the potential presence of hydrocarbons in the sub-slab vapor beneath the existing maintenance building at the site. Historical soil and groundwater data are presented in Attachment B. The scope of work will be completed in two phases; the first phase will evaluate soil, groundwater and sub-slab vapor conditions in close proximity to the former UST area, and the second phase will include groundwater monitoring well installation and sampling.

The first phase scope of work includes:

- Drilling and sampling six source area borings (B-1 through B-6) to delineate vertical impacts at each of the former UST locations. These borings will be advanced to an estimated depth of 20 feet below

[1]Sowers, Janet C., William Lettis and Associates, *Creek & Watershed Map of Oakland and Berkeley,* Oakland Museum of California, 1993, revised 1995 and 2000.

ground surface (bgs). Two borings are proposed near each of the two former diesel USTs, and one boring is proposed at each of the two former waste oil USTs. Grab-groundwater samples will be collected from these borings. As shown on Figure 6, these borings are located close to the former USTs, but are situated outside of the existing above-ground tank enclosure.

- Drilling and sampling five borings (B-7 through B-11) around the perimeter of the former UST area. These will characterize lateral soil and groundwater conditions a short distance outside of the UST area. These borings will be advanced to an estimated depth of 10 to 15 feet bgs. Additionally, grab-groundwater samples will be collected from these borings. Proposed boring locations are shown on Figure 6.
- Installing and sampling two sub-slab vapor probes (SVP-1 and SVP-2) inside the existing maintenance building, to determine whether sub-slab vapor is impacted with hydrocarbon vapors. The locations of these were selected considering the interior configuration, utilities, and current use of the maintenance building as shown on Figure 6.
- Soil, groundwater, and sub-slab vapor sample analysis as described in detail below.
- Data evaluation to recommend well locations and construction. A data packet including boring logs, analytical data tables, and recommendations will be submitted to ACEH. Upon ACEH concurrence, the second phase will be implemented.

The second phase scope of work includes:

- Drilling, soil sampling, installing and sampling two additional groundwater monitoring wells (MW-3 and MW-4), located north and south of former UST area, to delineate the extent of hydrocarbons in groundwater. Locations will be proposed based on the data collected in the first phase of work.
- Summary report preparation and submittal after well installation.
- Institute quarterly groundwater monitoring for one year.

Figure 6 shows the proposed locations of soil borings and sub-slab probes. Field procedures are presented in Attachment C.

The following specific tasks will be completed:

## Phase I Investigation

### Prefield

Prefield tasks will include obtaining any necessary permits, preparing a site-specific health and safety plan, and notifying inspectors as needed. In addition, Trinity staff will mark drilling locations and notify Underground Service Alert for utility clearance.

**Soil Boring Drilling and Sampling**

Trinity will oversee a licensed, subcontracted driller in advancing and sampling the eleven soil borings, utilizing direct-push sampling equipment. The boreholes will be continuously sampled, by pushing a 2 to 4-foot sample barrel with acetate liners into the soil. The liners will be retrieved and logged by Trinity staff under the supervision of a California Professional Geologist. Six borings at the former diesel UST locations and former waste oil UST locations will be drilled to a maximum depth of approximately 25 feet bgs. Five UST perimeter borings will be advanced to an estimated maximum depth of approximately 15 feet bgs. Samples will be preserved by cutting and capping select sections of the acetate liners, labeling the samples, and chilling the samples for transport to the laboratory.

Grab-groundwater samples will be collected from eight of the borings, including two to three samples from within the former UST area, and up to five from the perimeter borings. Grab-groundwater samples will be collected through a temporary well casing using a Teflon bailer. Following sampling, the borings will be abandoned by backfilling with neat cement grout. Field procedures are presented in Attachment C.

**Sub-Slab Vapor Probe Installation and Sampling**

Trinity will install two sub-slab vapor probes (SVP-1 and SVP-2) inside the existing maintenance building at the site to a depth of approximately 6 inches. A minimum of two hours after installation, Probes SVP-1 and SVP-2 will be sampled. Procedures will follow current regulatory guidance as presented in Attachment C.

**Laboratory Analysis**

Up to two soil samples per boring (for a total of 11 to 22 samples) and eight groundwater samples will be submitted under chain-of-custody to ESC Lab Sciences of Mt. Juliet, Tennessee (NELAP#-1157CA) for the following analyses:

- All soil and groundwater samples will be analyzed for:
    - Total petroleum hydrocarbons as gasoline (TPHg), TPH as diesel (TPHd), and TPH as motor oil (TPHmo) by EPA Method 8015
    - Benzene, toluene, ethylbenzene, and xylenes (BTEX), by EPA Method 8260
    - Methyl tert-butyl ether (MTBE), tert-butanol (TBA), diisopropyl ether (DIPE), ethyl tert butyl ether (ETBE), and tert amyl methyl ether (TAME), and for ethylene dibromide (EDB), ethylene dichloride (EDC) and naphthalene by EPA Method 8260.
- The soil samples which are from the former waste oil USTs and any additional samples to further delineate impacts from these USTs will also be analyzed for polyaromatic hydrocarbons (PAHs) by EPA Method 8270C SIM, for chlorinated volatile organic compounds (VOCs) by EPA Method 8260 (8010 list), and for the metals cadmium, chromium, nickel, lead and zinc by EPA Method 6020/200.8.

Sub-slab vapor samples will be submitted under chain-of-custody protocol to McCampbell Analytical, Incorporated, of Pittsburg, California (ELAP #1644). These samples will be analyzed for the following:

- TPHg, and VOCs by EPA Methods TO-3 and TO-15 with low detection limits requested. In addition, naphthalene will be sampled and analyzed by TO-17. Helium (the leak test compound) will be analyzed by Method ASTM-1946D, along with nitrogen, oxygen, methane and carbon dioxide.

All soil, groundwater and sub-slab vapor samples will be analyzed within the specified hold times for the analyses proposed.

## Data Evaluation

Locations of the groundwater monitoring wells will be proposed from the soil boring and sub-slab vapor data collected during the first phase of the investigation. Trinity will prepare a data package for submittal to ACEH which will include data tables, figures, and boring logs, along with proposed monitoring well locations and construction. The well locations will be recommended to delineate the extent of impacts. Trinity will proceed with well installation upon concurrence of proposed well locations and construction by ACEH.

## Phase II Investigation

### Groundwater Monitoring Well Installation

The proposed wells will be installed using similar drilling equipment as used for the soil borings. The wells will be installed using small-diameter (3/4-inch) pre-packed well screens with riser pipe, in the direct-push borehole. The maximum depth of the wells is estimated at 15 to 20 feet bgs, with screen extending up to approximately 4 feet bgs to intercept the static water level. The actual well screen interval will be determined based on field conditions during installation, with the intent of screening only the shallowest groundwater zone and utilizing the minimum screen length required for a representative sample of the shallowest zone. The wells will be completed with a bentonite and neat cement grout from the top of the pre-packed screen to the ground surface, and a traffic-rated vault box will be installed to protect each well. The wells will be surveyed to GeoTracker standards by a licensed surveyor.

Trinity will develop each new well at least 24 hours following well installation, by surging and bailing a minimum of 10 casing volumes, in order to remove fine-grained materials and reduce sample turbidity. A minimum of 72 hours following well development, the wells will be sampled following standard procedures. The samples will collected into laboratory-supplied containers appropriate for the requested analyses, labeled, placed on ice, and transported to a laboratory as described below. Groundwater elevations measured in the new and existing wells will be used to determine the groundwater flow direction at the site.

### Laboratory Analysis

One soil sample and one groundwater sample per monitoring well will be submitted under chain-of-custody to ESC Lab Sciences of Mt. Juliet, Tennessee (NELAP#-1157CA) for the following analyses:

- All soil and groundwater samples will be analyzed for TPHg, TPHd, and TPHmo by EPA Method 8015, and for BTEX, oxygenates including MTBE, TBA, DIPE, ETBE, and TAME; EDB; EDC; and naphthalene by EPA Method 8260. This analytical suite may be modified per reccomendations contained in the Phase I data packet.
- Additional analytes will be determined during data evaluation and included in the monitoring well location data package submitted to ACEH. These analytes may include PAHs by EPA Method 8270C SIM, for chlorinated VOCs by EPA Method 8260 (8010 list), and for the metals cadmium, chromium, nickel, lead and zinc by EPA Method 6020/200.8.

All soil and groundwater samples will be analyzed within the specified hold times for the analyses proposed.

**Reporting**

The methods, findings, and results of the work proposed herein will be presented in a report, which will include a site map, chain-of custody documentation, and certified analytical reports, along with conclusions and recommendations based on the data collected. Specific recommendations regarding groundwater monitoring will be included. The site data and report will be uploaded to GeoTracker.

**Quarterly Groundwater Monitoring**

Once all the groundwater monitoring wells are installed, Trinity will recommend groundwater monitoring analyses based on the conditions observed during Phases I and II of the investigation. Groundwater monitoring will begin on a quarterly basis beginning in the quarter following the report summarizing the findings of the above scope of work.

## SCHEDULE

ACEH requested that quarterly groundwater monitoring be instituted at the site, with the first quarterly report to be submitted by March 16, 2012. Trinity recommends that quarterly monitoring be instituted following completion of the soil and groundwater investigation proposed herein. The soil and groundwater investigation will provide data which may narrow the list of site compounds of concern (COCs). The potentially narrower list of COCs would be applied to the groundwater monitoring program. Therefore, we request that the first quarterly report due date be adjusted accordingly.

In addition, Trinity requests additional modifications to the schedule for report submittals established by ACEH in their January 27, 2012 letter. Trinity requests that due dates be established at 60 days following regulatory approval, rather than 45 days. This slightly-longer timeframe allows for incidental delays associated with each sequential activity (permitting, drilling, well development, well sampling, laboratory analyses, surveying, etc.), and will keep the project moving ahead while avoiding costs associated with expedited activities.

In view of the above comments, Trinity proposes the following schedule:

- **60 Days After Work Plan Addendum Approval:** Soil, Groundwater, and Vapor Data Submittal
- **60 Days After Well Location Approval:** Soil and Groundwater Investigation Report, including the proposal for quarterly groundwater monitoring
- **60 Days After Soil and Groundwater Investigation Report Approval:** Quarterly Groundwater Monitoring Report submittal

Should you have any questions regarding this letter, please call Trinity at (831) 426-5600.

Sincerely,

**TRINITY SOURCE GROUP, INC.**

Information, conclusions, and recommendations made by Trinity in this document regarding this site have been prepared under the supervision of and reviewed by the licensed professional whose signature appears below.


Debra J. Moser, PG, CEG, CHG
Senior Geologist

Cora Olson
Staff Engineer

Attachments:

| | |
|---|---|
| Figure 1: | Historical Creek Boundary and Site Location Map |
| Figure 2: | Site Map |
| Figure 3: | Utility Location Site Map |
| Figure 4: | Maintenance Building Utility Location Map |
| Figure 5 | Cross-Section of Utilities in UST Area |
| Figure 6: | Proposed Soil Boring and Sub-Slab Vapor Probe Location Map |
| | |
| Attachment A: | ACEH Letter Dated January 27, 2012 |
| Attachment B: | Historical Soil and Groundwater Data |
| Attachment C: | Field Procedures |

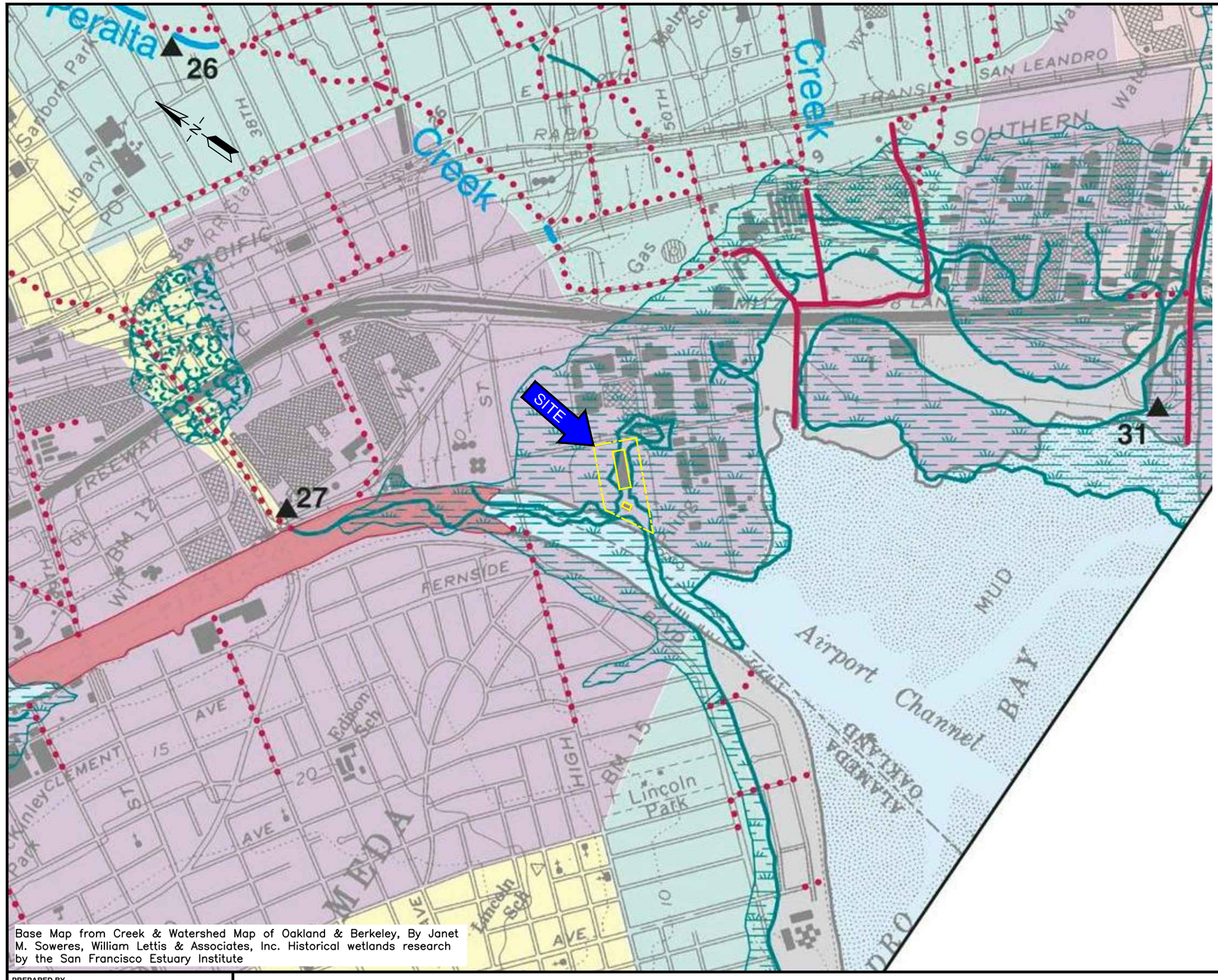
## DISTRIBUTION

A copy of this report has been forwarded to:

Mr. Chris Brown
ABF Freight System, Inc.
3801 Old Greenwood Road
Fort Smith, AR 72903

Leroy Griffin
Oakland Fire Department
250 Frank H. Ogawa Plaza, Ste. 3341
Oakland, CA 94612-2032
(sent via email to lgriffin@oaklandnet.com)

# FIGURES




## EXPLANATION

- Creeks
- Former creeks, buried or drained, and Bay shoreline, circa 1850
- Underground culverts and storm drains
- Engineered channels
- Willow groves, circa 1850
- Beach, circa 1850
- Tidal marsh, circa 1850
- now water
- now fill land
- Bay
- Bay, circa 1850, now fill land
- Artificial bodies of water
- Present watersheds

APPROX. SCALE IN FEET
0 1,000

Base Map from Creek & Watershed Map of Oakland & Berkeley, By Janet M. Soweres, William Lettis & Associates, Inc. Historical wetlands research by the San Francisco Estuary Institute

PREPARED BY

TRINITY source group, inc.
Environmental Consultants
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Santa Cruz, California 95060
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**HISTORICAL CREEK BOUNDARY AND SITE LOCATION MAP**

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.004.001

FIGURE: 1

REF. 154_001\154.004.001 fig1.dwg


Ref: 154_00 154-003.001 fig2-3.dwg
Base Map from Google Earth, 2009

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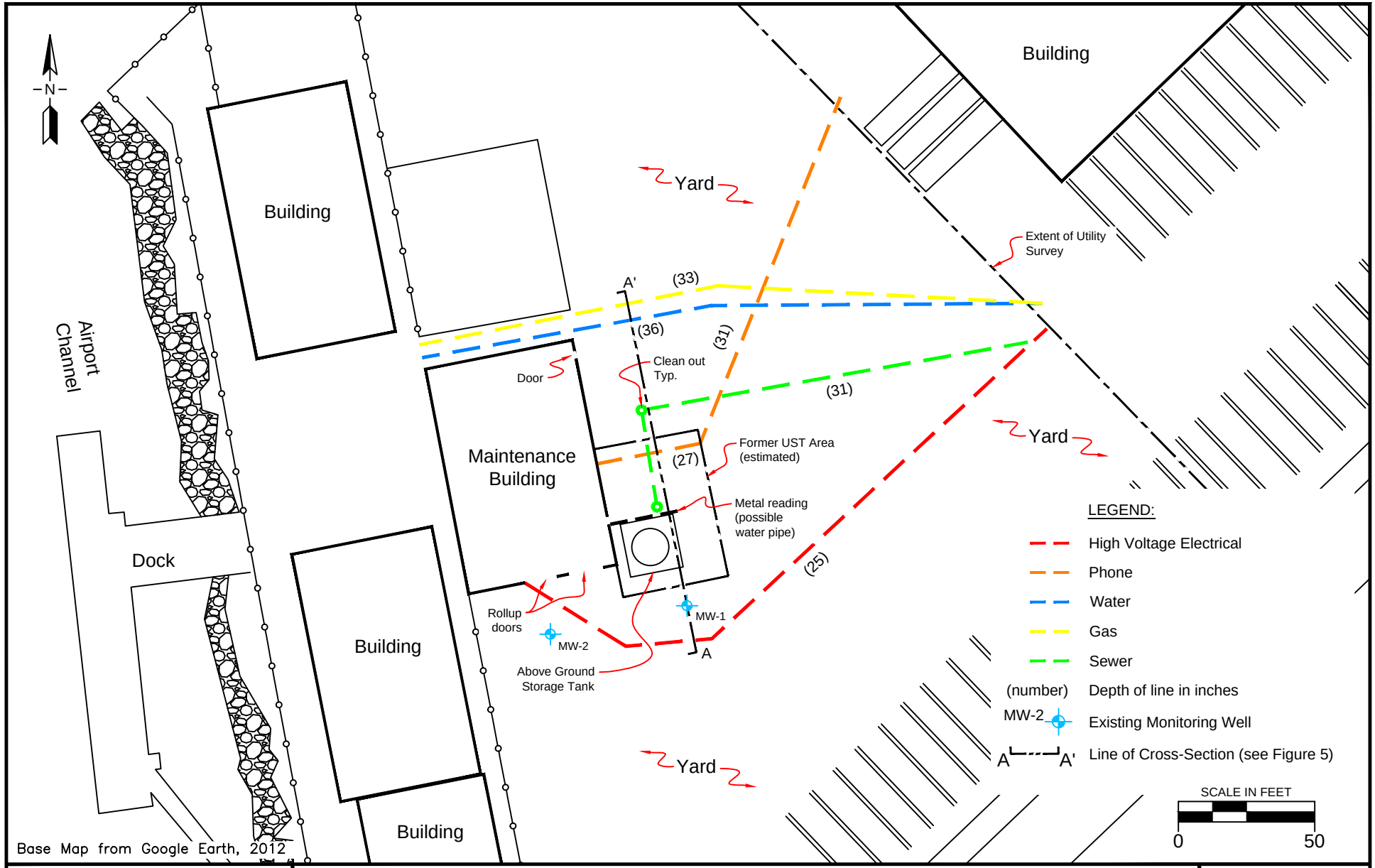
**SITE MAP**

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT:
154.004.001

FIGURE:
2

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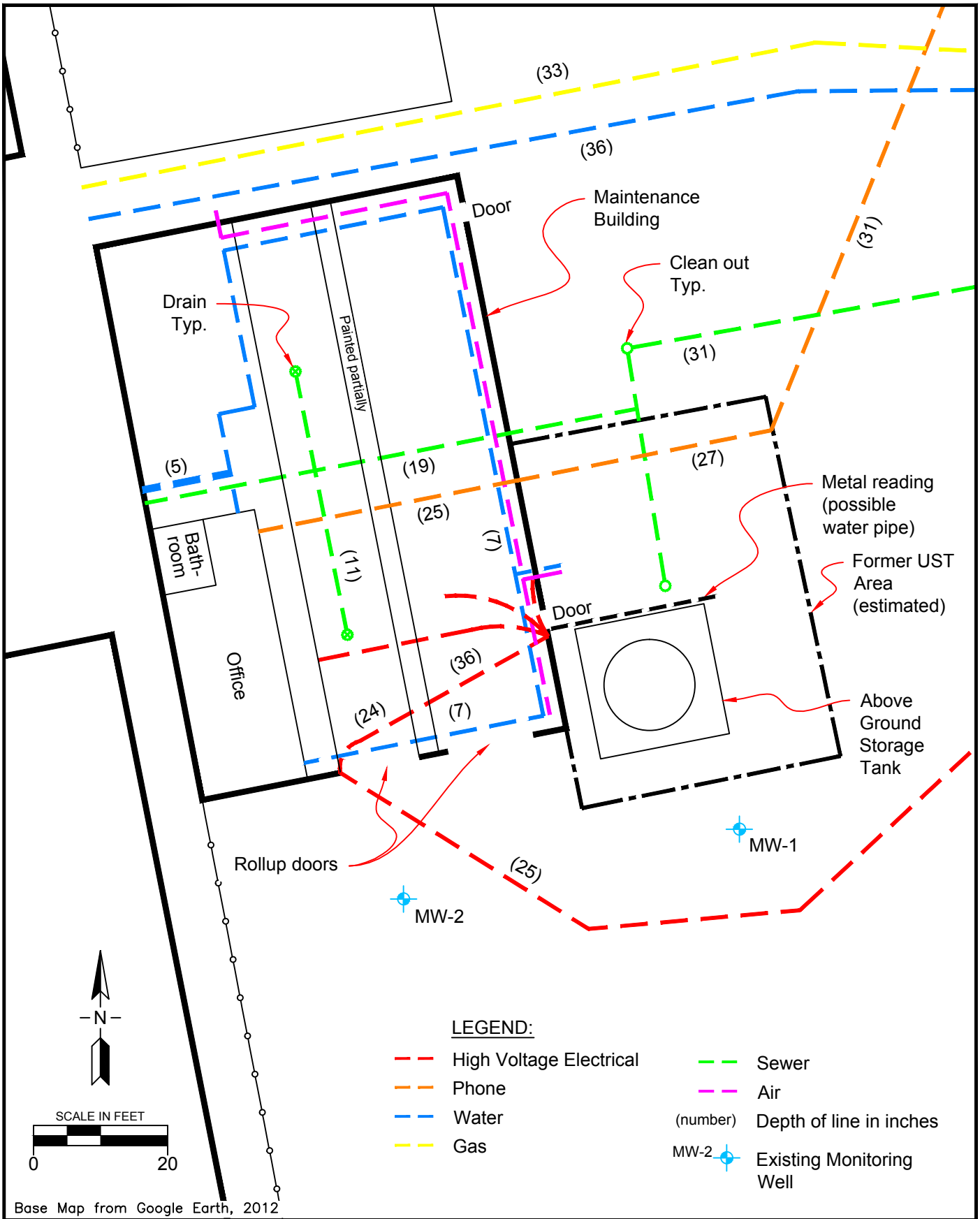
# UTILITY LOCATION SITE MAP

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT:
154.004.001

FIGURE:
3

REF. 154_001\154.004.001 fig3.dwg




Base Map from Google Earth, 2012

REF. 154_001\154.004.001 fig3.dwg

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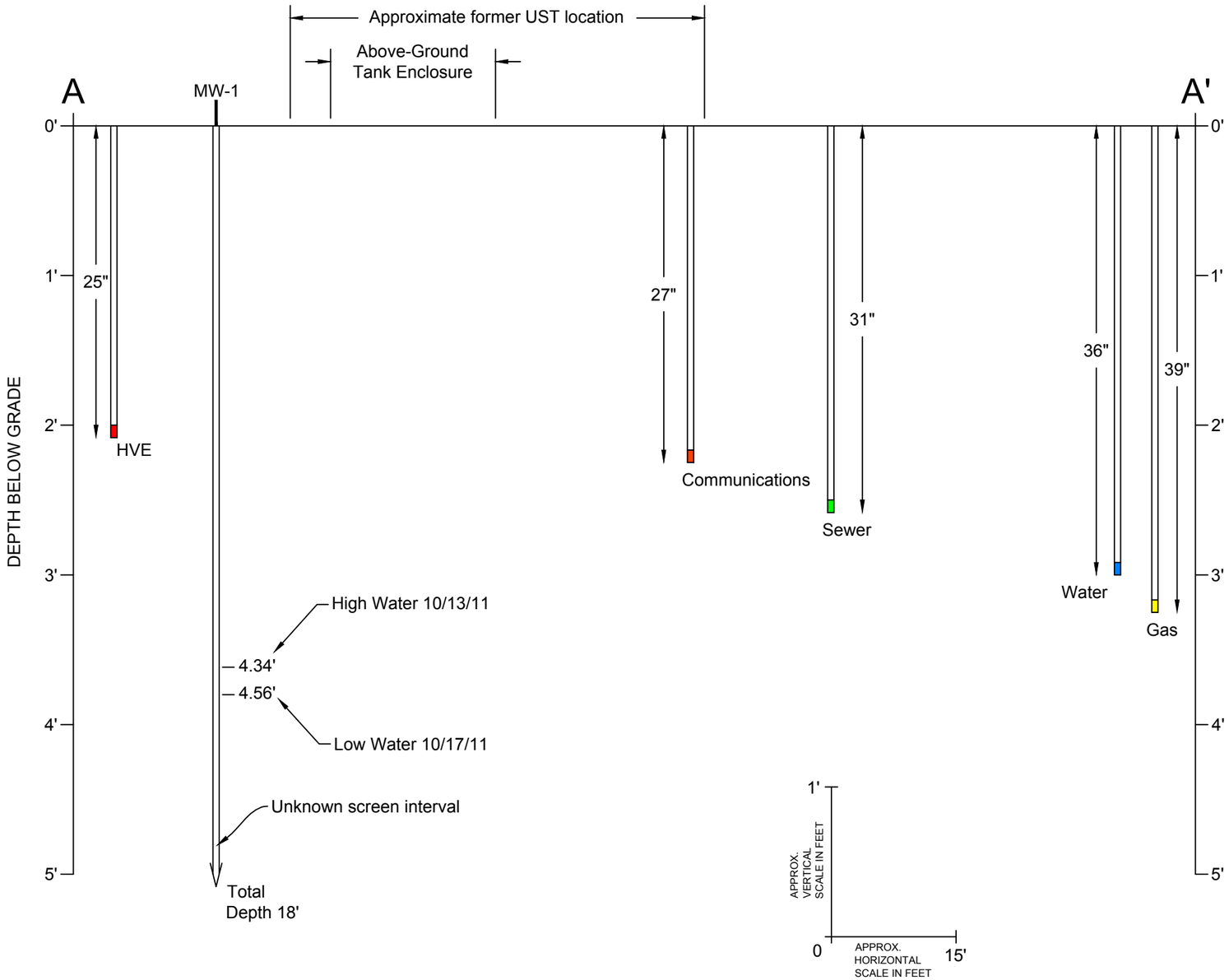
**MAINTENANCE BUILDING UTILITY LOCATION MAP**

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.004.001

FIGURE: 4




LEGEND:

UST Underground storage tank

NOTES:

- Utility depths provided by locating service
- See Figure 3 for location of section

REF. 154_001\154.004.001 fig5.dwg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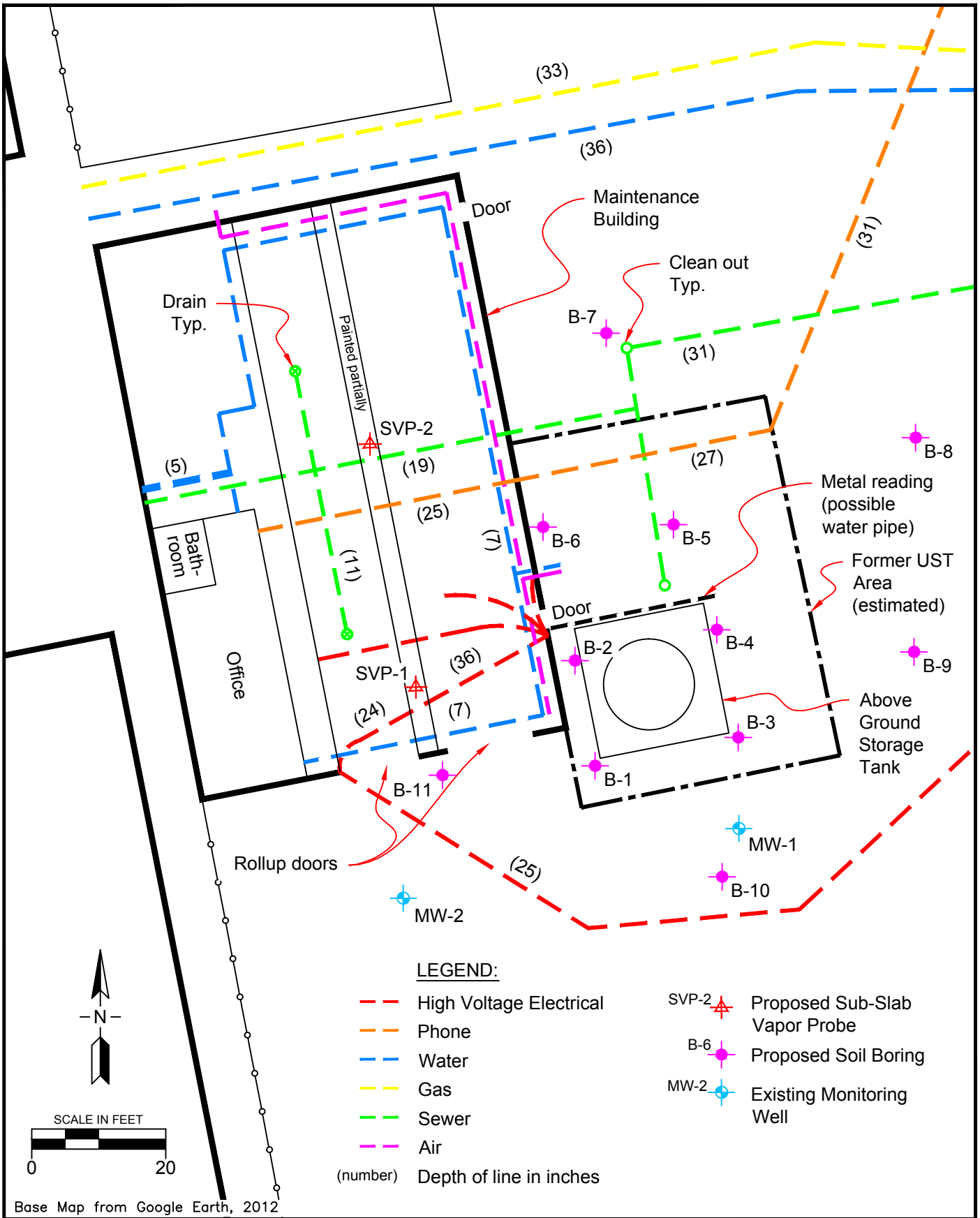
**CROSS-SECTION OF UTILITIES IN UST AREA**

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT:
154.004.001

FIGURE:
5




REF. 154_001\154.004.001 fig3.dwg

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**PROPOSED SOIL BORING AND SUB-SLAB VAPOR PROBE LOCATION MAP**

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT:
154.004.001

FIGURE:
6

# ATTACHMENT A

# ACEH Letter Dated January 27, 2012

ALAMEDA COUNTY
**HEALTH CARE SERVICES**
AGENCY
ALEX BRISCOE, Agency Director

ENVIRONMENTAL HEALTH SERVICES
ENVIRONMENTAL PROTECTION
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577
(510) 567-6700
FAX (510) 337-9335

January 27, 2012

Arkansas Bandag Corporation
PO Box 10048
Fort Smith AR 72917

Mr. Chris Brown
ABF Freight Systems, Inc.
PO Box 10048
Fort Smith AR 72917
(sent via electronic mail to cbrown@abf.com)

Subject: Request for a Work Plan Addendum; Fuel Leak Case No. RO0003033 and GeoTracker Global ID T0600100018, ABF Freight Systems, 4575 Tidewater Avenue, Oakland, CA 94601

Dear Mr. Brown:

Alameda County Environmental Health (ACEH) staff has reviewed the case file for the above-referenced site, including the *Soil and Groundwater Investigation Work Plan,* dated November 4, 2011, and prepared by the Trinity Source Group, Inc (Trinity). The work plan included an initial Site Conceptual Model (SCM) and the results of a groundwater monitoring and sampling event (with well redevelopment) conducted in October 2011 after discussions with ACEH. Thank you for the work plan and the initial work at the site.

Based on ACEH staff review of the referenced documents and of the case file we generally concur with the recently proposed scope of work, provided that the modifications requested in the technical comments below are addressed and incorporated during the field implementation. While the comments below request a number of additional soil bores, submittal of a revised Work Plan is limited to a revised Figure 5 and additionally requested items, unless an alternate scope of work outside that described in the Work Plan and technical comments below is proposed. We request that you address the following technical comments, submit the requested document, and upon ACEH approval, perform the proposed work, and send us the technical reports requested below. Please provide 72-hour advance written notification to this office (e-mail preferred to: mark.detterman@acgov.org) prior to the start of field activities.

## TECHNICAL COMMENTS

1. **Request for additional bore locations and grab groundwater sampling –** The November 2011 work plan referenced above proposes to install six tank basin backfill bores to investigate for potential residual soil contamination within the (presumed former) UST complex. The bores also are intended to investigate the vertical extent of any residual soil contamination encountered. Two additional groundwater monitoring wells to the north and south of the tank complex are proposed. Four additional bores are held in reserve should residual contamination be encountered in the tank complex, or in soil samples collected during well installation. These are intended to define the lateral extent of impacted soil around detected concentrations. The proposed installation of two sub-slab vapor probes within the maintenance facility immediate west of the UST complex is discussed in Technical Comment No. 4 below.

   ACEH notes that conflicting information is presently available for the site. While existing soil analytical appears to indicate limited impact to soil outside the UST complex (up to 34 mg/kg motor fuel at a depth of 9.5 feet), the soil samples were collected at a depth of 4.5 and 9.5 feet below grade surface (bgs), while groundwater appears to have been generally encountered at between 1 and 2 feet in most existing soil bores, with one noted to be as deep as 7 feet bgs. This can suggest that the soil samples were collected below groundwater (but may suggest the

vertical extent in soil might be defined). ACEH also notes that groundwater at an adjacent site (Di Salvo Trucking, RO0000107, 4919 Tidewater Avenue, Oakland) is generally encountered at a depth of 2 to 3 feet bgs). As a consequence of these indications ACEH requests the installation of additional soil bores, and the collection of grab groundwater samples, to define the lateral extent of potential soil and groundwater contamination in the vicinity of the UST complex prior to the installation of groundwater wells (with close attention paid to the depth of first encountered groundwater). This will also assist in determining well screen placement. Because the UST complex is immediately adjacent to the maintenance facility, this should include bores within that structure. This request is based on the detection of up to 2,900 mg/kg extractable hydrocarbons in the stockpile characterization sample and the presumed limited ability to remove additional laterally impacted soil adjacent to the building. This will additionally help in the understanding of the potential for vapor intrusion into that facility. This would also be consistent with full site delineation required by current policy and in any future adoption of the as yet not adopted "Low-Threat Policy". Because there is no UST basin perimeter characterization data this should also include collection of soil and groundwater to sufficiently characterize the basin perimeter.

For this phase of work ACEH requests a work plan addendum prior to commencement of field work (a revised Figure 5), to depict the location of additional bore and grab groundwater locations, by the date identified below.

2. **Request for a Preferential Pathway Study** – The purpose of a preferential pathway study is to locate potential migration pathways and conduits and determine the probability of a groundwater plume encountering preferential pathways and conduits that could spread contamination. Because of the proximity of the tidal estuary, ACEH requests you undertake this study prior to site investigations, and submit the results in a brief letter report accompanying the work plan addendum revised figure requested above. As a consequence, ACEH requests a conduit study that details the potential migration pathways and potential conduits (utilities, utility laterals, pipelines, foundational, and in particular at this site. in-filled estuary sloughs, and etc.) for vertical and lateral migration that may be present in the vicinity of the site.

   Discuss your analysis and interpretation of the results of the preferential pathway study and report your results in the work plan addendum requested below. The results of your study shall contain all information required by California Code of Regulations, Title 23, Division 3, Chapter 16, §2654(b).

   a. **Utility Survey -** An evaluation of all utility lines, utility laterals, and trenches (including sewers, storm drains, yard drainage, electrical, gas, pipelines, trench backfill, foundation backfill, etc.) within and near the site and plume area(s) is required as part of your study. Please synthesize available information and maps, and generate appropriate (vicinity and / or site specific) maps and cross-sections illustrating the location and depth of all utility lines and trenches within and near the site and plume areas(s) as part of your study.

   b. **In-Filled Estuary Channels** – ACEH reviewed the *Creek & Watershed Map of Oakland & Berkeley* (available through either the Oakland Museum of California website, or the ACEH website under "Technical References") for potential creeks, channelized creeks, trunk storm drain lines, or in-filled estuary sloughs. The subject site, inclusive of both buildings and the UST complex, appears to have been located directly over a former slough channel. Backfill for the channel is requested to be carefully evaluated and consideration be given with respect to potential preferential pathways caused by granular fill placement. This may require some modification to bore placement locations.

3. **Vapor Survey** – ACEH is in general agreement that a vapor survey is appropriate at the site; however, prior to conducting the survey, ACEH requests that the maintenance building layout, including utility conduits, bay doors, bathrooms, offices, or other appropriate structures be mapped out on a figure, and sub-slab vapor probe locations be justified within that context. This is requested to be submitted as a part of the work plan addendum previously requested. ACEH has the additional comments in regards to the proposed sub-slab vapor survey:

a. **Tracer Shroud -** The sampling protocols indicate that a shroud will be used; however, do not describe how the sampling train will be accessed to retain a helium enriched atmosphere around the sampling train at all times. To preclude miscommunication ACEH requests that the shroud remain in place for the duration of the test to maintain that atmosphere. To allow "real-time" monitoring of the shroud tracer atmosphere with a helium monitoring device, the shroud should be fitted with a minimum of one port. The port can be used to access the sampling train without removal of the shroud if a gas impermeable (e. g. plastic) curtain is used. Please tabulate the shroud tracer concentrations in the report requested below should the tracer concentration readings are not contained in the field data sheets.

b. **Additional Soil Vapor Analytical Suite** – To characterize the sub-slab vapor environment ACEH requests the collection and analysis of standard atmospheric gases (nitrogen and oxygen), as well as methane and carbon dioxide by appropriate methodologies.

4. **Well Placement** – ACEH is in general agreement that additional wells are appropriate at this site in order to define the lateral extent of impacted soil and groundwater. The wells should be placed based on the collection of additional soil and groundwater data to be collected in the soil bore program. Prior to well placement selection ACEH requests a data submittal of the results of the soil bore and sub-slab vapor survey investigations (data tables, figures, bore logs, and other appropriate data or explanations) in conjunction with proposed well locations. Upon ACEH concurrence with well placement, installation of the wells can proceed.

5. **Well Screen Intervals –** The work plan proposes to install well screens 11- to 16-feet in length between approximately 15 and 20 feet bgs, and up to approximately 4 feet bgs to intercept static water levels. ACEH assumes (and requests) that the upper depth interval be adjusted in the field depending on the depth of first encountered groundwater; however, ACEH generally requires shorter screen intervals in order to collect more representative groundwater sample. In general this should be no more than a 5 foot sand interval; however, ACEH also recognizes that a fully screened water-bearing zone is appropriate in thinner permeable zones. For shorter water bearing zones ACEH requests an effort to minimize the screen length at each well location to the extent possible, with well screens minimally longer than the water-bearing zone, but including the capillary fringe. If longer screen intervals are judged appropriate well clusters or multilevel wells (e.g. CMT) may be appropriate. Please document intended changes in the brief work plan addendum requested below, by the date identified below.

6. **Request for Quarterly Groundwater Monitoring and Sampling -** ACEH requests continuation of groundwater monitoring, initially on a quarterly basis, in order to establish groundwater and contaminant trends at the site, principally due to the extremely limited set of groundwater data present at the site. New wells additionally require a minimum of one full year of quarterly groundwater monitoring and sampling, once installed. The site can be reevaluated after this initial period for a reduction in the groundwater monitoring interval to semi-annual, or other appropriately justified intervals.

7. **Laboratory Analysis -** ACEH has the following technical comments on the proposed analytical program:

a. **Soil Analysis –** With respect to soil characterization for potential waste oil contaminants ACEH additionally requests collection of the standard waste oil suite of contaminants contained in revised *Table 2: Recommended Minimum Verification Analysis for Underground Storage Tank Leaks* (revised October 10, 2006). This should additionally include oil and grease, chlorinated VOCs (EPA 8260 list), EDB, EDC, PCBs, and PCPs by appropriate laboratory methods.

ACEH is in agreement that the use of silica gel cleanup is appropriate at this bay margin site. ACEH additionally requests an analysis of the carbon-range (fuel fingerprint) be

conducted in an attempt to determine if future cost savings may be achieved, in particular in the extractable range, at the site. Initially this would be in addition to standard TPH range analysis (gas, diesel, motor oil, etc).

b. **Groundwater Analysis -** In addition to the proposed groundwater analytical suite, ACEH additionally requests initial inclusion of a full fuel oxygenate analysis program (MTBE, TBA, DIPE, ETBE, TAME, as well as EDB and EDC). This should be applied to both grab groundwater and well groundwater samples. Upon collection of sufficient analytical data this request can be reevaluated. ACEH additionally requests collection of salinity measurements from groundwater monitoring wells on a one time basis. This, in addition to specific conductivity measurements, will help establish the resource potential of groundwater beneath the site.

**TECHNICAL REPORT REQUEST**

Please submit technical reports to Alameda County Environmental Health (Attention: Mark Detterman), according to the following schedule:

- **March 3, 2012 –** Work Plan Addendum (Figure 5, Conduit Survey, and Screen Interval)
- **March 16, 2012 –** First Quarter 2012 Groundwater Monitoring Report
- **45 Days After Work Plan Addendum Approval –** Soil, Groundwater, and Vapor Data Submittal
- **45 Days After Well Location Approval –** Soil and Groundwater Investigation Report
- **June 15, 2012 –** Second Quarter 2012 Groundwater Monitoring Report

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

If you have any questions, please call me at (510) 567-6876 or send me an electronic mail message at mark.detterman@acgov.org.

Sincerely,

Digitally signed by Mark E. Detterman
DN: cn=Mark E. Detterman, o, ou, email, c=US
Date: 2012.01.27 11:22:49 -08'00'

Mark E. Detterman, PG, CEG
Senior Hazardous Materials Specialist

Enclosures: Attachment 1 – Responsible Party (ies) Legal Requirements / Obligations
Electronic Report Upload (ftp) Instructions

cc: David Reinsma, Trinity Source Group, Inc, 500 Chestnut Street, Suite 225, Santa Cruz, CA 95060 (sent via electronic mail to dar@tsgcorp.net)

Debra Moser, Trinity Source Group, Inc, 500 Chestnut Street, Suite 225, Santa Cruz, CA 95060 (sent via electronic mail to djm@tsgcorp.net)

Donna Drogos, (sent via electronic mail to donna.drogos@acgov.org)
Mark Detterman (sent via electronic mail to mark.detterman@acgov.org)
Electronic File, GeoTracker

# Attachment 1

## Responsible Party(ies) Legal Requirements/Obligations

REPORT REQUESTS

These reports are being requested pursuant to California Health and Safety Code Section 25296.10. 23 CCR Sections 2652 through 2654, and 2721 through 2728 outline the responsibilities of a responsible party in response to an unauthorized release from a petroleum UST system, and require your compliance with this request.

ELECTRONIC SUBMITTAL OF REPORTS

ACEH's Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of reports in electronic form. The electronic copy replaces paper copies and is expected to be used for all public information requests, regulatory review, and compliance/enforcement activities. Instructions for submission of electronic documents to the Alameda County Environmental Cleanup Oversight Program FTP site are provided on the attached "Electronic Report Upload Instructions." Submission of reports to the Alameda County FTP site is an addition to existing requirements for electronic submittal of information to the State Water Resources Control Board (SWRCB) GeoTracker website. In September 2004, the SWRCB adopted regulations that require electronic submittal of information for all groundwater cleanup programs. For several years, responsible parties for cleanup of leaks from underground storage tanks (USTs) have been required to submit groundwater analytical data, surveyed locations of monitoring wells, and other data to the GeoTracker database over the Internet. Beginning July 1, 2005, these same reporting requirements were added to Spills, Leaks, Investigations, and Cleanup (SLIC) sites. Beginning July 1, 2005, electronic submittal of a complete copy of all reports for all sites is required in GeoTracker (in PDF format). Please visit the SWRCB website for more information on these requirements (http://www.waterboards.ca.gov/water_issues/programs/ust/electronic_submittal/).

PERJURY STATEMENT

All work plans, technical reports, or technical documents submitted to ACEH must be accompanied by a cover letter from the responsible party that states, at a minimum, the following: "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." This letter must be signed by an officer or legally authorized representative of your company. Please include a cover letter satisfying these requirements with all future reports and technical documents submitted for this fuel leak case.

PROFESSIONAL CERTIFICATION & CONCLUSIONS/RECOMMENDATIONS

The California Business and Professions Code (Sections 6735, 6835, and 7835.1) requires that work plans and technical or implementation reports containing geologic or engineering evaluations and/or judgments be performed under the direction of an appropriately registered or certified professional. For your submittal to be considered a valid technical report, you are to present site specific data, data interpretations, and recommendations prepared by an appropriately licensed professional and include the professional registration stamp, signature, and statement of professional certification. Please ensure all that all technical reports submitted for this fuel leak case meet this requirement.

UNDERGROUND STORAGE TANK CLEANUP FUND

Please note that delays in investigation, later reports, or enforcement actions may result in your becoming ineligible to receive grant money from the state's Underground Storage Tank Cleanup Fund (Senate Bill 2004) to reimburse you for the cost of cleanup.

AGENCY OVERSIGHT

If it appears as though significant delays are occurring or reports are not submitted as requested, we will consider referring your case to the Regional Board or other appropriate agency, including the County District Attorney, for possible enforcement actions. California Health and Safety Code, Section 25299.76 authorizes enforcement including administrative action or monetary penalties of up to $10,000 per day for each day of violation.

| Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) | **REVISION DATE:** July 20, 2010 |
|---|---|
| | **ISSUE DATE:** July 5, 2005 |
| | **PREVIOUS REVISIONS:** October 31, 2005; December 16, 2005; March 27, 2009; July 8, 2010 |
| **SECTION:** Miscellaneous Administrative Topics & Procedures | **SUBJECT:** Electronic Report Upload (ftp) Instructions |

The Alameda County Environmental Cleanup Oversight Programs (LOP and SLIC) require submission of all reports in electronic form to the county's ftp site. Paper copies of reports will no longer be accepted. The electronic copy replaces the paper copy and will be used for all public information requests, regulatory review, and compliance/enforcement activities.

**REQUIREMENTS**

- **Please do not submit reports as attachments to electronic mail.**
- Entire report including cover letter must be submitted to the ftp site as **a single portable document format (PDF) with no password protection**.
- It is **preferable** that reports be converted to PDF format from their original format, (e.g., Microsoft Word) rather than scanned.
- **Signature pages and perjury statements must be included and have either original or electronic signature.**
- **Do not password protect the document**. Once indexed and inserted into the correct electronic case file, the document will be secured in compliance with the County's current security standards and a password. **Documents with password protection will not be accepted**.
- Each page in the PDF document should be rotated in the direction that will make it easiest to read on a computer monitor.
- Reports must be named and saved using the following naming convention:

  RO#_Report Name_Year-Month-Date (e.g., RO#5555_WorkPlan_2005-06-14)

**Submission Instructions**

1) Obtain User Name and Password
   a) Contact the Alameda County Environmental Health Department to obtain a User Name and Password to upload files to the ftp site.
      i) Send an e-mail to deh.loptoxic@acgov.org
   b) In the subject line of your request, be sure to include **"ftp PASSWORD REQUEST"** and in the body of your request, include the **Contact Information, Site Addresses**, and the **Case Numbers (RO# available in Geotracker) you will be posting for**.

2) Upload Files to the ftp Site
   a) Using Internet Explorer (IE4+), go to ftp://alcoftp1.acgov.org
      (i) Note: Netscape, Safari, and Firefox browsers will not open the FTP site as they are NOT being supported at this time.
   b) Click on Page located on the Command bar on upper right side of window, and then scroll down to Open FTP Site in Windows Explorer.
   c) Enter your User Name and Password. (Note: Both are Case Sensitive.)
   d) Open "My Computer" on your computer and navigate to the file(s) you wish to upload to the ftp site.
   e) With both "My Computer" and the ftp site open in separate windows, drag and drop the file(s) from "My Computer" to the ftp window.

3) Send E-mail Notifications to the Environmental Cleanup Oversight Programs
   a) Send email to deh.loptoxic@acgov.org notify us that you have placed a report on our ftp site.
   b) Copy your Caseworker on the e-mail. Your Caseworker's e-mail address is the entire first name then a period and entire last name @acgov.org. (e.g., firstname.lastname@acgov.org)
   c) The subject line of the e-mail must start with the RO# followed by **Report Upload**. (e.g., Subject: RO1234 Report Upload) If site is a new case without an RO#, use the street address instead.
   d) If your document meets the above requirements and you follow the submission instructions, you will receive a notification by email indicating that your document was successfully uploaded to the ftp site.

**Debra Moser**

**From:** Detterman, Mark, Env. Health [Mark.Detterman@acgov.org]
**Sent:** Friday, March 02, 2012 10:40 AM
**To:** Debra Moser
**Cc:** David Reinsma
**Subject:** RE: ABF Freight Systems, RO0003033

Hi Debbie,
That would be fine. It's still moving forward. I'll update Geotracker shortly.
Best,

*Mark Detterman*
*Senior Hazardous Materials Specialist, PG, CEG*
*Alameda County Environmental Health*
*1131 Harbor Bay Parkway*
*Alameda, CA 94502*
*Direct: 510.567.6876*
*Fax: 510.337.9335*
*Email: mark.detterman@acgov.org*

*PDF copies of case files can be downloaded at:*

*http://www.acgov.org/aceh/lop/ust.htm*

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**From:** Debra Moser [mailto:djm@tsgcorp.net]
**Sent:** Friday, March 02, 2012 9:59 AM
**To:** Detterman, Mark, Env. Health
**Cc:** 'David Reinsma'
**Subject:** ABF Freight Systems, RO0003033

Hi Mark,
We have a Work Plan Addendum for the referenced site ready to send to you, but the ABF person who needs to sign the cover letter is out of the office until next Tuesday. Would you allow us to submit the Work Plan Addendum at that time?

Thanks very much,
Debbie

***Debra J. Moser, PG, CEG, CHG***
*Senior Geologist*
***Trinity Source Group, Inc.***
*500 Chestnut Street, Suite 225*
*Santa Cruz, CA 95060*
*Tel: (831) 426-5600*
*Fax: (831) 426-5602*
*Cell: (831) 212-8846*



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# ATTACHMENT B

# Historical Soil and Groundwater Data

**Table 1**
**Soils Analytical Data**

ABF Freight System, Inc.
4575 Tidewater Avenue
Oakland, California

| Sample ID | Sample Date | Sample Depth (ft) | TPHg (mg/kg) | Benzene (mg/kg) | Toluene (mg/kg) | Total Xylenes (mg/kg) | Notes |
|---|---|---|---|---|---|---|---|
| MW-1 | 9/15/1986[a] | 4-1/2-5 | <0.05 | <0.001 | <0.001 | <0.001 | Gasoline |
| MW-2 | 9/15/1986[a] | 4-1/2-5 | <0.05 | <0.001 | <0.001 | <0.001 | Gasoline |
| MW-2 | 9/15/1986[a] | 9-1/2-10 | <0.05 | <0.001 | <0.001 | <0.001 | Gasoline |
| S-1 | 9/15/1986[a] | 4-1/2-5 | <0.05 | <0.001 | <0.001 | **0.022** | Gasoline |
| S-2 | 9/15/1986[a] | 4-1/2-5 | <0.05 | <0.001 | <0.001 | <0.001 | Aged Gasoline |
| S-3 | 9/15/1986[a] | 4-1/2-5 | **34** | **0.012** | **0.01** | **0.058** | Aged Gasoline |

Notes:
a = Data reported in Weston report dated February 25, 1987; analysis by EPA Methods 5020/8015/8020; Weston report listed "Motor Fuel" analysis which Trinity is reporting under TPHg
ID = Identification
TPHg = Total Petroleum Hydrocarbons, gasoline-range organics
MW = Monitoring Well
mg/kg = milligrams per kilogram
< = not detected at above detection limit
TPH = Total petroleum hydrocarbons

**Table 2**
**Groundwater Analytical Data**

ABF Freight System, Inc.
4575 Tidewater Avenue
Oakland, California

| Sample ID | Sample Date | Depth to Groundwater (ft) | EPA Method: 1664A | 8015D/G | 3511/80 | | | | Volatile Organics: 8260B | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | TPH Oil & Grease (µg/L) | TPHg (µg/L) | TPHd without silica gel cleanup (µg/L) | TPHmo without silica gel cleanup (µg/L) | TPHd with silica gel cleanup (µg/L) | TPHmo with silica gel cleanup (µg/L) | Acetone (µg/L) | Benzene (µg/L) | Ethyl Benzene (µg/L) | Naph-thalene (µg/L) | Toluene (µg/L) | Total Xylenes (µg/L) | Other Detections |
| MW-1 | 9/15/1986[a] | NA | NA | **4,520** | NA | NA | NA | NA | NA | **1,590** | NA | NA | **12** | **1,000** | |
| | 10/17/11 | 4.56 | <1,300 | **660** | **6,680** | **110** | **4,520** | **33** | **8.4** | **11** | **0.93** | **56** | **1.1** | **3.3** | **A** |
| MW-2 | 9/15/1986[a] | NA | NA | <50 | NA | NA | NA | NA | NA | **9** | **NA** | NA | <1 | <1 | |
| | 10/17/11 | 3.87 | **1,700** | <40 | **730** | **64** | **600** | **69** | **11** | <0.10 | <0.11 | **1.0** | <0.15 | <0.50 | **none** |
| | | ESL (Industrial Land Use, Non-Drinking Water Source) | 210 | 210 | 210 | 210 | 210 | 210 | 1,500 | 46 | 43 | 24 | 130 | 100 | |

| Sample ID | Sample Date | Depth to Groundwater (ft) | Polynuclear Aromatic Hydrocarbons - EPA METHOD 8270C: Acenaph-thene (µg/L) | Acenaph-thylene (µg/L) | Anthracene (µg/L) | Fluoranthene (µg/L) | Fluorene (µg/L) | Naphthalene (µg/L) | 1-Methyl napthalene (µg/L) | 2-Methyl napthalene (µg/L) | Phenan-threne (µg/L) | Pyrene (µg/L) | Other Detections |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MW-1 | 10/17/11 | 4.56 | **0.69** | **0.20** | **0.056** | **0.049** | **1.5** | **31** | **13** | **13** | **0.29** | **0.041** | **none** |
| MW-2 | 10/17/11 | 3.87 | **0.097** | <0.011 | <0.013 | **<0.016** | **0.022** | **0.57** | **0.096** | **0.088** | <0.018 | **0.021** | **none** |
| | | ESL (Industrial Land Use, Non-Drinking Water Source) | 23 | 30 | 0.73 | 8.0 | 1.5 | 24 | NLE | 2.1 | 4.6 | 2.0 | |

Notes:

Note: Please reference lab report for all qualifers and notes.
ID = Identification
EPA = Environmental Protection Agency
a = Data reported in Weston report dated February 25, 1987; analysis by EPA Methods 5020/8015/8020; Weston report listed "Motor Fuel" analysis which Trinity is reporting under TPHg
TPHg = Total Petroleum Hydrocarbons, gasoline-range organics
TPHd = Total Petroleum Hydrocarbons, diesel-range organics (sum of C10-C22 and C22-C32 hydrocarbons)
TPHmo = Total Petroleum Hydrocarbons, motor-oil range organics (C32-C40 hydrocarbons)
ESL = Environmental Screening Level (ESL) listed i *Screening For Environmental Concerns at Sites With Contaminated Soil and Groundwater* (November 2007), San Francisco Bay Regional Water Quality Control Board, California EPA, http://www.waterboards.ca.gov/sanfranciscobay/esl.htm, updated May 2008
MW = Monitoring Well
µg/L micrograms per liter (equivalent to parts per billion)
< = not detected at above detection limit

**Table 2**
**Groundwater Analytical Data**

ABF Freight System, Inc.
4575 Tidewater Avenue
Oakland, California

| | | | EPA Method | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 1664A | 8015D/G | 3511/80 | | | | Volatile Organics: 8260B | | | | | | |
| Sample ID | Sample Date | Depth to Groundwater (ft) | TPH Oil & Grease (µg/L) | TPHg (µg/L) | TPHd without silica gel cleanup (µg/L) | TPHmo without silica gel cleanup (µg/L) | TPHd with silica gel cleanup (µg/L) | TPHmo with silica gel cleanup (µg/L) | Acetone (µg/L) | Benzene (µg/L) | Ethyl Benzene (µg/L) | Naph-thalene (µg/L) | Toluene (µg/L) | Total Xylenes (µg/L) | Other Detections |

MDL = Minimum detection limit
TPH = Total petroleum hydrocarbons
A = The following analytes were detected above MDL: n-Butylbenzene 2.6 µg/L, sec-Butylbenzene 1.9 µg/L, tert-Butylbenzene 14 µg/L, n-Hexane 7.9 µg/L, Isopropylbenzene 11 µg/L, n-Propylbenzene 21 µg/L, and 1,2,3-trimethylbenzene 1.2 µg/L
NLE = No level established

**Table 3**
**UST Removal Analytical Data**

ABF Freight System
4575 Tidewater Avenue
Oakland, California

| Water Sample ID | Sample Date | Depth (feet) | EPA Method 418.7 | EPA Method 8010 | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | TPH (mg/L) | Benzene (µg/L) | Toluene (µg/L) | Ethylbenzene (µg/L) | Total Xylenes* (µg/L) | Notes: |
| SPU-02 | 1/8/1987 | NA | 721 | ND<2 | ND<2 | ND<2 | ND<2 | |

| Soil Sample ID | Sample Date | Depth (feet) | EPA Method 418.7 | EPA Method 8010 | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | TPH (mg/kg) | Benzene (µg/L) | Toluene (µg/L) | Ethylbenzene (µg/L) | Total Xylenes* (µg/L) | Notes: |
| SPU-03 | 1/8/1987 | NA | 681 | ND<10 | ND<10 | ND<10 | ND<10 | a |
| SPU-04 | 1/8/1987 | NA | 108 | ND<10 | ND<10 | ND<10 | ND<10 | a |

Notes:

EPA = Environmental Protection Agency
TPH = Total petroleum hydrocarbons
mg/kg = milligrams per kilogram also equivalent to parts per million (ppm)
* = Laboratory reported m-Xylene, p-Xylene, and o-Xylene separately, each with detection limit shown.
< = not detected at above detection limit
a = Units (µg/L) are as shown on analytical report from Weston, dated 2/12/1987; Trinity assumes this is an error and should be mg/kg or µg/kg.

# ATTACHMENT C

# Field Procedures

# FIELD PROCEDURES

## Soil Borings

### Prefield Tasks

Exploratory boreholes are permitted and installed in accordance with state and local guidelines using a subcontracted state licensed driller. Prior to drilling, standard boring clearance procedures are followed to minimize the potential for encountering structures in the subsurface. Standard borehole clearance procedures include: (1) marking boring locations at the site and visually identifying, where possible, existing utilities; (2) notifying Underground Service Alert (USA); (3) obtaining available facility blueprints; (4) reviewing boring locations with former site operators; (5) performing field review of USA markings; and (6) hand clearing each boring to a depth of 5 feet below ground surface (bgs). Additional tasks include completing a site-specific health and safety plan and scheduling inspectors.

### Exploratory Drilling

The boring is drilled using Geoprobe® or similar direct-push drilling equipment. A precleaned sampler with a clear acetate liner and drive rods (typically two inches in diameter) is advanced for the purpose of collecting samples and evaluating subsurface conditions. The sampler is advanced in intervals of 3 to 4 feet, then the rods and sampler are retracted and the acetate liner removed from the sampler head for evaluation and sample collection by the onsite Trinity geologist. The sampler head is then cleaned, filled with a new acetate liner, inserted into the borehole, and advanced over the next sampling interval where the sample retrieval process is repeated.

After retrieval, each filled acetate liner is split open for examination of soils. The onsite Trinity geologist logs the soils including a physical description of observed soil characteristics (i.e. moisture content, consistency, obvious odor, color, photoionization detector [PID] readings, etc.), drilling difficulty, and soil type as a function of depth, in accordance with the Unified Soil Classification System (USCS).

Soils collected at 2-foot intervals are screened in the field for volatile organic compounds (VOCs) using a photoionization detector (PID). The PID screening is conducted by placing approximately 30 grams from an undisturbed soil sample into a clean plastic zip-lock bag. The bag is then placed in the ambient air for approximately 20 minutes, pierced, and the head-space within the bag tested for total organic vapor measured in parts per million as benzene (ppm; volume/volume). The PID readings represent relative levels of organic vapors for the site conditions at the time of drilling. The PID readings are noted on the field logs.

In general, soil samples are preserved at changes in soil type, elevated PID readings or at a minimum of every 4 feet. Selected soil samples are retained in the acetate liners, and capped with Teflon sheeting and plastic end caps, properly labeled and then placed in an ice-filled cooler for transport to the laboratory under chain-of-custody documentation.

**Grab-Groundwater Sampling**

After a soil boring has been drilled to the total depth a grab-groundwater sample may be collected. A temporary PVC casing with a screen in the water-bearing zone will be placed into the boring. The casing will be bailed with a Teflon bailer until the water appears clear, and then a grab-groundwater sample will be collected. Groundwater samples are placed into laboratory-supplied containers appropriate for the analyses to be performed. Ground water sampling is described in greater detail below. Purge water from groundwater sampling will be stored in 55-gallon drums and removed off site by a licensed waste hauler. Waste disposal documentation will be included in the summary report.

## Sub-Slab Vapor Probe Installation and Sampling

The installation procedure is consistent with that described by USEPA[2]. Sampling and analysis procedures generally follows the guidelines contained in the California Department of Toxic Substances Control (DTSC) "Advisory for Active Soil Gas Investigations" dated January 28, 2003, and the DTSC "Final Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air" dated October 2011. The installation procedures are summarized below:

Sub-slab vapor probes are installed to float in the concrete slab. The concrete slabs underlying the buildings are assumed to be up to 6 inches thick. Therefore, to install a sub-slab probe, a one-inch diameter hole in the concrete slab is drilled to a depth of approximately 3 inches using a rotary drill or equivalent equipment. Assuming that the hole does not penetrate the slab, the hole is vacuumed out to remove cuttings. The drill bit is then changed to 5/16-inch, and the hole is advanced approximately an additional 6 inches through the slab and into the underlying sub-slab material. The sub-slab vapor probe is assembled using a 2-inch long by ¼-inch inner-diameter (ID) stainless steel tube attached to an NPT ¼-inch ID brass or stainless steel threaded fitting and Swagelok cap or plug. This assembly is placed into the drilled hole, and grouted into place using Sakrete Bolt and Rail Cement (a non-shrinking, quick-setting cement). The cement installation is recessed so that the plug is accessible. The top of the plug is set flush with the top of the concrete slab. A schematic diagram of the sub-slab probe is presented on Figure C-1.

**Sampling Set-up**

The sub-slab probes are allowed to equilibrate for a minimum of two hours prior to sample collection. Mobilization for sub-slab sampling will not occur if measurable precipitation or site irrigation near the sampling location has occurred in the previous five days.

Prior to sampling, the sampling technician puts on a new pair of clean gloves, and the plug on the sub-slab probe is removed and quickly replaced with a closed Swagelok valve. A tee fitting is connected to two six-liter Summa canisters with a pressure gauge installed on each of these fittings.

---

[2] United States Environmental Protection Agency (2006), *Assessment of Vapor Intrusion in Homes Near the Raymark Superfund Site Using Basement and Sub-Slab Air Samples*, and

United States Environmental Protection Agency, *Draft Standard Operating Procedure for Installation of Sub-Slab Vapor Probes and Sampling Using EPA Method TO-15 to Support Vapor Intrusion Investigations*.

The two Summa canisters are connected by approximately 1 to 2 feet of tubing and a third tee fitting. The vacuum reading on each canister is confirmed and recorded before proceeding. The vacuum reading is expected to be 30 inches mercury ("Hg). On the downhole side of the third tee fitting, a 100 to 200-milliliter per minute (ml/min) flow regulator followed by a laboratory supplied particulate filter is installed. On the downhole side of the particulate filter, a vapor-tight valve is installed to connect the sampling equipment with the probe tube. A schematic drawing of the sub-slab sampling set-up is shown on Figure C-2.

**Leak Testing**

A vacuum test is conducted on the connections between the Summa canisters and the valve on the downhole side of the regulator for 10 minutes by opening and closing the purge canister valve to place a test vacuum on the assembly. Further work is terminated if gauge vacuum cannot be maintained for 10 minutes.

Additional leak testing is performed during the sub-slab vapor sampling by placing a shroud over the sampling assembly, and maintaining a helium-enriched atmosphere under the shroud. The shroud is emplaced after purging the vapor probe, but before the sample is collected. Using a helium canister and appropriate tubing and fittings, helium is injected under the shroud. A helium detector is used to monitor the helium-enriched environment beneath the shroud in "real time" until the sampling process is complete. Helium concentrations will be tabulated and included in the investigation report.

**Purging**

If the vacuum test is successful, purging is conducted. The purge canister valve and the valve on the downhole side of the particulate filter are opened and the time is recorded. The purge canister valve is closed after three volumes of air have been purged from the sample apparatus and borehole. The purge volume is calculated based on the internal volume of the tubing and probe apparatus. The amount of air purged is measured based on the time that the flow-control orifice is opened, with a flow rate of 100 to 200-ml/min, and based on a discernable vacuum drop on the purge canister pressure gauge. The time at which purging is terminated is recorded.

**Sampling**

Following purging, the sample Summa canister valve is opened to begin sample collection. The time at which sample collection begins is recorded.

The flow-control orifice is maintained at 100 to 200-ml/min, and is kept open until the sample Summa canister pressure gauge indicates approximately 5"Hg. At that point, the sample canister valve is closed and the time recorded. The tee fitting on the sample canister is replaced with a laboratory-supplied brass plug.

The sample canister is labeled and chain-of-custody maintained by recording: sample name, sample date, sample time, final vacuum, canister and flow controller serial numbers, initials of sample collector, and the compounds to be analyzed by the certified laboratory. The sample canisters are stored in a container that blocks sunlight to the opaque canister and does not subject the air-tight canister to changes in pressure and temperature. The sample canisters are delivered to the analytical laboratory via ground transportation under chain-of-custody documentation.

Sorbent tubes will be used to sample for some of the analytes. The procedure for sampling with a sorbent tube involves attaching a metered air sampling pump to one end of the sorbent tube, and attaching the other end to the sub-slab probe. The sampling pump is activated for a pre-determined period of time at a predetermined flow rate, to allow sufficient sample volume to sorb to the tube. Following sampling, the tube is sealed at both ends, labeled, and delivered to the laboratory via ground transportation under chain-of-custody documentation.

**Well Installation**

The boring for a small-diameter well is advanced using truck-mounted direct-push drilling equipment, with the boring advanced as described above for the soil borings. Drilling and sampling equipment is steam cleaned or cleaned with tri-sodium phosphate prior to and between uses.

During drilling, soils from each sample liner are examined. The onsite Trinity geologist logs the soils including a physical description of observed soil characteristics (i.e. moisture content, consistency, obvious odor, color, PID readings, etc.), drilling difficulty, and soil type as a function of depth in accordance with the USCS. Additional descriptive information denoted on the logs includes groundwater and well installation data.

Screening with the PID is performed at approximately two-foot intervals as described above. The PID readings are noted on the field logs.

In general, soil samples are preserved at changes in soil type, elevated PID readings or at a minimum of every 4 feet. Selected soil samples are retained in the acetate liners, and capped with Teflon sheeting and plastic end caps, labeled, and then placed in an ice-filled cooler for transport to the laboratory under chain-of-custody documentation.

Following the completion of the borehole, the boring is converted to a groundwater monitoring well constructed to monitor discrete water bearing strata. Well construction information is denoted on the boring logs. Groundwater monitoring well construction materials consists of 3/4-inch diameter flush-threaded Schedule 40 PVC casing and 0.020-inch factory-slotted screen with appropriate graded sand pack pre-installed across the screen interval, a bentonite and cement grout surface seal, a locking cap, and protective traffic-rated vault box.

**Well Development**

Well development is performed by alternately surging and bailing or pumping the well to remove sand and silt and to reduce turbidity. Typically a minimum of 10 casing volumes of water are removed during well development, while monitoring temperature, pH, and electrical conductivity of removed water. The water is placed into a 55-gallon drum for storage and disposal.

## Groundwater Sampling

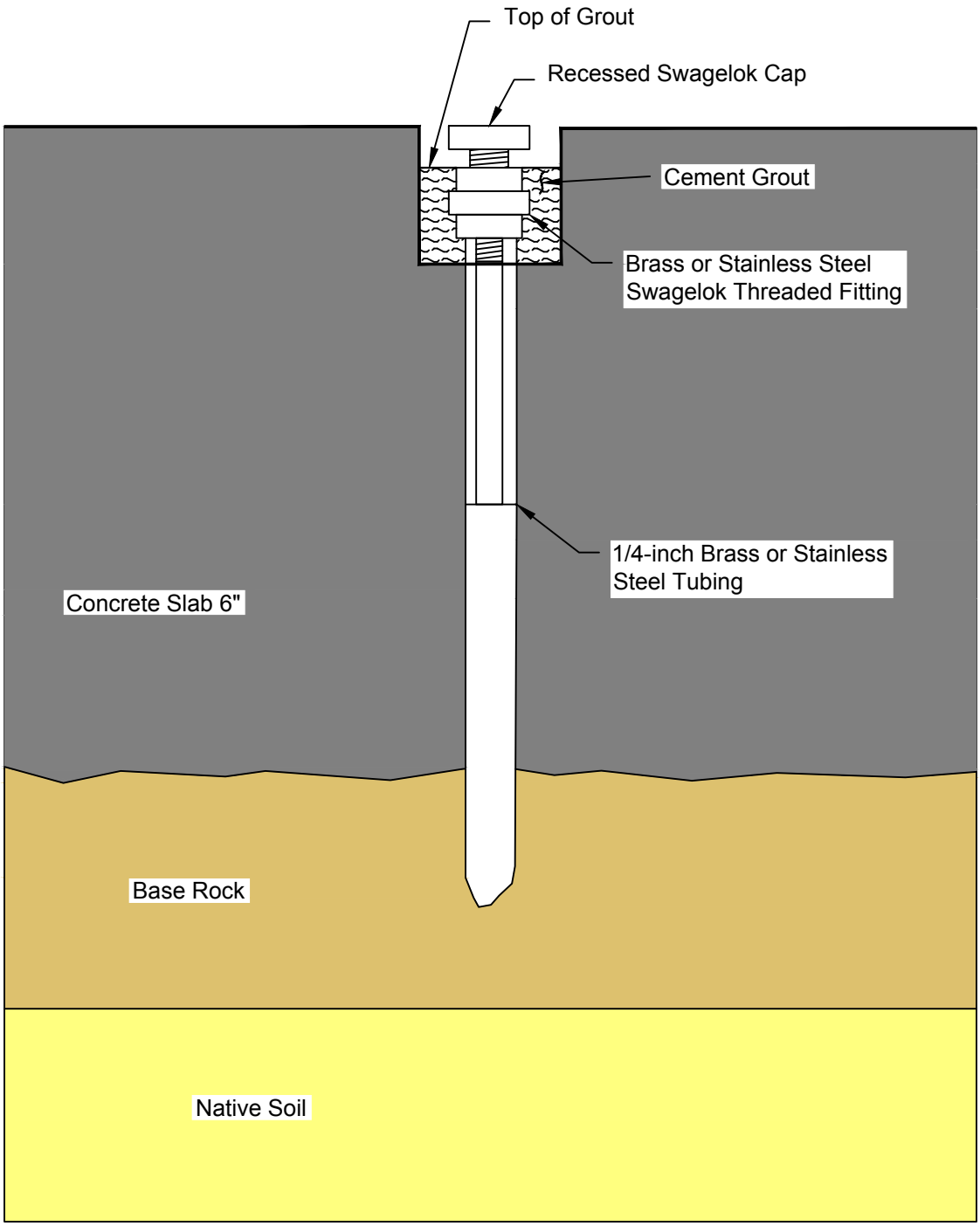
### Groundwater Level and Total Depth Determination

A water level indicator is lowered down the well and a measurement of the depth to water from an established reference point on the casing is taken. The indicator probe is used to sound the bottom of the well and a measurement of the total depth of the well is taken. Both the water level and total depth measurements are taken to the nearest 0.01-foot.

### Monitoring Well Purging and Sampling

Monitoring wells are purged by removing approximately three casing volumes of water from the well using a clean disposable bailer or electrical submersible purge pump equipped with a flow-through cell. Purge volumes are calculated prior to purging. During purging, the temperature, pH, and electrical conductivity of the purge water are monitored. Dissolved oxygen is also measured in the flow-through cell. The well is considered to be sufficiently purged when the three casing volumes have been removed; the temperature, pH, and conductivity values have stabilized to within 10% of the initial readings; and the groundwater being removed is relatively free of suspended solids. After purging, groundwater levels are allowed to stabilize to within 80% of the initial water level reading. A water sample is then collected from each well with a clean, disposable polyethylene bailer. If the well is bailed or pumped dry prior to removing the minimum amount of water, the groundwater is allowed to recharge. If the well has recharged to within 80% of the initial depth to water reading within two hours, the well will continue to be purged until the minimum volume of water has been removed. If the well has not recharged to at least 80% of the initial depth to water reading within two hours, the well is considered to contain formational water and a groundwater sample is collected. Groundwater removed from the well is stored in 55-gallon drums at the site and labeled pending disposal.

Groundwater samples are placed into laboratory-supplied containers appropriate for the analyses to be performed. For analysis for volatile organic compounds, samples are placed into 40-milliliter vials. The vial is tilted and filled slowly until an upward convex meniscus forms over the mouth of the vial. The Teflon™ side of the septum (in cap) is then placed against the meniscus, and the cap is screwed on tightly. The sample is then inverted and the bottle is tapped lightly to check for air bubbles. If an air bubble is present in the vial, the cap is removed and more sample is transferred from the bailer. The vial is then resealed and rechecked for air bubbles. The sample is then appropriately labeled and stored on ice from the time of collection through the time of delivery to the laboratory. The chain-of-custody form is completed to ensure sample integrity. Groundwater samples are transported to a state-certified laboratory and analyzed within the U.S. Environmental Protection Agency-specified hold times for the specified analytes.




REF. 154_001\154.003.001 fig C-1.dwg

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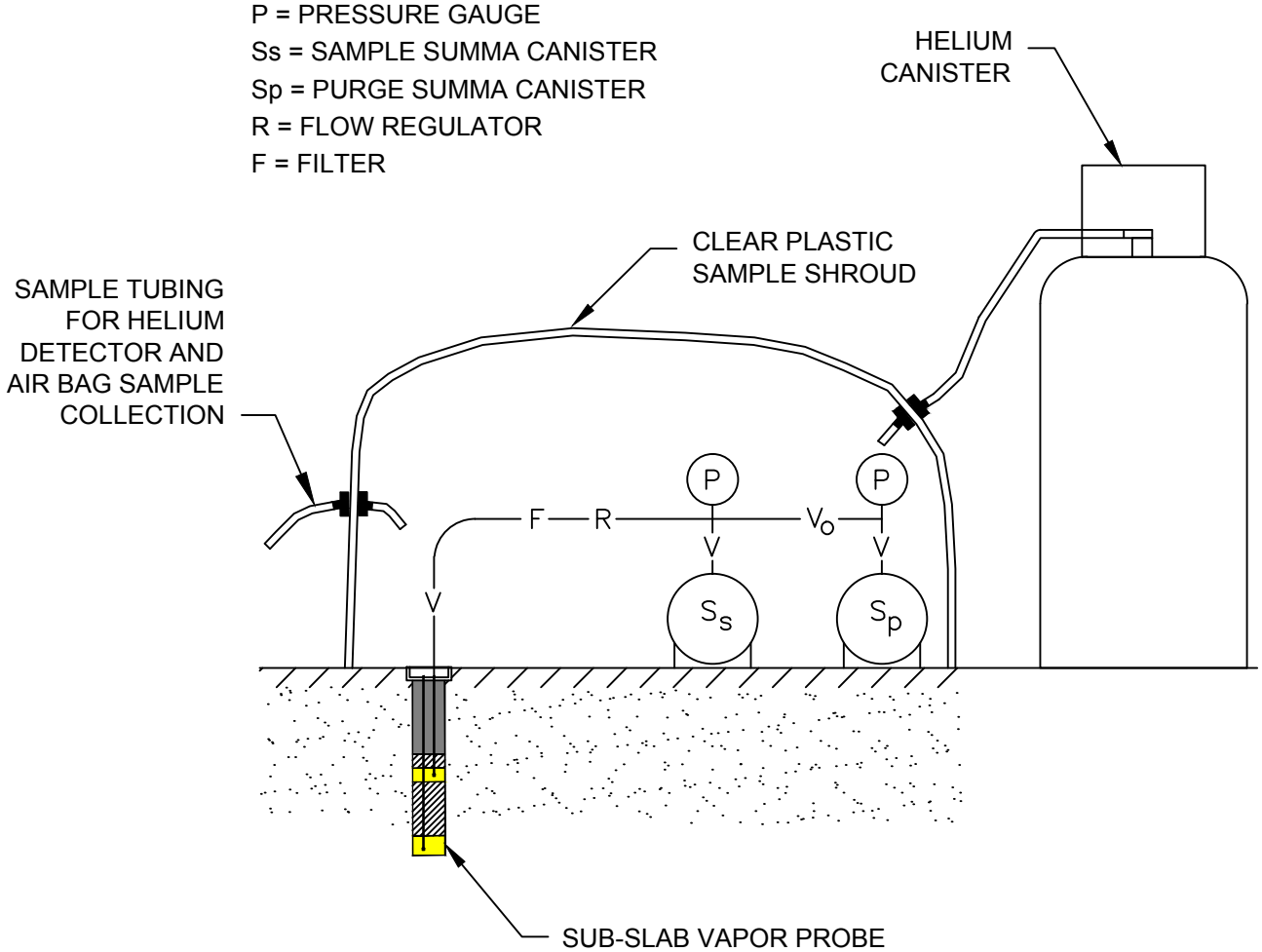
**SUB□SLAB □APOR PROBE SCHEMATIC**

ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT:
154.004.001

FIGURE:
C-1

V = VALVE
Vo = OPTIONAL VALVE
P = PRESSURE GAUGE
Ss = SAMPLE SUMMA CANISTER
Sp = PURGE SUMMA CANISTER
R = FLOW REGULATOR
F = FILTER




* USE SWAGELOK FITTINGS ON ALL CONNECTIONS

** ASSEMBLE SAMPLE APPARATUS AND LEAK TEST PRIOR TO MOBILIZING TO FIELD

REF. 154_001\154.003.001 fig C-2.dwg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**SUB-SLAB VAPOR SAMPLING EQUIPMENT SCHEMATIC**
ABF Freight System Facility
4575 Tidewater Ave.
Oakland, California

PROJECT: 154.004.001

FIGURE: C-2