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Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94205-6577

Re: Former Shell Service Station
461 8th Street
Oakland, California
SAP Code: 129453
Incident No. 97093399
ACHCSA Case No. 0343

RECEIVED

1:53 pm, Jun 10, 2008

Alameda County
Environmental Health

Dear Mr. Wickham:

The attached document is provided for your review and comment. Upon information and belief, I declare, under penalty of perjury, that the information contained in the attached document is true and correct.

If you have any questions or concerns, please call me at (707) 865-0251.

Sincerely,

Denis L. Brown
Project Manager



**CONESTOGA-ROVERS
& ASSOCIATES**

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June 9, 2008

Mr. Jerry Wickham
Alameda County Health Care Services Agency
1131 Harbor Bay Parkway, Suite 250
Alameda, California 94502-6577

Re: **Agency Response and Work Plan Addendum**
Former Shell Service Station
461 8th Street
Oakland, California
SAP Code 129453
Incident No. 97093399
ACHCSA Case No. 0343

Dear Mr. Wickham:

Conestoga-Rovers & Associates (CRA) prepared this document on behalf of Equilon Enterprises LLC dba Shell Oil Products US (Shell). Previously, CRA submitted a *Remedial Action Plan (RAP)* dated April 17, 2008 proposing interim remediation by excavation with a consideration for secondary remediation by insitu chemical oxidation (ISCO). The Alameda County Health Care Services Agency (ACHCSA) responded with technical comments in correspondence dated April 24, 2008. This document provides Shell's response to agency technical comments and an addendum to the work plan for interim remediation by insitu chemical oxidation (ISCO). A status update and schedule of activities is also included herein.

SITE BACKGROUND

The site is currently a paved parking lot located at the southwest corner of the intersection of 8th Street and Broadway in Oakland, California (Figures 1 and 2). The property was leased by American Oil Company from at least 1965 until 1972 when the lease was assigned to Shell Oil Products Company (Shell). A Shell service station operated on the property from 1972 to 1980. The underground storage tanks (USTs) associated with the former Shell service station were removed after Shell terminated operations at the site in May 1980. A summary of previous site details and environmental activities performed were presented in Attachment A of the April 14, 2008 *RAP*. The subject site is currently used as a paid public parking lot. The current property owners have submitted development plans and to the best of our knowledge, received approval from the City of Oakland Building Department to develop a mixed-use site consisting of multi-storied commercial and residential units with a subsurface parking area.

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AGENCY RESPONSE

Below are excerpts and paraphrasing of the itemized technical comments forwarded by ACHCSA in their April 24, 2008 response to CRA's April 17, 2008 *RAP* followed by our response.

1. Extent of Excavation: *ACHCSA requested that the excavation be extended to 25 feet below grade (fbg) and expanded to include borings B-10 and B-11.* In a telephone conversation on May 16, 2008, Shell discussed this issue with ACHCSA. To extend the excavation from the proposed depth of 20 fbg to 25 fbg would excessively increase the costs of the work due to shoring and equipment, and also would likely postpone the work due to availability. Shell requested that the excavation depth remain at 20 fbg, and that the impacted smear zone below 20 fbg be remediated by insitu treatment following the excavation work. The ACHCSA agreed to allow the excavation depth to remain at 20 fbg as proposed. Since soils in borings B-10 and B-11 were impacted only below the 20 fbg interval, expanding the excavation to include these borings is no longer warranted. The deeper soils at this site will be targeted for remediation by insitu treatment following excavation.

It should be noted that the limits of proposed excavation in the *RAP* were 20 feet by 60 feet, beginning at the property boundary along the sidewalk of Broadway. After reviewing the site conditions, the contractor determined that the shoring should be placed approximately 10 feet inside the property boundary to limit any potential damage to the sidewalk surface and also to maintain its' structural integrity. Since soil analytical data from boring B-23 and well S-14 did not indicate significant impact above 20 fbg, and due to sidewalk safety issues, the shoring will be placed such that the inside excavation limits will be approximately 20 feet by 50 feet (see Figure 3). Also, because of a change in proposed shoring contractors that could meet the aggressive field schedule, the entire excavation perimeter will be shored at one time, instead of in three stages as previously proposed. This will further expedite field activities.

2. Confirmation Soil Sampling: *The ACHCSA requested a modified sampling plan based on the proposed three stages of shoring and excavation and the extended depth:* Because of the modified shoring plan, all of the excavation work will proceed in one continuous effort, and the entire bottom of the excavation will be visible and accessible for sampling purposes. Based on the size of the excavation, the number of borings and soil samples from this area, and the known impacted soils remaining below 20 fbg, CRA proposes sampling the bottom of the excavation by obtaining one sample from every 100 square feet (or roughly 10 foot by 10 foot area). The proposed sample locations are depicted on Figure 4. Additional soil samples can be collected as requested by ACHCSA based on observations during the field work.



3. Well Replacement: *The ACHCSA requested a work plan for replacement of monitoring wells destroyed in advance of the excavation work.* Wells S-14, S-15, S-16, AS-1, and VP-1 were properly destroyed by grouting on May 23, 2008. Based on conversations between Shell and ACHCSA, a plan to conduct chemical oxidation activities after excavation and before backfilling was discussed. In order to conduct monitoring during the chemical oxidation activities, the ACHCSA requested that two monitoring wells and a vapor well be installed near the southern excavation boundary. On May 30, 2008, two groundwater monitoring wells (S-17 and S-18) and one vadose zone observation well (OW-1) were installed at the approximate locations shown on Figure 3. CRA followed the same procedures as previously performed for monitoring well installation at this site. Each well is constructed of 2 inch diameter schedule 40 PVC. S-17 and S-18 are screened with 0.020 inch slotted screen placed from 15-35 fbg, and OW-1 is screened with 0.020 inch slotted screen placed from 5-20 fbg. A complete report of installation will be submitted in accordance with the schedule proposed below. At this time, no additional monitoring wells are proposed for installation on site. Based on the completion of the interim remediation and subsequent monitoring, the need for additional wells will be evaluated.

4. Off-site Vapor Sampling: *The ACHCSA approved the plan to complete the installation of offsite vapor probes and requested a report be submitted by July 25, 2008.* At this time, Shell is continuing negotiations for access with the offsite property owner's legal representative. As soon as access is granted, a schedule for work and reporting will be provided to ACHCSA.

5. Vertical Delineation: *The ACHCSA requested a work plan to perform vertical delineation by advancing borings to 50 fbg in the southern portion of the site be submitted by June 10, 2008.* A work plan for vertical delineation will be prepared. However, in order to include any additional proposed work that may be deemed necessary following completion of the excavation and first ISCO application (discussed below), CRA requests an extension for submittal of the next work plan to July 15, 2008.

6. Long-Term Effectiveness of Remediation: *The long term effectiveness of the proposed excavation to meet remedial objectives has not been evaluated.* The work plan addendum (below) includes a plan for additional interim remediation by ISCO, and proposes a post-remediation monitoring program to assist with evaluating the effectiveness of the remediation and for making further recommendations as needed.



WORK PLAN ADDENDUM

Soils and groundwater at the site are impacted by petroleum hydrocarbons. Gasoline range petroleum hydrocarbons (TPHg) have been detected in wide groundwater at concentrations of up to 100,000 micrograms per liter ($\mu\text{g/L}$). Benzene has been detected at 2,000 $\mu\text{g/L}$. An area 20 feet by 50 feet will be excavated to 20 fbg to remove residual source-impacted soil from beneath the former product piping and pump islands. Rather than perform chemical oxidation by application into an open excavation as was discussed by Shell and ACHCSA, CRA's recommended approach for sites where TPHg and BTEX are to be treated by chemical oxidation is to install an injection system in the excavation and proceed with backfilling the excavation prior to treatment. This will allow the treatment to be performed without the open excavation safety concerns.

The piping for the injection system is to be 4-inch diameter PVC Schedule 40 minimum. The risers will be solid Schedule 40 PVC. The perforated sections may be sleeved with a non-cotton filter sock or wrapped with non-cotton filter material to prevent infiltration of the pea gravel or finer bank run gravel into the pipe through the perforations. A couple of inches of gravel will be placed beneath the piping. The gravel to be placed around the injection piping is to be coarse pea gravel or 1 inch average bank run gravel, and will extend to approximately 17 fbg. At approximately 17 fbg, a non-cotton filter fabric will be installed, with class II material placed compacted to 90% to 5 fbg, and to 95% to subgrade. The surface is scheduled for re-paving with asphalt upon completion of the backfilling activities.

The length of the horizontal pipe runs will be sized to fit the excavation, and are expected to be between 10 and 15 feet in length. There will be three riser pipes each having 4 horizontal pipes coming out in four directions from beneath the riser using tees. The 2 outer distribution pipes will resemble an "X" and the inner one will look like a "+". Each horizontal pipe will terminate at a 4 inch cap. The top of the riser should terminate at a threaded fitting with a threaded plug. The risers will be enclosed in flush-mount traffic-rated boxes of minimum 12-inch diameter. The proposed piping layout is included in Attachment A.

Based on CRA's review of the available data, dose estimates were prepared for ISCO treatment using Fenton's Reagent and sodium persulfate catalyzed with hydrogen peroxide. Treatment of the groundwater with Fenton's Reagent would require a dose of approximately 16,906 pounds (lbs) of hydrogen peroxide and 735 lbs of ferrous sulfate. For sodium persulfate treatment, 8,012 lbs of sodium persulfate and 1,150 lbs of hydrogen peroxide catalyst would be required. Based on the high TPHg levels and experience at similar sites, CRA intends to use sodium persulfate at this site.



Using sodium persulfate, a total of 4,800 gallons of 20% sodium persulfate and 1,380 gallons of 10% hydrogen peroxide will be applied. We recommend that this dose be divided and applied in three applications consisting of 460 gallons of 10% hydrogen peroxide followed by 500 gallons of chase water and then 1,600 gallons of 20% sodium persulfate during each injection event. Based on other sites and the usage rate of the chemicals, the optimum injection events would be one month apart.

Monitoring Plan: Monitoring will take place at 3, 6, and 9 months after the final injection event. Dissolved oxygen, pH, ORP, sulfate, VOCs (BTEX) and TPHg will be analyzed at each monitoring event. Since this corresponds with the existing quarterly monitoring program, all of the onsite wells will be analyzed for these parameters.

Site Health and Safety Plan: Pursuant to OSHA and Shell requirements, CRA will prepare a comprehensive site safety plan to protect site workers. The plan will be kept on site during field activities and will be reviewed and signed by each site worker. Air monitoring will be conducted using a photo-ionization detector (PID) during injection events. Appropriate PPE will be used to ensure that hydrogen peroxide solution does not come into contact with bare skin or the eyes as it can produce burns. If frothing, bubbling, or steam production occurs as hydrogen peroxide is injected, injection will be slowed or halted until the reaction subsides.

Data Evaluation/Reporting: Upon completion of the field pilot study, the data will be compiled and tabulated. The percent reduction of TPH as a result of the oxidation treatments will be calculated to assess the effectiveness of the tested oxidant. A report describing the tests conducted and results obtained will be prepared and submitted approximately 60 days following the final post-injection monitoring event. Periodic status updates will be provided in the ongoing quarterly groundwater monitoring reports for this site.



STATUS UPDATE AND SCHEDULE OF ACTIVITIES

1. The shoring activities were initiated on June 5, 2008 and will be followed by excavation and off hauling of the soil. Currently, the anticipated date for **sampling the bottom of the excavation is June 11, 2008.**
2. The offsite sub-slab vapor probes will be installed once access is granted; current report due date of July 25, 2008 unlikely since access not yet granted.
3. The report of findings for the destroyed wells (S-14, S-15, S-16, AS-1, and VP-1) and the recently installed wells (S-17, S-18, and OW-1) will be prepared and included with the report of excavation sampling activities. This document will be submitted approximately 60 days following completion of the excavation work (August 20, 2008).
4. If this plan is approved, we are tentatively scheduling the initial application of the chemical oxidants to the subsurface via the infiltration gallery piping the week of June 23-27, 2008, with subsequent events following monthly (July 21-25 and August 18-22, 2008). The quarterly groundwater monitoring program at this site will be adjusted such that monitoring occurs approximately 3, 6, and 9 months following the final injection (ie: November 2008, February and May 2009). A report of findings for the ISCO activities will be prepared and submitted approximately 60 days following completion of the third post-remediation monitoring event (July 30, 2009).



**CONESTOGA-ROVERS
& ASSOCIATES**

Mr. Jerry Wickham
June 9, 2008

CLOSING

We appreciate your cooperation and prompt response to this submittal. If you have any questions regarding this document, please contact Ana Friel at (707) 268-3812.

Sincerely,

Conestoga-Rovers & Associates



Ana Friel, P.G.

Alan Weston, PhD
Remedial Technologies Director

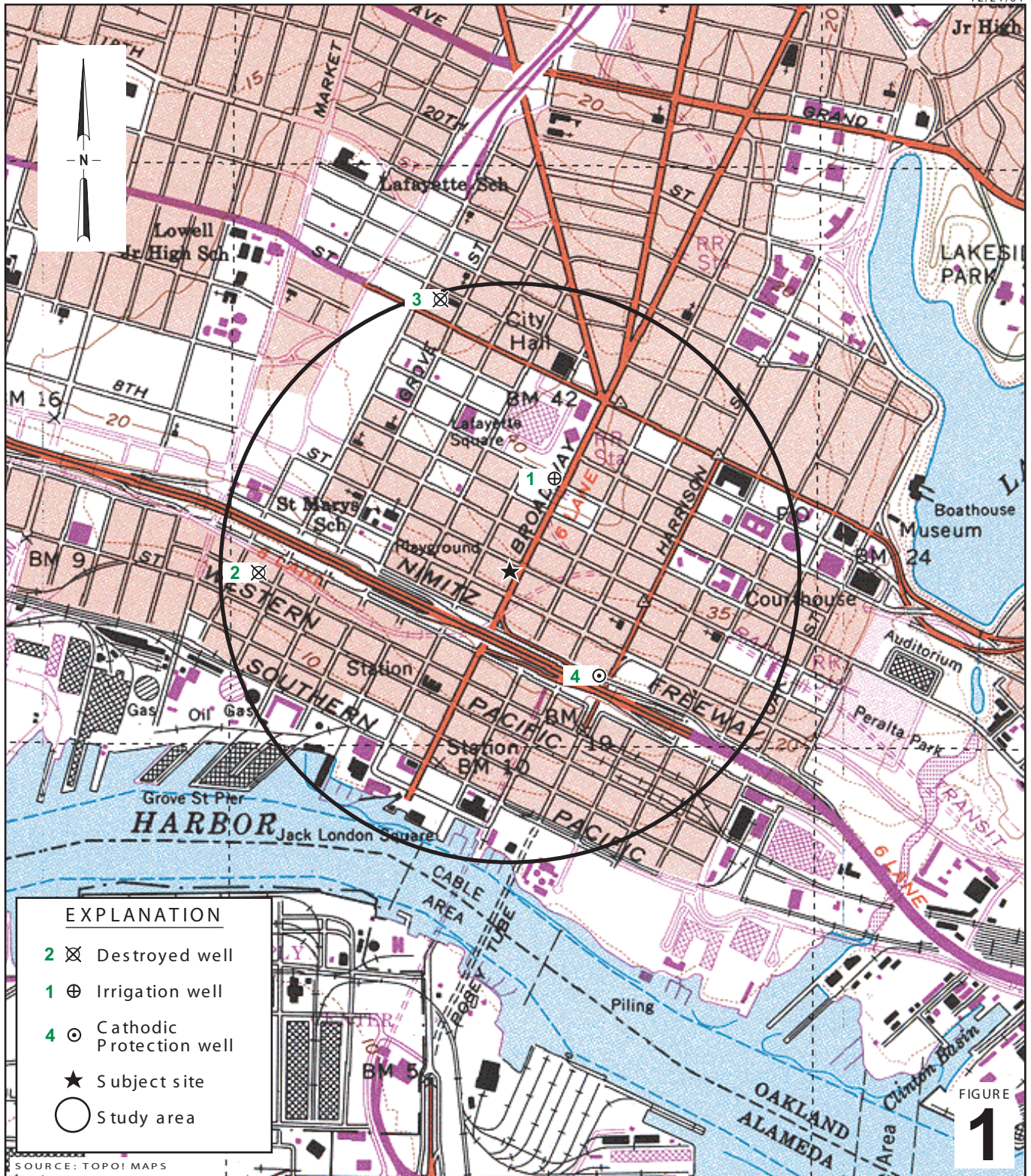
Figures: 1 – Vicinity Map
 2 – Site Plan
 3 – May 2008 Wells and Proposed Limits of Excavation
 4 – Proposed Excavation Sample Locations

Attachments: A – Injection Pipe Layout and Construction Diagram

cc: Denis Brown, Shell Oil Products US
 A.F. Evans Company (Property Owners), c/o Anye Spivey
 R. Casteel & Co.
 Leroy Griffin, City of Oakland Fire Prevention Bureau

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Former Shell Service Station
 461 8th Street
 Oakland, California

Vicinity Map

1/2 Mile Radius



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EXPLANATION

- Attempted soil boring location
 - Groundwater monitoring well
 - Air sparging well
 - Soil vapor probe
 - Abandoned monitoring well
 - Destroyed recovery well
 - Soil boring
 - Soil vapor boring
- Manhole
 - Flow line depth below ground surface
 - Flow direction indicator
 - Underground BART line (B)
 - Storm Drain line (SD)
 - Water line (W)
 - Sanitary Sewer line (SS)
 - Pacific Bell line (T)
 - Gas line (G)
 - Electrical line (E)

Note: Because well S-5 is located in confined space, it is no longer gauged or sampled

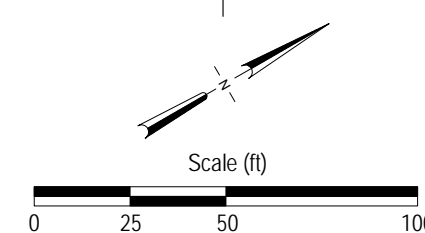
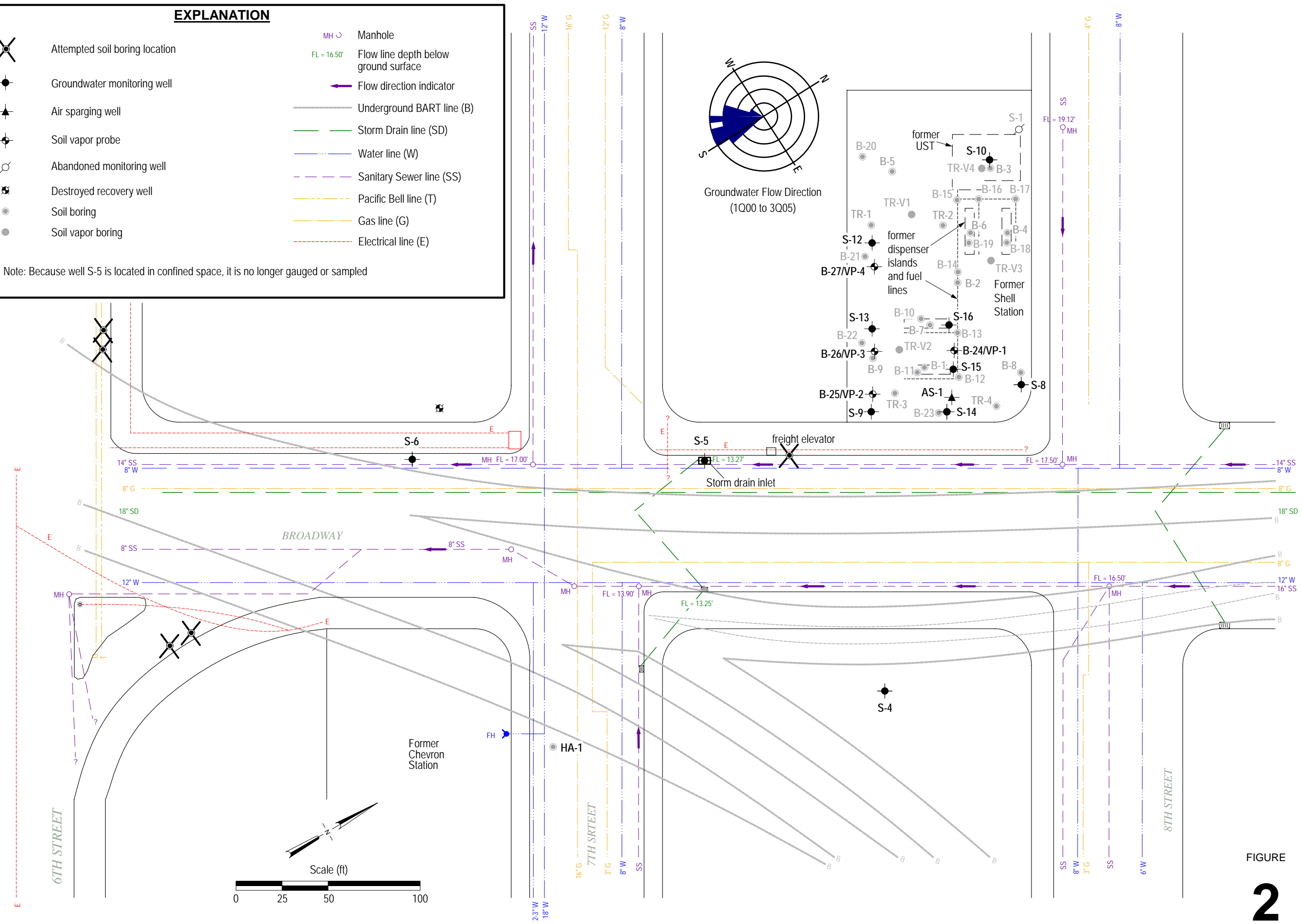
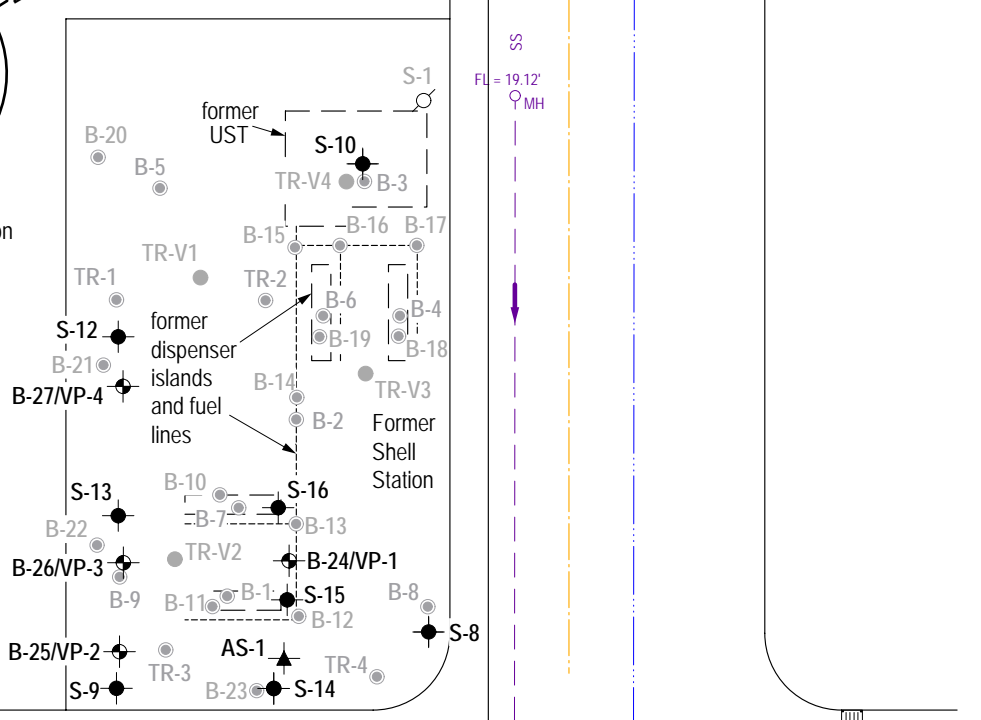
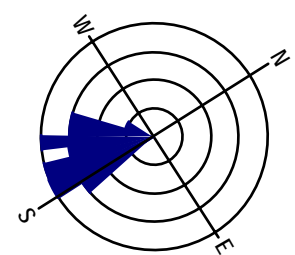








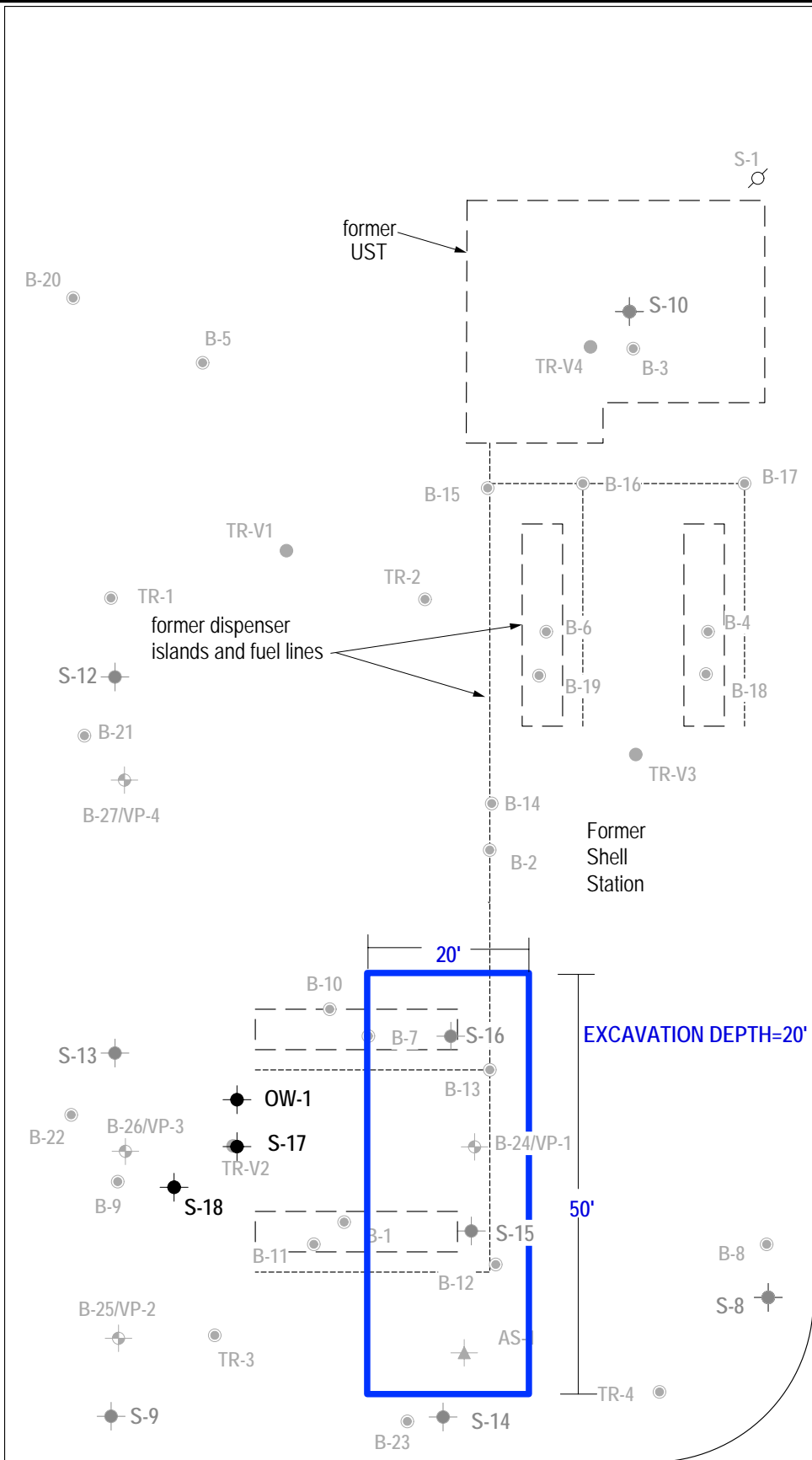
FIGURE
2



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EXPLANATION

-  Soil boring/soil vapor probe
-  Groundwater monitoring well
-  Air sparging well
-  Abandoned monitoring well
-  Soil boring
-  Soil vapor boring



7TH STREET

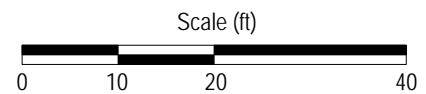
8TH STREET

BROADWAY

Storm drain inlet

freight elevator

S-5



FIGURE

3

May 2008 Wells and Proposed Limits of Excavation



Former Shell Service Station
 461 8th Street
 Oakland, California

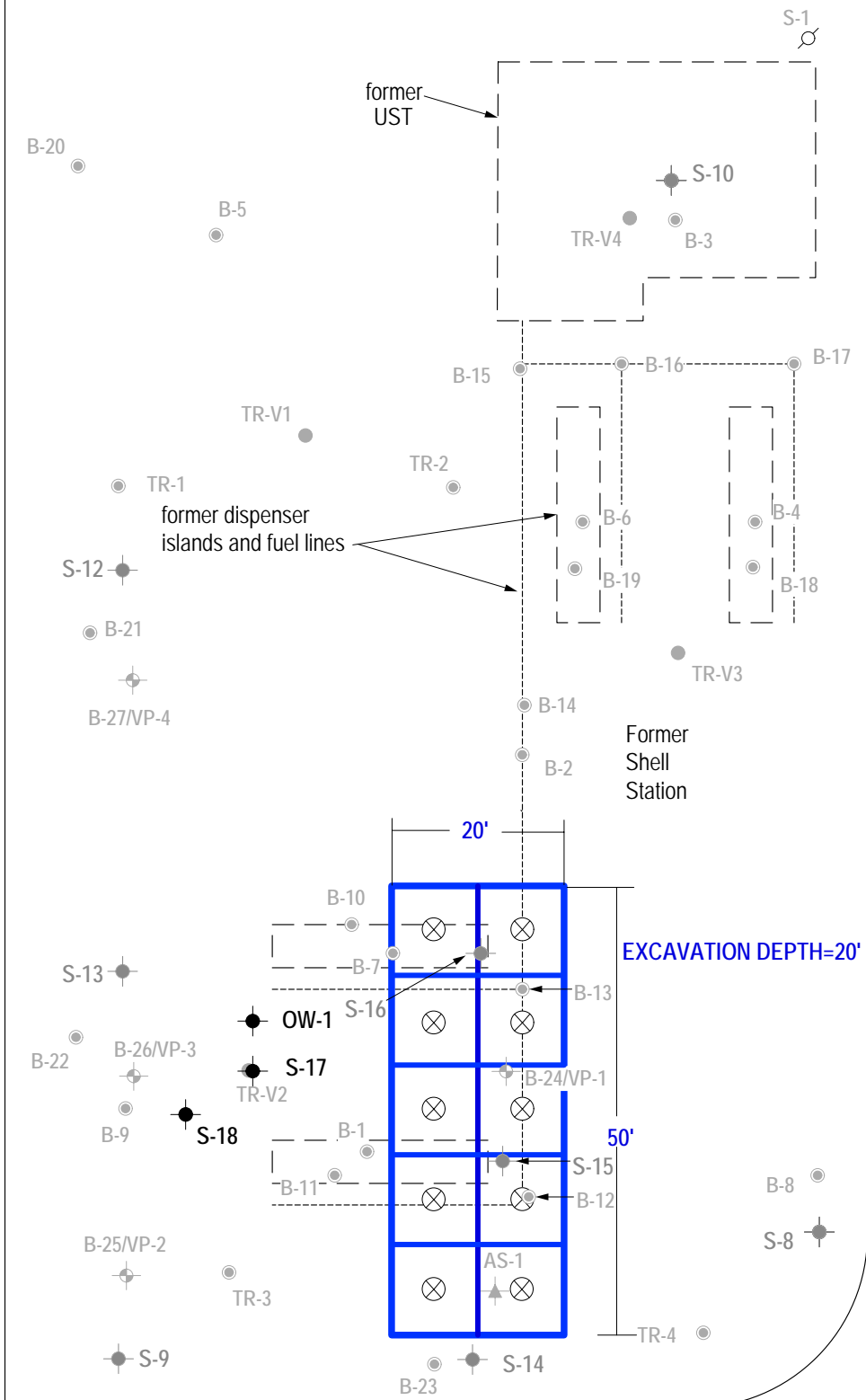
EXPLANATION

- ⊗ Proposed soil sample location
- ⊕ Soil boring/soil vapor probe
- Groundwater monitoring well
- ⬆ Air sparging well
- Abandoned monitoring well
- ⊙ Soil boring
- Soil vapor boring

7TH STREET

8TH STREET

BROADWAY



241501

S-5

Storm drain inlet

freight elevator

Scale (ft)



FIGURE

4

Proposed Excavation Sample Locations



Former Shell Service Station

461 8th Street
Oakland, California

ATTACHMENT A
INJECTION PIPE LAYOUT A

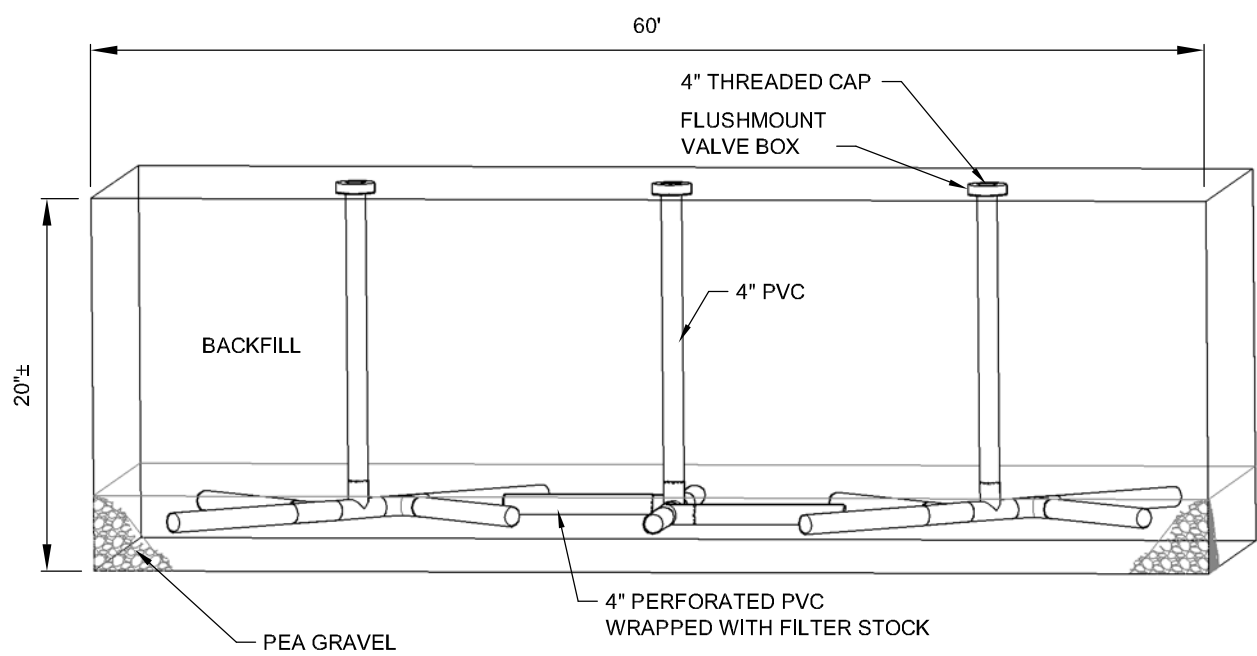
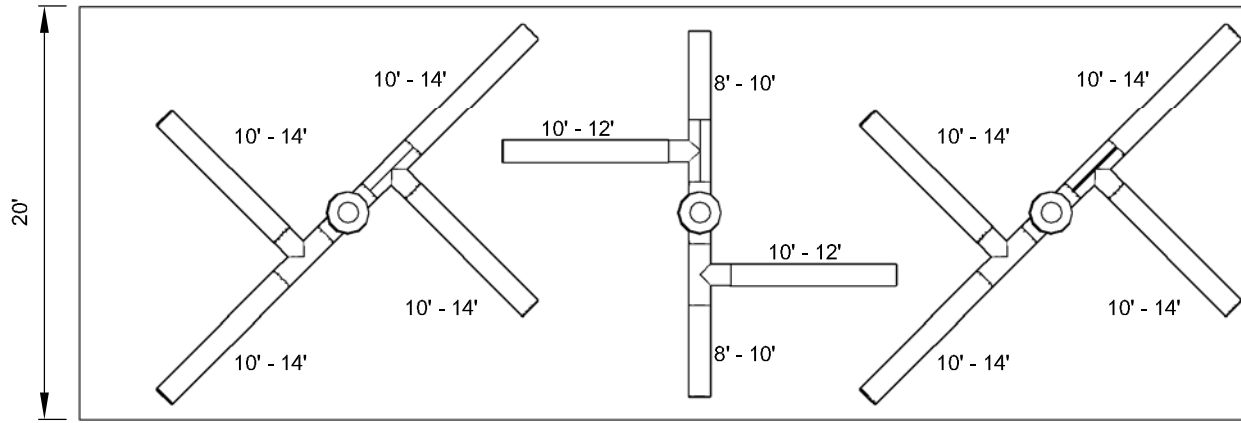


Figure 1
 INJECTION PIPE LAYOUT AND CONSTRUCTION
 ISCO TREATMENT
 FORMER SHELL SERVICE STATION
 461 8th Street, Oakland, California

